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AND SOCIAL SCIENCES, BRATISLAVA

Rehabilitation and Physiotherapy after COVID-19

**Rehabilitacja i fizjoterapia
po COVID-19**

**Rehabilitácia a fyzioterapia
po COVID-19**

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Topics 1

COVID-19

Post-COVID syndrome

NEUROLOGICAL COMPLICATIONS IN POSTCOVID AND POSTVACCINATION AGAINST COVID. PREVENTION, TREATMENT, REHABILITATION AND ARTIFICIAL INTELLIGENCE. REVIEW OF CASE REPORTS

NEUROLOGICKÉ KOMPLIKÁCIE PRI POST-COVIDE A PO OČKOVANÍ PROTI COVIDU. PREVENČIA, LIEČBA, REHABILITÁCIA A UMEĽÁ INTELIGENCIA. PREHĽAD PRÍPADOVÝCH SPRÁV

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Abstract

Introduction: This review emphasizes the importance of a multidisciplinary approach to the proper treatment of post-COVID-19 syndrome in general and neuropsychiatric post-COVID-19 symptoms in particular. They show a call for risk management and specialist involvement that can potentially support the reduction of those presenting with post-COVID-19 symptoms. During the clinical follow-up of patients after COVID-19, there must be a multidisciplinary approach, also with the simultaneous use of artificial intelligence, to guarantee coherent, integrative and holistic care.

Core of work: Prevention strategies must take into account the severity of the course of COVID-19, age, comorbidities and also gender, as women are more at risk of developing fatigue after COVID-19 and are also known for disorders such as anxiety, depression. The number of symptoms in the acute phase is also an important risk factor for the development of the syndrome after COVID-19, perhaps because this parameter could reflect the importance of the systemic response. In addition, systematic screening of neuropsychiatric symptoms in the acute phase of COVID-19 and targeting circadian dysfunction and encouraging physical activity in at-risk people could be effective ways to reduce neuropsychiatric symptoms after COVID-19. All of these very promising strategies should be studied further.

With reference to the high prevalence of post-COVID-19 syndrome, their high disease burden and economic impact on the labor market and social security systems, a positive evaluation of the intervention, the detection of possible adverse consequences and subsequent implementation could be of great importance for mental and public health as well as economic importance.

Conclusion: This review has highlighted several potential therapeutic strategies for post-COVID-19 symptoms that have emerged as a result of hypothesized mechanisms. Most of them are far from routine clinical practice. Without any clinical trial and validation, however, these therapeutics remain hypothetical and should be investigated in further clinical trials.

The hope that a multidisciplinary complex approach is effective in reversing some of the long-term consequences of not only the acute infection of COVID-19 but also the post-COVID-19 syndrome will bring useful results. We expect that the COVID-19 pandemic will further facilitate holistic and integrated systems of care for physical and mental health and provide a blueprint not only for the treatment of the post-COVID-19 syndrome, but also for the development and transformation of healthcare across all chronic, ongoing and long-term health conditions.

Keywords: Post COVID-19, post anti-COVID-19 vaccination, Neurological complications, prevention, treatment, virtual reality, rehabilitation, artificial intelligence.

Abstrakt

Úvod: V literárnom prehľade sa zdôrazňuje dôležitosť multidisciplinárneho prístupu k správnej liečbe post-COVID a postvakcinačného syndrómu vo všeobecnosti a špecificky neuropsychiatrických post-COVID-symptómov. Ukazuje výzvu na riadenie rizík a účasť špecialistov, ktorá môže potenciálne podporovať zníženie následkov, ktorí vykazujú post-COVID a postvakcinačne symptómy. Počas klinického sledovania pacientov po COVID-e musí byť použitý multidisciplinárny prístup, so súčasným využitím umelej inteligencie, aby sa zaručila koherentná, integrujúca a holistická starostlivosť.

Jadro práce: Stratégie prevencie musia brať do úvahy závažnosť priebehu COVID-19, vek, komorbidity, pohlavie, ženy sú viac ohrozené vývojom únavy, úzkosť, depresia. Počet symptómov v akútnej fáze je dôležitým rizikovým faktorom pre rozvoj syndrómu po COVID-19 možno preto, že tento parameter by mohol odrážať dôležitosť systémovej odpovede. Systematický skrining neuropsychiatrických symptómov v akútnej fáze COVID-19 a zameranie sa na cirkadiálnu dysfunkciu a povzbudzovanie fyzickej aktivity u rizikových ľudí môžu byť účinnými spôsobmi na zníženie neuropsychiatrických symptómov po COVID-19. Všetky tieto veľmi sľubné stratégie by sa mali ďalej študovať.

Vysoká prevalencia post-COVIDového a postvakcinačného syndrómu, záťaž chorobou, má ekonomický dopad na trh práce a systémy sociálneho zabezpečenia. Odhalenie nežiaducich následkov, pozitívne hodnotenie, liečba, následné zavedenie do praxe ma veľký význam pre duševné a verejné zdravie a ekonomiku. Preventívne a terapeutické stratégie majú ďaleko od rutínnej klinickej praxe. Bez klinického skúšania a overovania, zostávajú hypotetické a mali by sa preskúmať v ďalších klinických štúdiách.

Záver: Multidisciplinárny, komplexný prístup je účinný pri zvrátení dlhodobých následkov akútnej infekcie, postcovidového a postvakcinačného syndromu prinesie užitočné výsledky. Uľahčí holistické a integrované systémy starostlivosti o fyzické a duševné zdravie a poskytne

plán nielen pokiaľ ide o liečbu syndrómu po COVID-19, ale aj o rozvoj a transformáciu zdravotnej starostlivosti naprieč všetkými chronickými, pretrvávajúcimi a dlhodobými zdravotnými stavmi.

Keywords: Post COVID-19, Post vakcinácia proti COVID-19, Neurologické komplikácie, prevencia, liečba, virtuálna realita, rehabilitácia, umelá inteligencia.

Introduction

After two years of the pandemic, due to COVID-19, depression, anxiety, sleep disorders, and aggressiveness, patients with a history of stress and associated diseases are arising. Similar symptoms on the nervous and sensory systems after overcoming postcovid syndrome appear after vaccination, postanticovid vaccination syndrom. They have diverse neurological, sensory, psychiatric, post-traumatic, neurodegenerative, autoimmune disorders, and cognitive reduction functions (Šramka, et al., 2022). PCNS signs and symptoms that occur during or after infection in accordance with the *SARS-CoV-2* disease and persist longer than 12 weeks are not explained by an alternative diagnosis (Okrzeja, et al., 2023). In studying the effect on the nervous and sensory systems postcovid and postanticovid vaccination syndrom, it is necessary to distinguish between complications like hypoxic encephalopathy, acute neuropathy, including infectious, parainfectious and postinfectious encephalitis. Complications, hypercoagulable states, nervous, and cardiovascular system diseases, metabolic, immune, and endocrine system disorders. If primary COVID-19 is accompanied by alterations of smell and taste (Moein, et al., 2020), patients may have serious neurological, sensory, psychological and musculoskeletal disorders (Sramka, et al., 2020).

Nervous System Response to SARS-CoV-2 Infection

Patients after infection with *SARS-CoV-1* and middle east respiratory syndrome coronavirus (*MERS-CoV*) do not return to normal quality of life and experience neurological complications for years after an acute infection (Fotuhi, et al., 2020). They may have neurological, sensory, musculoskeletal and neuropsychiatric disorders (Duran, et al., 2021). Disorders of the frontal lobe of the brain are prevalent in individuals with encephalopathy (Rass, et al., 2021), 36.4 % of cases with COVID-19 have CNS disorders, 8.9 % PNS disorders, 10.7 % skeletal muscle symptoms (Collantes, et al., 2021), 28.8 % NCPM with COVID-19 higher risk of severe disability or death (Immovilli, et al., 2022). Guillain-Barré syndrome was the most common neurological disorder (21.8 %), NCPM (16.4 %), optic neuritis. They remain latent in the nervous system after SARS-CoV-2 and are able to reactivate (Jaafar, et al., 2022). The rapidly developing coronavirus disease pandemic was caused by severe acute respiratory *SARS-CoV-2* syndrome (Zhu, et al., 2019). associated with lung infection, leads to pneumonia, affected are cardiovascular, immune, gastrointestinal and nervous systems (Kakamed, et al., 2021).

Affinity for the human angiotensin-converting enzyme 2 receptor allows *SARS-CoV-2* to infect the nervous system. Receptor present in neural, glial cells, explains neurological symptoms, anosmia, peripheral neuropathy, brain disorders. In postmortem studies, *SARS-CoV-2* particles were identified in cerebrospinal fluid, cytoplasm, hypothalamus, and neocortex,

causing neuronal degeneration, edema, cellular infiltration, hyperplasia, and glial cell death. Research on an animal model confirmed that *SARS-CoV-2* enters the central nervous system through the olfactory bulb, a region of the brain, causing a perivascular inflammatory reaction, meningitis (Monroy-Gómez, et al., 2020). Postcovid syndrome is defined by the World Health Organization (WHO) as “a condition that occurs in patients with probable or confirmed *SARS CoV-2* infection, usually 3 months after the onset of the COVID-19 disease symptoms, and which lasts for at least 2 months, and cannot be explained by an alternative diagnosis” (World Health Organization, 2021).

The coronavirus is latent in the CNS for a long time, is capable of reactivation, and causes neurological problems (Monroy-Gómez, et al., 2020), includes symptoms associated with residual inflammatory reaction, organ failure, impact on existing diseases (Moreno-Pérez, et al., 2021). Secondary hypoxia, cytokine-related dysfunction and retrograde transit through the olfactory nerve bulb, can reactivate *SARS-CoV-2* (Kumar, et al., 2021). Careful, continuous monitoring of COVID-19 patients, asymptomatic, in the acute stage of the disease, with neurological symptoms, and through routine screening, requires contact between primary care physicians and neurologists so that they can be documented and analyzed (Wijeratne, et al., 2021). The ability of *SARS-CoV-2* to infect and replicate in the human brain was demonstrated by detection of genomic RNA and subgenomic RNA by polymerase chain reaction imaging methods of *SARS-CoV-2*, RNA and protein in CNS cells, and sequencing in CNS (Stein, et al., 2022). There is significant heterogeneity between brain regions, low concentrations of viral RNA indicate that *SARS-CoV-2* has a weak CNS tropism (Thakur, et al., 2021). *SARS-CoV-2* can occur in most areas of the nervous system, both hemispheres of the brain, brainstem, thalamus, sciatic nerves, except for the dura mater (Thakur, et al., 2021; Stein, et al., 2022).

The link between the infection and diseases of the nervous system is not clear. In clinical studies), 36.4 % of patients with COVID-19 had CNS symptoms, 8.9 % had peripheral nervous system symptoms (Collantes, et al., 2021). Neurological symptoms may not be related to CNS, PNS infection, they may be the result of a strong systemic reaction to COVID-19. Cases of meningitis and encephalitis associated with coronavirus disease suggests that *SARS-CoV-2* can directly attack the nervous system (Chen, et al., 2020). Acute symptoms of COVID-19, such as muscle pain, vertigo, headache, and concentration disorders may have a neurological cause and persist after the acute period (Gupta, et al., 2020; Singh, et al., 2020). Small emboli to the brain (Dixon, et al., 2020; Sawlani, et al., 2020), failure of the blood-brain barrier (Buzhdygan, et al., 2020; Crook, et al., 2020), inflammatory reactions in the CNS (Lee, et al., 2021) lead to coagulopathy, initiators of hospitalization, mechanical ventilation, sedatives and in long-term neurological problems (Lee, et al., 2021; Taquet, et al., 2021).

Syndrome includes psychiatric problems caused by social isolation, panic, and loss of family members (Taquet, et al., 2021). Stay in hospital, intensive care unit, duration of critical illness affects the occurrence of neuropsychiatric disorders after infection (Crook, et al., 2020). Chronic symptoms caused by a combination of physiological factors, coronavirus RNA can

persist in brain tissue, exacerbating neurodegeneration (Singh, et al., 2020; Najjar, et al., 2020; Wu, et al., 2020; Generoso, et al., 2021). Infiltration of innate immune cells associated with brain barrier failure can prolong neuroinflammatory processes (Generoso, et al., 2021). Injuries during acute illness, chronic exhaustion are associated with the development of neuropsychiatric disorders after infection, especially sleep difficulties (Morin, et al., 2021). Symptoms of the neurological and neuropsychiatric syndrome PCNS are exhaustion, cognitive disorders, brain fog, memory, concentration, and sleep disorders. Twelve weeks after the onset of the acute illness of COVID-19, they persist for a period of 3 – 6 months, more often half a year after infection (Taquet, et al., 2021; Estiri, et al., 2021).

Atrophy of the hippocampus and cerebral cortex (Generoso, et al., 2021; Poloni, et al., 2021; Solomon, et al., 2021), ischemic changes (Radnis, et al., 2020), small vessel disease (SVD) (Lowenstein, et al., 2020) develop as a result of inflammatory reactions and oxidative stress during COVID-19 (Generoso, et al., 2021; Huth, et al., 2021). The long-term effects of these processes can manifest as memory, concentration and cognitive impairments disorders, brain fog. Anosmia, loss of smell, dysgeusia, taste disturbances, headaches are symptoms of an acute illness of COVID-19, they often disappear. In patients during acute coronavirus disease with, anosmia and taste disorder, 68 % recovered their sense of smell, 70 % their taste after 2 months from the onset of symptoms (Nguyen, et al., 2021). Disorders polyneuropathy, myopathy, encephalopathy, post-infectious transverse myelitis, seizures, Parkinsonism, orthostatic hypotension associated with vasovagal syncope, strokes, neuro-ophthalmological problems, and were detected in patients at 12-week tracking (Rass, et al., 2021).

GBS has been occurring more frequently since the beginning of the epidemic, there is a link between SARS-CoV-2 infection and GBS (Gupta, et al., 2021). Most GBS patients with COVID-19 were parainfectious, while GBS after infection is rare (Maramattom, et al., 2021). After recovery from COVID-19, twelve cases of GBS were shown to link between COVID-19 and GBS progression during acute infection (Abolmaali, et al., 2021). The mechanism is the production of antibodies against the surface glycoproteins of SARS-CoV-2, which cause damage to peripheral nerves due to similar native protein forms (Gupta, et al., 2021), SARS-CoV-2 can cause stroke by invading vascular walls, coagulopathy due to endothelial inflammatory reactions, and damage to the heart by the formation of clots, destabilization of atheroma plates (Fraiman, et al., 2020).

Differential diagnoses

Stroke, thrombosis of cerebral veins, neurodegenerative diseases, encephalitis, encephalopathy, seizures, insomnia, anxiety, depression, post-traumatic stress disorder and other mental disorders in which MRI, CT, PET/CT can help in the differential diagnosis (Verger, et al., 2022; Baig, et al., 2022; StatPearls, et al., 2022). According to analyzes of SARS-CoV-1 and MERS, patients who returned to full health may have neurological sequelae years later (Fotuhi, et al., 2020). PCNS and PVCNS is one of the most significant long-term global public health problems that affects both hospitalized and non-hospitalized people.

Age over 65 years, chronic lung disease, heart disease, high blood pressure, adiposity and diabetes are important risk factors for PCNS (Nuzzo, et al., 2021). Despite recovery from the acute illness, we emphasize the necessity of monitoring all patients. (Sramka, et al., 2020 a; Sramka, et al., 2020 b; Sramka, et al., 2021).

At the beginning of the COVID-19 pandemic, there was information about loss of smell and taste, headaches, confusion, hallucinations, delirium, depression, anxiety, and sleep disorders. The *SARS-CoV-2* virus enters the brain along the olfactory nerve, it is neurotropic, and the symptoms are related to brain inflammation. Post-mortem MRI of the brain of patients with COVID-19 confirmed microvascular damage and leakage of fibrinogen into the brain. Blood clots, inflamed epithelium, disorders of the blood-brain barrier can contribute to brain damage with COVID-19. Inflammation changes the neurotransmitters in the brain – serotonin, norepinephrine, dopamine – that allow nerve cells to communicate. Patients with depression have high levels of inflammation. Acute cerebrovascular disease is a complication of COVID-19. Clinical symptoms of nervous system disease associated with COVID-19, Parkinson's disease, encephalopathy, encephalitis, neuropsychiatric, neurocognitive disorders, psychosis, and types of dementia, affective disorders (Varatharaj, et al., 2020), irritability, and confusion, disorders of consciousness, it is associated with seizures, psychotic symptoms, and renomination (Ellul, et al., 2020; Wong, et al., 2020).

Neurological symptoms after respiratory symptoms, cough, fever, are irritability, confusion, disturbances of consciousness, associated with seizures (Bernard-Valnet, et al., 2020; Sohal, et al., 2020), psychotic symptoms (Vollono, et al., 2020) and renomination (Wong, et al., 2020). Risks in patients due to severe acute respiratory syndrome *SARS-CoV-2* differ according to age and comorbidity. Encephalitis caused by infection or immune disorder has been described in connection with COVID-19 infection, encephalopathy, and changes in personality, behavior, cognition, disorders of consciousness, delirium coma (Slooter, et al., 2020). Acute disseminated encephalomyelitis, multifocal demyelination syndrome (Dugue, et al., 2020; Helms, et al., 2020; Mao, et al., 2020; Paniz-Mondol, et al., 2020; Zhou, et al., 2020), acute hemorrhagic necrotizing encephalopathy and myelitis (Zhao, et al., 2020). Diseases of the PNS in connection with COVID-19 are GBS, acute polyradiculopathy with progressive symmetric limb weakness, sensory disorders, and loss of facial nerve sensitivity, dysphagia, respiratory failure (Zhao, et al., 2020), ophthalmoplegia, ataxia and areflexia, acute vestibular syndrome, rhabdomyolysis, Miller Fisher syndrome.

In patients with encephalopathy and COVID-19 who do not have encephalitis, the cause may be hypoxia, medications, drugs, toxins, metabolic disorders. Patients with severe respiratory diseases experienced dizziness, headaches and impaired consciousness. Neurological symptoms with structural brain MRI changes were eight months after infection (Nuzzo, et al., 2021; Chen, et al., 2020; Carfi, et al., 2020). Neurological, neuropsychiatric disorders, anosmia, ageusia, dysgeusia, headache, muscle and joint pain, fatigue and brain fog persist for months (Rudroff, et al., 2020), leading to delirium, psychosis, inflammatory syndromes.

NCPM (Rudroff, et al., 2020; Morgul, et al., 2020; Satıcı, et al., 2020; Iadecola, et al., 2020), headaches, cognitive disorders, mental confusion, delirium, dementia (Liotta, et al., 2020). Encephalopathy occurs in older people with existing chronic diseases (Nuzzo, et al., 2021). Cognitive decline and dementia in persons older than 60 years with a predisposition to cerebrovascular diseases, arterial hypertension, diabetes, dyslipidemia have a higher risk of ischemic stroke during the disease of COVID-19 (Qureshi, et al., 2020), acute neuropathy and polyneuropathy, GBS, damage nerves with gradual loss of muscle strength, and affected respiratory muscles (Webb, et al., 2020). When walking, weakness of the lower limbs, lack of muscle strength of the pelvic girdle, skin hyperalgesia, drowsiness, malaise. Absence of movement in bed, immobilization, decrease in muscle mass, muscle strength, chronic fatigue, headaches, finger paresthesia, anxiety, depression.

The impact of post-COVID-19 on sensory disorders shows that inflammatory eye disease can be the first sign of COVID-19. Red eyes are also a symptom of emerging tumors of the eyes, orbit and auxiliary organs (Furdová, et al., 2020). Musculoskeletal disorders during the use of mobile devices during COVID-19 are a consequence of failure to maintain proper posture, as well as inappropriate working conditions when working at home (Mašán, et al., 2021; Golská, et al., 2021; Kerestéšová, et al., 2021). Patients with a severe form of COVID-19 have permanent feelings of physical and mental fatigue, muscle weakness, drowsiness, and lack of concentration and reduced cognitive functions. They perceive physical exhaustion and experience feelings of fatigue and lack of energy, which affect their daily life (Carfi, et al., 2020; Goertz, et al., 2020; Masan, 2020). GABA-ergic dysfunction explains apathy, fatigue and performance deficits (Orteli, et al., 2020), dysexecutive syndrome (Orteli, et al., 2020; Helms, et al., 2020). COVID-19 has a negative impact on motivational aspects and a direct correlation between apathy and depression has been found. In the acute phase of COVID-19, a hyper inflammatory state with a disorder of oxidative cellular stress developed, associated with complications of the central and peripheral nervous system (Masan, et al., 2021).

Altered mental status, psychosis, affective disorders, neurocognitive disorders (similar to dementia), headache, encephalitis, myelitis, myopathy, myositis, GBS, mononeuritis, multineuritis (Filosto, et al., 2020; Koralnik, et al., 2020; Romero-Sanchez, et al., 2020; Zhao, et al., 2020). Six months after symptom onset, patients developed fatigue, muscle weakness, sleep problems, anxiety and depression. In severe course of the disease, reduced lung diffusion capacity (Huang, et al., 2021). Hyper inflammation and endothelitis disrupt the blood-brain barrier of the brain (Najjar, et al., 2020). The virus increases hypercoagulability through mechanisms and interactions between thrombosis and inflammation (Wang, et al., 2020). Neurological syndrome after COVID-19 (PCNS) causes symptoms with prolonged muscle weakness and forms of myopathy (Wijeratnea, et al., 2020c). A study of SARS reported active central nervous system involvement and chronic fatigue four years after infection (Chan, et al., 2003; Lam, et al., 2009). In patients with encephalopathy and COVID-19, hypoxia, medications, drugs, toxins, and metabolic disorders may be the cause of worsening of the disorder. Patients with severe respiratory diseases, claimed dizziness, headaches and

disturbances of consciousness. (Sramka, et al., 2020). For doctors, COVID-19 is associated with sleep disorders, depression, anxiety, signs of severe post-traumatic stress disorder (Bo, et al., 2020). Even asymptomatic or mildly symptomatic patients experience long-term muscle pain, dizziness, headache, fatigue, anosmia for several months (Goërtz, et al., 2020). The neurotropism of *SARS-CoV-2* is unclear (Harapan, et al., 2021). Patients with a severe disease of COVID-19 need the care of a multidisciplinary team. Risks in *SARS-CoV-2* patients vary according to age and comorbidity. Infectious encephalitis, an immune disorder, has been described in association with COVID-19 infection. Diseases of the PNS in connection with COVID-19 are GBS with progressive symmetrical weakness of the limbs, sensory disorders, loss of sensitivity of the facial nerve, dysphagia, ophthalmoplegia, acute vestibular syndrome. Neurological symptoms with structural changes in brain MRI were present eight months after infection, neuropsychiatric disorders, anosmia, ageusia, dysgeusia, headache, muscle and joint pain, fatigue, brain fog can persist for months, lead to delirium, psychosis, inflammatory syndromes, NCPM, cognitive disorders, including mental confusion, delirium, dementia. Encephalopathy, changes in personality, behavior, cognition, disturbances of consciousness, delirium and coma occur in elderly people with existing chronic diseases. Cognitive decline and dementia, especially in people over 60 years of age with a predisposition to cerebrovascular diseases, arterial hypertension, diabetes, and dyslipidemia have a higher risk of ischemic stroke during the disease of COVID-19, GBS. They cause nerve damage with gradual loss of muscle strength, respiratory muscles are also affected. When walking, weakness of the lower limbs, lack of muscle strength of the pelvic girdle, skin hyperalgesia, drowsiness, malaise are present.

Absence of movement in bed and immobilization cause a decrease in muscle mass, muscle strength, chronic fatigue, headaches, finger paresthesia, anxiety and depression. On the MRI of the brain, there are hyperintense areas in the periventricular, subcortical white matter, in the center of the semioval. After five months, neurological disorders appeared along with depression and seizures (Nuzzo, et al., 2021). According to cardiologist *SARS-CoV-2* infection can cause heart problems in some people, including inflammation of the heart muscle (Abu-Rumeileh, et al., 2021). One recent study found that 60 % of people who recovered from COVID-19 still had symptoms of recurrent heart inflammation, which could lead to common symptoms such as palpitations, shortness of breath, and rapid heart rate. This inflammatory response was even observed in patients who had no previous comorbidities or were healthy individuals.

Case studies:

MRI CNS disturbances – coma, epileptic seizure. Figure 1 – 4.

We observed changes on MRI in a 56-year-old female patient. Two days after contact with COVID-19, she fell into a coma, had an epileptic seizure, and was put on pulmonary ventilation. MRI after one month: Infratentorially in the middle cerebellar peduncles and supratentorially,

predominantly in the paraventricular white matter, hyperintense areas with microvascular etiology are present on both sides on both sequences. GABA-ergic dysfunction explains apathy, fatigue, performance deficits, and dysexecutive syndrome. This study documents reduced GABA-ergic inhibition in patients who have recovered from COVID-19 with neurological complications and manifested fatigue and dysexecutive syndrome. Significance: TMS can serve as a diagnostic tool for cognitive disorders and fatigue in patients after COVID-19 (Versace, et al., 2023). COVID-19 has a negative impact on motivational aspects, a correlation was found between apathy and depression, psychosis, affective disorders, neurocognitive disorders, headache, encephalitis, Guillain-Barré syndrome. Six months after symptom onset, patients developed fatigue, muscle weakness, sleep problems, anxiety and depression. Previous SARS epidemics report involvement of the central nervous system and chronic fatigue even four years after infection. Asymptomatic or mildly symptomatic patients experience muscle pain, dizziness, headache.

(Figure 1). Repeated MRI after 3 months. **(Figure 2).** After intensive rehabilitation, sleep disturbance, general weakness, and fatigue persist. MRI image after 6 months **(Figure 3, 4).**

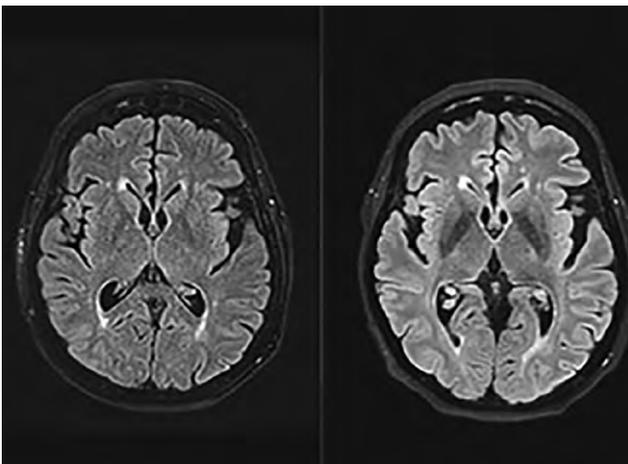


Figure 1. At the level of the basal ganglia.

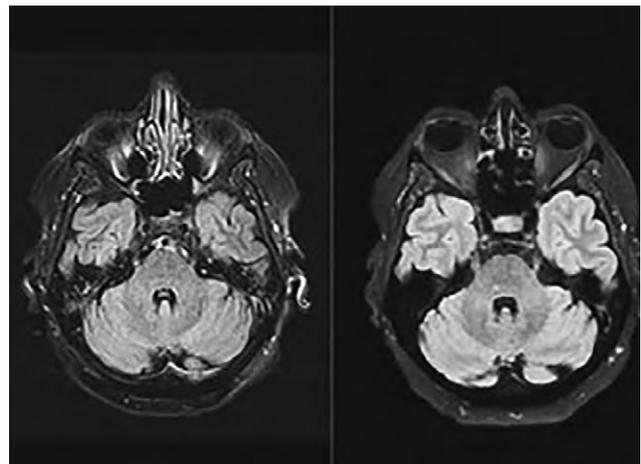


Figure 2. FLAIR sequence (T2 TIRM) at the level of the brainstem.

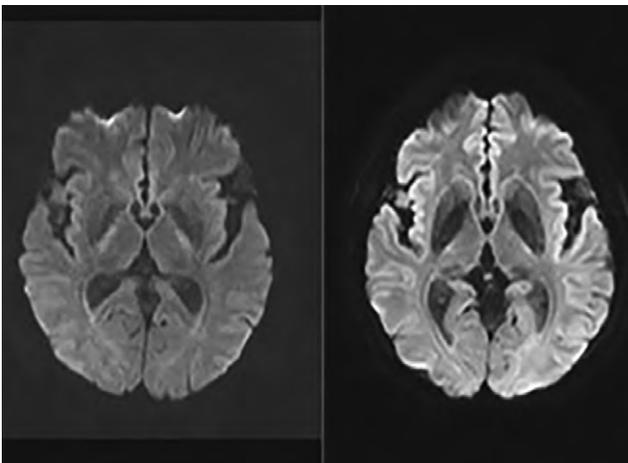


Figure 3. At the level of the basal ganglia.

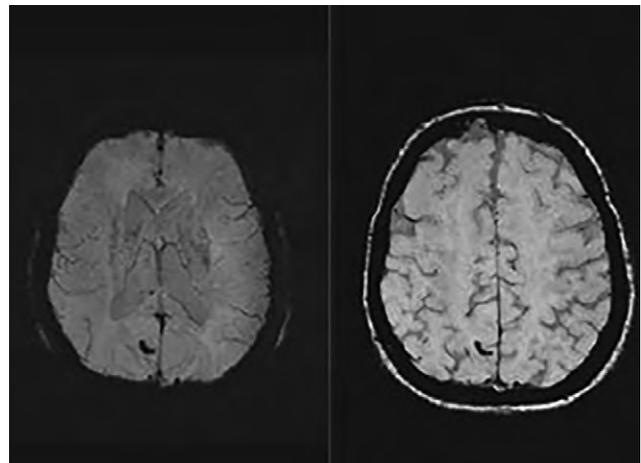


Figure 4. Above the ceiling of the lateral ventricles.

MRI disorders dizziness, disorders of balance, orientation in space Figure 5–6.

A 72-year-old patient with disorders of the vestibular apparatus, dizziness, disorders of balance, orientation in space, distinguished between peripheral and central disorders on MRI.

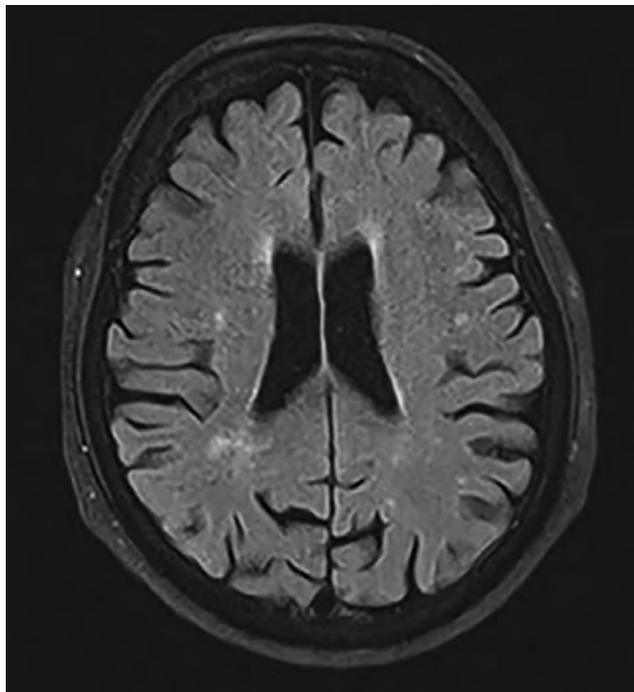


Figure 5. MRI examination.

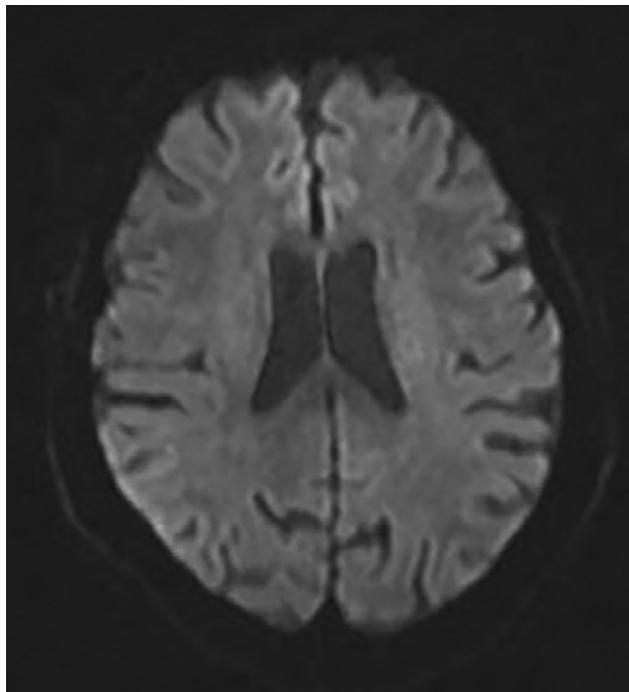


Figure 6. After 3 months of follow-up.

Virtual reality

An important role is played by rehabilitation using virtual reality (Samka, et al., 2022; Masan 2020; Ružický, et al., 2020; Ružický, et al., 2022). Virtual reality, as one of the possible rehabilitation methods, creates emotional changes that motivate the patient to rehabilitate. The virtual environment has a direct impact on the quality of individual rehabilitation movements and exercises (Ružický, et al., 2021; Estiri, et al., 2021; Filosto, et al., 2020). Patients prefer a realistically processed 3D scene in which they can move comfortably and concentrate directly on the activity being performed (Varela-Aldá, 2021). At the time of the pandemic crisis, telerehabilitation became an extremely useful tool for providing health care to patients.

The use of artificial intelligence in post-COVID-19 syndrome

Artificial intelligence can be used to predict the duration and consequences of the disease; machine learning algorithms were used to predict the consequences of COVID-19. Using artificial intelligence, they predicted the development of the pandemic based on records of infected patients and territories close to the development of the pandemic. In the treatment of the post-COVID-19 syndrome, parameters have been identified that can be measured to objectively assess the improvement of the patient's condition and to continue

the personalization of individual rehabilitation scenarios. In patients who completed the combined rehabilitation method with virtual reality, progress was observed in the ability to improve breathing, motor skills of the limbs and also cognitive functions of the patients (Ružický, et al., 2022; Lacko, et al., 2023). In electronic healthcare, there is use of artificial intelligence. (Ruzicky, et al., 2020; Šramka, et al., 2021). Cohort studies are able to provide evidence within a broad patient population. The COVID-19 pandemic emphasized the need for fast methods, with a focus on public health, informatics. On the basis of several studies, a theoretical model was proposed on how to increase the engagement of people in the period of COVID-19 and after it (De-la-Calle-Durán, et al., 2021). At the same time, methods do not sufficiently use the abilities of human thinking to solve problems that computers could not solve, just as the human brain is capable of making correct predictions. It is important to increase interest in new strategies and their combinations, to minimize the consequences of postcovid and postvaccination syndrome.

Compilation peer reviewed medical papers of covid vaccine injuries

More than 1,000 peer reviewed medical articles of covid vaccine injuries to various medical journals evidencing a multitude of adverse events in February 20, 2022 (Compilation: Peer Reviewed Medical papers of Covid Vaccine Injuries at all., Oct. 2023)

Myocarditis. Includes terms: Inflammatory Heart Reactions & Myocardial. Inflammation of the heart muscle (myocardium). The inflammation can reduce the heart's ability to pump and cause rapid or irregular heart rhythms (arrhythmias). Signs and symptoms of myocarditis include chest pain, fatigue, shortness of breath, and rapid or irregular heartbeats. In a small percentage of cases persons with myocarditis can be at risk of sudden death following strenuous activity. Some sufferers of myocarditis may require heart surgery or a heart transplant later in life (228 peer reviewed articles on covid vaccine injuries).

Thrombosis. Includes terms: Thrombotic & Thromboembolic & Thromboembolism. There are three categories of causes of thrombosis: damage to the blood vessel (catheter or surgery), slowed blood flow (immobility), and/or thrombophilia (if the blood itself is more likely to clot). (150 peer reviewed articles on covid vaccine injuries).

Thrombocytopenia. A condition in which there is a lower-than-normal number of platelets in the blood. It may result in easy bruising and excessive bleeding from wounds or bleeding in mucous membranes and other tissues. (116 peer reviewed articles on covid vaccine injuries).

Cerebral Venous Thrombosis. A type of stroke in which the venous channels of the brain become thrombosed, resulting in cerebral infarction in the areas corresponding to the thrombosis. (61 peer reviewed articles on covid vaccine injuries).

Vasculitis. Includes term: Microscopic polyangiitis. Inflammation of the blood vessels that causes changes in the blood vessel walls. When your blood vessel becomes weak, it might stretch and bulge (called an aneurysm). It might also burst open, causing bleeding. This can be life-threatening. (43 peer reviewed articles on covid vaccine injuries).

Guillain-Barré Syndrome. A neurological disorder in which the body's immune system mistakenly attacks part of its peripheral nervous system-the network of nerves located outside of the brain and spinal cord. GBS can range from a very mild case with brief weakness to nearly devastating paralysis, leaving the person unable to breathe independently. Fortunately, most people eventually recover from even the most severe cases of GBS. After recovery, some people will continue to have some degree of weakness. (43 peer reviewed articles on covid vaccine injuries).

Lymphadenopathy. Includes terms: Unilateral, Supraclavicular and Cervical. A disease affecting the lymph nodes where the sizes of the lymph can be affected. (35 peer reviewed articles on covid vaccine injuries).

Anaphylaxis. Includes term: Anaphylactoid. A severe. potentially life-threatening allergic reaction. (30 peer reviewed articles on covid vaccine injuries).

Myopericarditis. A complication of acute pericarditis, is characterized by extension of pericardial inflammation to the myocardium, which manifests as an elevated troponin level. It is generally evaluated and treated as acute pericarditis. (21 peer reviewed articles on covid vaccine injuries).

Allergic Reactions. Includes Term: Allergy. A condition in which the immune system reacts abnormally to a foreign substance. (20 peer reviewed articles on covid vaccine injuries).

Bell's Palsy. Includes Terms: Facial Paralysis & Facial Palsy. An unexplained episode of facial muscle weakness or paralysis. It begins suddenly and worsens over 48 hours. This condition results from damage to the facial nerve (the 7th cranial nerve). Pain and discomfort usually occur on one side of the face or head. (18 peer reviewed articles on covid vaccine injuries).

Axillary Adenopathy. Includes term: Adenopathy. Also called armpit lump. axillary lymphadenopathy occurs when your underarm (axilla) lymph nodes grow larger in size. While this condition may be concerning, it's usually attributed to a benign cause. It may also be temporary. (18 peer reviewed articles on covid vaccine injuries).

Pericarditis. swelling and irritation of the thin, saclike tissue surrounding your heart (pericardium). Pericarditis often causes sharp chest pain and sometimes other symptoms. The chest pain occurs when the irritated layers of the pericardium rub against each other. (15 peer reviewed articles on covid vaccine injuries).

Acute Myelitis. Includes Term Transverse Myelitis. An inflammation of the spinal cord which can disrupt the normal responses from the brain to the rest of the body, and from the rest of the body to the brain. Inflammation in the spinal cord, can cause the myelin and axon to be damaged resulting in symptoms such as paralysis and sensory loss. Myelitis is classified to several categories depending on the area or the cause of the lesion; however, any inflammatory attack on the spinal cord is often referred to as transverse myelitis. (15 peer reviewed articles on covid vaccine injuries).

Perimyocarditis. An acute inflammation of the pericardium and the underlying myocardium resulting in myocellular damage. It is usually asymptomatic with complete resolution in most cases. It can however lead to fulminant cardiac failure resulting in death or requiring cardiac transplantation. (10 peer reviewed articles on covid vaccine injuries).

Intracerebral Haemorrhage. Includes Term: Stroke. Intracerebral haemorrhage (bleeding into the brain tissue) is the second most common cause of stroke (15 – 30 % of strokes) and the most deadly. Blood vessels carry blood to and from the brain. Arteries or veins can rupture, either from abnormal pressure or abnormal development or trauma. (8 peer reviewed articles on covid vaccine injuries).

Immune-Mediated Hepatitis. Defined as an elevation in the patient's liver function tests that requires corticosteroids and that has no alternate etiology. (8 peer reviewed articles on covid vaccine injuries).

Facial Nerve Palsy. Patients cannot move the upper and lower part of their face on one side. (6 peer reviewed articles on covid vaccine injuries).

Neurological Symptoms. Includes Terms: Neurological Side Effects & Neurological Complications. Medically defined as disorders that affect the brain as well as the nerves found throughout the human body and the spinal cord. (6 peer reviewed articles on covid vaccine injuries).

Haemorrhage. Includes terms: cerebral. lobar. acral and retinal. The release of blood from a broken bloody vessel. either inside or outside the body. (6 peer reviewed articles on covid vaccine injuries).

Immune-Mediated Disease Outbreaks. Autoimmune diseases occur when the immune system produces antibodies that attack the body's own cells. There are many types, including Coeliac disease, lupus and Graves' disease. Although they can't be cured, there are various treatment options to manage the symptoms and reduce further damage to your body. (6 peer reviewed articles on covid vaccine injuries).

Takotsubo cardiomyopathy. A temporary heart condition that develops in response to an intense emotional or physical experience. It's also known as stress cardiomyopathy or broken heart syndrome. In this condition, the heart's main pumping chamber changes shape, affecting the heart's ability to pump blood effectively. Death is rare, but heart failure occurs in about 20 % of patients. Rarely reported complications include arrhythmias (abnormal heart rhythms), obstruction of blood flow from the left ventricle, and rupture of the ventricle wall. (5 peer reviewed articles on covid vaccine injuries).

Cardiac. Cardiac complications include myocardial injury, heart failure (HF), cardiogenic shock, multisystem inflammatory syndrome in adults, and cardiac arrhythmias including sudden cardiac arrest. (10 peer reviewed articles on covid vaccine injuries).

Rhabdomyolysis. A serious syndrome due to a direct or indirect muscle injury. It results from the death of muscle fibers and release of their contents into the bloodstream. This can

lead to serious complications such as renal (kidney) failure. This means the kidneys cannot remove waste and concentrated urine. In rare cases, rhabdomyolysis can even cause death. (5 peer reviewed articles on covid vaccine injuries).

Thrombotic Thrombocytopenic Purpura. A disorder that causes blood clots (thrombi) to form in small blood vessels throughout the body. These clots can cause serious medical problems if they block vessels and restrict blood flow to organs such as the brain, kidneys, and heart. (4 peer reviewed articles on covid vaccine injuries).

Cardiovascular events. Refer to any incidents that may cause damage to the heart muscle. (4 peer reviewed articles on covid vaccine injuries).

Acute Hyperactive Encephalopathy. Includes Terms: Acute Encephalopathy & Encephalitis. A general brain dysfunction due to significantly high blood pressure. Symptoms may include headache, vomiting, trouble with balance, and confusion. Onset is generally sudden. Complications can include seizures, posterior reversible encephalopathy syndrome, and bleeding, the back of the eye. (4 peer reviewed articles on covid vaccine injuries).

Acute Kidney Injury. A sudden episode of kidney failure or kidney damage that occurs within a few hours or a few days. (3 peer reviewed articles on covid vaccine injuries) peer reviewed articles on covid vaccine injuries).

Multiple Sclerosis. A potentially disabling disease of the brain and spinal cord (central nervous system). (4 peer reviewed articles on covid vaccine injuries).

Henoch-Schonlein Purpura. Affects the small blood vessels of the skin, joints, intestines and kidneys. It's most common before the age of seven but can affect anyone. A disorder causing inflammation and bleeding in the small blood vessels. (3 peer reviewed articles on covid vaccine injuries).

Bleeding Episodes. Major episodes include most joint bleeds, bleeding into large muscles, muscle bleeds with signs of compartment syndrome, life-threatening bleeds, and surgery. These usually require a 70–100 % correction and more than one infusion. The exact dose will depend on the individual and on HTC policy. (3 peer reviewed articles on covid vaccine injuries).

Cutaneous Adverse Effects. Also known as toxidermia, are skin manifestations resulting from systemic drug administration. These reactions range from mild erythematous skin lesions to much more severe reactions such as Lyell's syndrome. (3 peer reviewed articles on covid vaccine injuries).

Skin Reactions. An allergic reaction can cause rash, itching, burning, redness, bumps, hives, and swelling. (9 peer reviewed articles on covid vaccine injuries).

Vogt-Koyanagi-Harada syndrome. A rare disorder of unknown origin that affects many body systems, including the eyes, ears, skin, and the covering of the brain and spinal cord (the meninges). The most noticeable symptom is a rapid loss of vision. (2 peer reviewed articles on covid vaccine injuries).

Capillary Leak Syndrome. Includes Term: Systemic Capillary Extravasation Syndrome. A rare disorder by acute and severe recurrent attacks associated with a rapid fall in blood pressure as a result of fluid leaks from smaller vessels called capillaries. Attacks often last several days and require emergency care. They are sometimes life threatening. SCLS occurs most often in adults and the disease is very rare in children. (2 peer reviewed articles on covid vaccine injuries).

Systemic Lupus Erythematosus. An autoimmune disease in which the immune system attacks its own tissues, causing widespread inflammation and tissue damage in the affected organs. It can affect the joints, skin, brain, lungs, kidneys, and blood vessels. Treatment can help, but this condition can't be cured. (2 peer reviewed articles on covid vaccine injuries).

Petechiae. Includes: Petechial rash. Tiny purple, red, or brown spots on the skin. They usually appear on your arms, legs, stomach, and buttocks. You might also find them inside your mouth or on your eyelids. These pinpoint spots can be a sign of many different conditions – some minor, others serious. They can also appear as a reaction to certain medications. Though petechiae look like a rash, they're actually caused by bleeding under the skin. (2 peer reviewed articles on covid vaccine injuries).

Purpura Annularis Telangiectodes. An uncommon pigmented purpuric eruption, which is characterized by symmetrical, purpuric, telangiectatic, and atrophic patches with a predilection for the lower extremities and buttocks. (2 peer reviewed articles on covid vaccine injuries).

Pulmonary Embolism. Pulmonary embolism is a blockage in one of the pulmonary arteries in your lungs. In most cases, pulmonary embolism is caused by blood clots that travel to the lungs from deep veins in the leg or, rarely, from veins in other parts of the body (deep vein thrombosis). Because the clots block blood flow to the lungs, pulmonary embolism can be life-threatening. (2 peer reviewed articles on covid vaccine injuries).

Psoriasis. A chronic autoimmune condition that causes the rapid buildup of skin cells. This buildup of cells causes scaling on the skin's surface. Inflammation and redness around the scales is fairly common. Typical psoriatic scales are whitish-silver and develop in thick, red patches. Sometimes, these patches will crack and bleed. (4 peer reviewed articles on covid vaccine injuries).

Nephrotic Syndrome. Kidney disorder that causes your body to pass too much protein in your urine. Nephrotic syndrome is usually caused by damage to the clusters of small blood vessels in your kidneys that filter waste and excess water from your blood. (4 peer reviewed articles on covid vaccine injuries).

Bullous Drug Eruption. Refers to adverse drug reactions that result in fluid-filled blisters or bullae. Blistering may be localised and mild, or widespread and severe, even life-threatening. (2 peer reviewed articles on covid vaccine injuries).

Hemophagocytic Lymphohistiocytosis. An aggressive and life-threatening syndrome of excessive immune activation. It most frequently affects infants from birth to 18 months of age, but the disease is also observed in children and adults of all ages. (2 peer reviewed articles on covid vaccine injuries).

Pulmonary Embolism. Pulmonary embolism is a blockage in one of the pulmonary arteries in your lungs. In most cases, pulmonary embolism is caused by blood clots that travel to the lungs from deep veins in the legs or, rarely, from veins in other parts of the body (deep vein thrombosis). Because the clots block blood flow to the lungs, pulmonary embolism can be life-threatening. (6 peer reviewed articles on covid vaccine injuries).

Blood Clots. A gelatinous mass of fibrin and blood cells formed by the coagulation of blood. (1 peer reviewed articles on covid vaccine injuries).

Thrombophilia. A blood disorder that makes the blood in your veins and arteries more likely to clot. This is also known as a hypercoagulable condition because your blood coagulates or clots more easily. (1 peer reviewed articles on covid vaccine injuries).

iTTP episode. A rare, life-threatening thrombotic microangiopathy caused by severe ADAMTS13 (a disintegrin and metalloproteinase with thrombospondin, motifs 13) deficiency, recurring in 30 – 50 % of patients. (1 peer reviewed articles on covid vaccine injuries).

Refractory Status Epilepticus. Can be defined as status epilepticus (seizures) that continues despite treatment with benzodiazepines and one antiepileptic drug. RSE should be treated promptly to prevent morbidity and mortality; however scarce evidence is available to support the choice of specific treatments. (1 peer reviewed articles on covid vaccine injuries).

Central Serous Retinopathy. A medical condition where fluid builds up behind the retina in the eye. It can cause sudden or gradual vision loss as the central retina detaches. This central area is called the macula. (1 peer reviewed articles on covid vaccine injuries).

Cutaneous Reactions. A group of potentially lethal adverse drug reactions that involve the skin and mucous membranes of various body openings such as the eyes, ears, and inside the nose, mouth, and lips. (1 peer reviewed articles on covid vaccine injuries).

Prion Disease. Prion diseases comprise several conditions. A prion is a type of protein that can trigger normal proteins in the brain to fold abnormally. Prion diseases or transmissible spongiform encephalopathies (TSEs) are a family of rare progressive neurodegenerative disorders that affect both humans and animals. They are distinguished by long incubation periods. Characteristic spongiform changes associated with neuronal loss, and a failure to induce inflammatory. (1 peer reviewed articles on covid vaccine injuries).

Pregnant Woman. Characteristic spongiform changes associated with neuronal loss, and a failure to induce inflammatory. (1 peer reviewed articles on covid vaccine injuries).

Process-Related Impurities. Characteristic spongiform changes associated with neuronal loss, and a failure to induce inflammatory. (1 peer reviewed articles on covid vaccine injuries).

CNS Inflammation. A disease that causes inflammation of the small arteries and veins in the brain and/or spinal cord. The brain and spinal cord make up the CNS. Intense Interest in Inflammation In the CNS has arisen from Its potential role In diseases including acute brain Injury. stroke, epilepsy, multiple sclerosis. motor neurone disease, movement disorders and Alzheimer’s disease, and more recently some psychiatric disorders. (1 peer reviewed articles on covid vaccine injuries).

CNS Demyelination. A demyelinating disease is any condition that results in damage to the protective covering (myelin sheath) that surrounds nerve fibers in your brain. optic nerves and spinal cord. When the myelin sheath is damaged. nerve impulses slow or even stop, causing neurological problems. (1 peer reviewed articles on covid vaccine injuries).

Orofacial. An orofacial myofunctional disorder (OMO) is when there is an abnormal lip, jaw, or tongue position during rest, swallowing or speech. (1 peer reviewed articles on covid vaccine injuries).

Brain Haemorrhage. Includes Term: Lobar Hemorrhage. An emergency condition in which a ruptured blood vessel causes bleeding inside the brain. (1 peer reviewed articles on covid vaccine injuries).

Varicella Zoster Virus. The varicella-zoster virus (VZV) is so named because it causes two distinct illnesses: varicella (chickenpox), following primary infection. and herpes zoster (shingles), following reactivation of latent virus. Varicella is a highly contagious infection with an incubation period of 10–21 days, most commonly 14–16 days, after which a characteristic rash appears. Acute varicella may be complicated by secondary bacterial skin infections, haemorrhagic complications, cerebellar is, encephalitis, and viral and bacterial pneumonia. (1 peer reviewed articles on covid vaccine injuries).

Nerve and Muscle Adverse Events. Many different possible neurologic adverse events including encephalitis, myelopathy, aseptic meningitis, meningoradiculitis, Guillain-Barré like syndrome. peripheral neuropathy (including mononeuropathy, mononeuritis multiplex. and polyneuropathy) as well as myasthenic syndrome. (1 peer reviewed articles on covid vaccine injuries).

Oculomotor Paralysis. Defines the decreased strength of a muscle, which produces a reduced rotational movement of the eyeball in the direction corresponding to the paralysed muscle. Partial deficit is called paresis. while full deficit is called paralysis. (1 peer reviewed articles on covid vaccine injuries).

Parsonage-Turner Syndrome. An neurological disorder characterized by rapid onset of severe pain in the shoulder and arm. This acute phase may last for a few hours to a few weeks and is followed by wasting and weakness of the muscles (amyotrophy) in the affected areas. (1 peer reviewed articles on covid vaccine injuries).

Acute Macular Neuroretinopathy. A rare, acquired retinal disorder characterised by transient or permanent visual impairment accompanied by the presence of reddish brown,

wedge-shaped lesions in the macula. the apices of which tend to point towards the fovea. (1 peer reviewed articles on covid vaccine injuries).

Lipschutz ulcers (Vaginal ulcers). Acute genital ulceration, also known as “Lipschutz ulcers” or “ulcus vulvae acutum,” is an uncommon, self-limited, non sexually transmitted condition characterized by the rapid onset of painful, necrotic ulcerations of the vulva or lower vagina. (1 peer reviewed articles on covid vaccine injuries).

Amyotrophic Neuralgia. A disorder characterized by episodes of severe pain and muscle wasting (amyotrophy) in one or both shoulders and arms. Neuralgic pain is felt along the path of one or more nerves and often has no obvious physical cause. (1 peer reviewed articles on covid vaccine injuries).

Polyarthralgia. Pain in multiple joints. Symptoms may include pain, tenderness. or tingling in the joints and reduced range of motion. Polyarthralgia is similar to polyarthritis, but it doesn’t cause inflammation. Lifestyle changes, home remedies and medication can help manage the symptoms. (1 peer reviewed articles on covid vaccine injuries).

Thyroiditis. The swelling, or inflammation, of the thyroid gland and can lead to over-or under-production of thyrod hormone. A thyroid storm-or thyroid crisis – can be a life-threatening condition. It often includes a rapid heartbeat, fever, and even fainting, Symptoms may include pain in the throat. feeling generally unwell swelling of the thyroid gland and, sometimes, symptoms of an overactive thyroid gland or symptoms of an under active thyroid gland. (1 peer reviewed articles on covid vaccine injuries).

Keratolysis (Corneal Melting). A common prelude to the development of corneal perforation. This process occurs from conditions such as infections, sterile inflammation, or surgical/ chemical injury to the cornea. Collectively, these conditions are a significant cause for blindness world-wide. (1 peer reviewed articles on covid vaccine injuries).

Arthritis. The swelling and tenderness of one or more joints. The main symptoms of arthritis are Joint pain and stiffness. which typically worsen with age. The most common types of arthritis are osteoarthritis and rheumatoid arthritis. (1 peer reviewed articles on covid vaccine injuries).

Thymic hyperplasia. A condition in which the thymus gland is inflamed. It is often accompanied by autoimmune diseases such as systemic lupus erythematosus, myasthenia gravis and rheumatoid arthritis. (1 peer reviewed articles on covid vaccine injuries).

Tolosa-Hunt Syndrome. A rare disorder characterized by severe periorbita, headaches, along with decreased and painful eye movements (ophthalmoplegia). Symptoms usually affect only one eye (unilateral). In most cases. affected individuals experience intense sharp pain and decreased eye movements. (1 peer reviewed articles on covid vaccine injuries).

Hailey-Hailey Disease. Also known as benign chronic pemphigus, is a rare skin condition that usually appears in early adulthood. The disorder is characterized by red, raw, and blistered

areas of skin that occur most often in skin folds, such as the groin, armpits, neck. and under the breasts. (1 peer reviewed articles on covid vaccine injuries).

Acute Lympholysis. The destruction of lymph cells. (1 peer reviewed articles on covid vaccine injuries).

Interstitial Lung Disease. Describes a large group of disorders, most of which cause progressive scarring of lung tissue. The scarring associated with interstitial lung disease eventually affects your ability to breathe and get enough oxygen into your bloodstream. (1 peer reviewed articles on covid vaccine injuries).

Vesiculobullous Cutaneous Reactions. A vesiculobullous lesion of the skin encompasses a group of dermatological disorders with protean clinicopathological features. They usually occur as a part of the spectrum of various infectious, inflammatory, drug-induced, genetic, and autoimmune disorders. (1 peer reviewed articles on covid vaccine injuries).

Hematologic Conditions. Disorders of the blood and blood-forming organs. (1 peer reviewed articles on covid vaccine injuries).

Hemolysis. The destruction of red blood cells. (1 peer reviewed articles on covid vaccine injuries).

Headache. The destruction of red blood cells. (1 peer reviewed articles on covid vaccine injuries).

Acute Coronary Syndrome. Any condition brought on by a sudden reduction or blockage of blood flow to the heart. (1 peer reviewed articles on covid vaccine injuries).

ANCA Glomerulonephritis. The term we use when ANCA vasculitis has affected or involved the kidneys, and when this happens there is inflammation and swelling in the kidney filters, meaning that the body's own immune system injures its cells and tissues. (1 peer reviewed articles on covid vaccine injuries).

Neurologic Phantosmia. An olfactory hallucination perceived when no odorants are present. Both the olfactory distortions are typically described as unpleasant. (1 peer reviewed articles on covid vaccine injuries).

Uveitis. Includes terms: bilateral. A form of eye, inflammation. It affects the middle layer of tissue in the eye waif (uvea). uveitis warning signs often come on suddenly and get worse quickly. They include eye redness, pain and blurred vision. (1 peer reviewed articles on covid vaccine injuries).

Pathophysiologic Alterations. Deranged function in an individual or an organ due to a disease. For example, a pathophysiologic alteration is a change in function as distinguished from a structural defect. (1 peer reviewed articles on covid vaccine injuries).

Inflammatory Myositis. Inflammatory myopathies are a group of diseases that involve chronic (long-standing) muscle inflammation, muscle weakness, and, in some cases, muscle pain. Myopathy is a general medical term used to describe a number of conditions affecting

the muscles. All myopathies cause muscle weakness. (1 peer reviewed articles on covid vaccine injuries).

Still's Disease. A rare type of inflammatory arthritis that features fevers, rash and joint pain. Some people have just one episode of adult Still's disease. In other people, the condition persists or recurs. This inflammation can destroy affected joints, particularly the wrists. (1 peer reviewed articles on covid vaccine injuries).

Pityriasis Rosea. A skin rash that sometimes begins as a large spot on the chest abdomen or back. followed by a pattern of smaller lesions. (1 peer reviewed articles on covid vaccine injuries).

Acute Eosinophilic Pneumonia. Is the acute-onset form of eosinophilic pneumonia. a lung disease caused by the buildup of eosinophils, a type of white blood cell, in the lungs. It is characterized by a rapid onset of shortness of breath. cough, fatigue, night sweats. and weight loss. (1 peer reviewed articles on covid vaccine injuries).

Sweet's Syndrome. An uncommon skin condition marked by a distinctive eruption of tiny bumps that enlarge and are often, tender to the touch. They can appear on the back. neck. arms or face. Sweet's syndrome. also called acute febrile neutrophilic dermatosis, is an uncommon skin condition. (1 peer reviewed articles on covid vaccine injuries).

Sensorineural Hearing Loss. Hearing loss caused by damage to the inner ear or the nerve from the ear to the brain. Sensorineural hearing loss is permanent. (1 peer reviewed articles on covid vaccine injuries).

Serious Adverse Events Among Health Care Professionals. Hearing loss caused by damage to the inner ear or the nerve from the ear to the brain. Sensorineural hearing loss is permanent (1 peer reviewed articles on covid vaccine injuries).

Toxic Epidermal Necrolysis. A life-threatening skin disorder characterized by a blistering and peeling of the skin. This disorder can be caused by a drug reaction-often antibiotics or anticonvulsives. (1 peer reviewed articles on covid vaccine injuries).

Ocular Adverse Events. The majority of ocular immune-related adverse events (irAEs) are mild, low-grade, non-sight threatening. such as blurred vision, conjunctivitis, and ocular surface disease. (1 peer reviewed articles on covid vaccine injuries).

Depression. A common and serious medical illness that negatively affects how you feel. the way you think and how you act. Depression causes feelings of sadness and/or a loss of interest in activities you once enjoyed. (1 peer reviewed articles on covid vaccine injuries).

Pancreas Allograft Rejection. When the body's blood cells identify the pancreas as foreign and begin mounting an army of cells to attack the transplanted organ. Although acute rejection can happen at any time. about 15 to 25 % of pancreas acute rejection occurs within the first three months after transplant. (1 peer reviewed articles on covid vaccine injuries).

Acute Hemichorea-Hemiballismus. Hemiballismus is characterized by high amplitude, violent, flinging and flailing movements confined to one side of body and hemichorea is characterized by involuntary random-appearing irregular movements that are rapid and non-patterned confined to one side of body. (1 peer reviewed articles on covid vaccine injuries).

Alopecia Areata. Sudden hair loss that starts with one or more circular bald patches that may overlap. Alopecia areata occurs when the immune system attacks hair follicles and may be brought on by severe stress. (1 peer reviewed articles on covid vaccine injuries).

Graves' Disease. An autoimmune disorder that causes hyperthyroidism, or overactive thyroid. With this disease, your immune system attacks the thyroid and causes it to make more thyroid hormone than your body needs. The thyroid is a small, butterfly-shaped gland in the front of your neck. Thyroid hormones control how your body uses energy, so they affect nearly every organ in your body-Even the way your heart beats. If left untreated, hyperthyroidism can cause serious problems with the heart, bones, muscles, menstrual cycle, and fertility. During pregnancy, untreated hyperthyroidism can lead to health problems for the mother and baby. Graves' disease also can affect your eyes and skin. (1 peer reviewed articles on covid vaccine injuries).

Cardiovascular Events. Incidents that may cause damage to the heart muscle. (1 peer reviewed articles on covid vaccine injuries).

Metabolic Syndrome. A cluster of conditions that increase the risk of heart disease, stroke and diabetes. (1 peer reviewed articles on covid vaccine injuries).

Eosinophilic Dermatoses. Eosinophilic skin diseases, commonly termed as eosinophilic dermatoses, refer to a broad spectrum of skin diseases characterized by eosinophil infiltration and/or degranulation in skin lesions, with or without blood eosinophilia. The majority of eosinophilic dermatoses lie in the allergy-related group, including allergic drug eruption, urticaria, allergic contact dermatitis, atopic dermatitis, and eczema. (1 peer reviewed articles on covid vaccine injuries).

Hypercoagulability. The tendency to have thrombosis as a result of certain inherited and/or acquired molecular defects. Clinical manifestations of hypercoagulability can be devastating and even lethal. (1 peer reviewed articles on covid vaccine injuries).

Neuroimaging Findings in Post COVID-19 Vaccination. The tendency to have thrombosis as a result of certain inherited and/or acquired molecular defects. Clinical manifestations of hypercoagulability can be devastating and even lethal (1 peer reviewed articles on covid vaccine injuries).

Urticaria. Allergic reaction. (1 peer reviewed articles on covid vaccine injuries).

Central Vein Occlusion. A blockage of this vein that causes the vein to leak blood and excess fluid into the retina. This fluid often collects in the area of the retina responsible for central vision called the macula. When the macula is affected, central vision may become blurry.

The second eye will develop vein occlusion in 6 – 17 % of cases. There's no cure for retinal vein occlusion. Your doctor can't unblock the retinal veins. What they can do is treat any complications and protect your vision. (1 peer reviewed articles on covid vaccine injuries).

Thrombophlebitis. A condition in which a blood clot in a vein causes inflammation and pain. (1 peer reviewed articles on covid vaccine injuries).

Squamous Cell Carcinoma. A slow-growing type of lung cancer. (1 peer reviewed articles on covid vaccine injuries).

Chest Pain. A slow-growing type of lung cancer. (1 peer reviewed articles on covid vaccine injuries).

Acute Inflammatory Neuropathies. Encompass groups of heterogeneous disorders characterized by pathogenic immune-mediated hematogenous leukocyte infiltration of peripheral nerves. nerve roots or both, with resultant demyelination or axonal degeneration or both. and the pathogenesis of these disorders remains elusive. (1 peer reviewed articles on covid vaccine injuries).

Brain Death. Irreversible cessation of all functions of the entire brain, including the brain stem. A person who is brain dead is dead. (1 peer reviewed articles on covid vaccine injuries).

Kounis Syndrome. The concurrence of acute coronary syndromes with conditions associated with mast cell activation, such as allergies or hypersensitivity and anaphylactic or anaphylactoid insults that can involve other interrelated and interacting inflammatory cells behaving as a 'ball of thread'. (1 peer reviewed articles on covid vaccine injuries).

Angioimmunoblastic T-cell Lymphoma. A type of peripheral T-cell lymphoma. It is a high grade (aggressive) lymphoma that affects blood cells called T cells. High grade lymphomas tend to grow more quickly than low grade lymphomas. NTL usually affects older people, typically around the age of 70, is typically aggressive with a median survival of fewer than 3 years. even with intensive treatment. (1 peer reviewed articles on covid vaccine injuries).

Gastroparesis. A condition that affects the stomach muscles and prevents proper stomach emptying. (1 peer reviewed articles on covid vaccine injuries).

Asthma. A condition in which a person's airways become inflamed, narrow and swell and produce extra mucus, which makes it difficult to breathe. Asthma can be minor or it can interfere with daily activities. In some cases, it may lead to a life-threatening attack. (3 peer reviewed articles on covid vaccine injuries).

Safety Monitoring of the Janssen Vaccine. A slow-growing type of lung cancer. (1 peer reviewed articles on covid vaccine injuries).

Myocardial Injury. Refers to the cell death of cardiomyocytes and is defined by an elevation of cardiac troponin values. It is not only considered a prerequisite for the diagnosis of myocardial infarction but also an entity in itself and can arise from non-ischaemic or non-cardiac conditions. (2 peer reviewed articles on covid vaccine injuries).

Autoimmune Inflammatory Rheumatic Diseases. Rheumatic diseases are autoimmune and inflammatory diseases that cause your immune system to attack your joints, muscles, bones and organs. Rheumatic diseases are often grouped under the term “arthritis” – which is used to describe over 100 diseases and conditions. (1 peer reviewed articles on covid vaccine injuries).

Neurological Autoimmune Diseases. If you have a neurological autoimmune disease, your immune system may be overly active and mistakenly attack healthy cells. These include central nervous system demyelinating disorders such as multiple sclerosis and neuromyelitis optica, paraneoplastic, and other autoimmune encephalomyelitis and autoimmune inflammatory myositis and demyelinating neuropathies. (1 peer reviewed articles on covid vaccine injuries).

Herpes Simplex Virus. A virus causing contagious sores, most often around the mouth or on the genitals. (1 peer reviewed articles on covid vaccine injuries).

Conclusion

This review emphasizes the importance of a multidisciplinary approach to the proper treatment of postcovid and postvaccination syndrome in general and neuropsychiatric and musculoskeletal symptoms in particular. They show a call for risk management and specialist involvement that can potentially support the reduction of those presenting with postcovid and postvaccination symptoms. During the clinical follow-up of patients after COVID-19, there must be a multidisciplinary approach, also with the simultaneous use of artificial intelligence, to guarantee coherent, integrative and holistic care.

Prevention strategies must take into account the severity of the course of COVID-19, age, comorbidities and also gender, as women are more at risk of developing fatigue after COVID-19 and are also known for disorders such as anxiety, depression. The number of symptoms in the acute phase is also an important risk factor for the development of the syndrome after COVID-19, perhaps because this parameter could reflect the importance of the systemic response. In addition, systematic screening of neuropsychiatric symptoms in the acute phase of COVID-19 and targeting circadian dysfunction and encouraging physical activity in at-risk people could be effective ways to reduce neuropsychiatric symptoms after COVID-19.

All of these very promising strategies should be studied further. With reference to the high prevalence of post-covid and postvaccinations syndrome, their high disease burden and economic impact on the labor market and social security systems, a positive evaluation of the intervention, the detection of possible adverse consequences and subsequent implementation could be of great importance for mental and public health as well as economic importance. This review has highlighted several potential therapeutic strategies for post-covid and postvaccination symptoms that have emerged as a result of hypothesized mechanisms.

Most of them are far from routine clinical practice. Without any clinical trial and validation, however, these therapeutics remain hypothetical and should be investigated in further clinical trials. The hope that a multidisciplinary complex approach is effective in reversing some of the long-term consequences of not only the acute infection of COVID-19 but also the postcovid and postvaccination syndrome will bring useful results. We expect that the COVID-19 pandemic will further facilitate holistic and integrated systems of care for physical and mental health and provide a blueprint not only for the treatment of the post-COVID and postvaccination syndrome, but also for the development and transformation of healthcare across all chronic, ongoing and long-term health conditions.

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ČO OČÁKAVAŤ PO PREKONANÍ COVID-19 A SKONČENÍ PANDÉMIE COVID-19? WHAT TO EXPECT AFTER OVERCOMING COVID-19 AND ENDING THE COVID-19 PANDEMIC?

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Abstrakt

Úvod: V snahe pomôcť pacientom s ochorením COVID-19 boli vyvinuté rôzne protokoly liečby, ktoré sa neustále menia. V liečbe boli použité rôzne antivirotiká a iné potenciálne použiteľné lieky (často „*off label*“, bez predchádzajúceho schválenia alebo testovania). Vďaka rýchlym rozhodnutiam sa podarilo situáciu s pandémiou stabilizovať po celom svete. Veľký spolupodiel na tom má aj relatívne rýchly vývin vakcín proti SARS-CoV-2 s cieľom dosiahnutia kolektívnej imunity. Na druhej strane „rýchle rozhodnutia“ prispeli k vzniku takých problémov, ako nežiaduce účinky používaných liekov.

Cieľ: V príspevku chceme upozorniť širšiu verejnosť aj na druhú stranu liečby ochorenia COVID-19, a to na možnosť iatrogénie, ktorá významne prispieva k vzniku postkovidového syndrómu a chronickej bolesti. Kladieme väčší dôraz na dôležitosť preventívnych opatrení ako na neistý výsledok liečby ochorenia COVID-19.

Súbor a metodika: Analizovali sme široký spektr dostupnej literatúry týkajúcej sa ochorenia COVID-19 a jeho následkov, pomocou porovnávania dostupných údajov vypracovali sme niektoré odporúčenia ohľadom jeho prevencie a liečby, ako aj liečby postkovidových ťažkostí.

Výsledky: Výsledky a porovnanie dostupných údajov sú veľmi obsiahle, zhrnuté a prezentované formou textu a tabuliek.

Záver: Účinným prostriedkom pre boj s vírusom SARS-CoV-2, ktorý spôsobil pandémiu a ochromil krajiny, rodiny, spoločnosti i jednotlivcov na celom svete, je očkovanie. K tomu, aby bola celonárodne dosiahnutá tzv. kolektívna imunita, je v prípade COVID-19 potrebné preočkovať viac ako 60 – 70 % populácie. Očkovanie má z hľadiska záchrany životov zásadný význam, ale neukončí pandémiu zo dňa na deň. Preto musíme používať aj iné možnosti prevencie. V procese aktivácie antivírusovej imunity (nadviazanej na syntézu interferónu), je v prevencii „cytokínovej búrky“ a pre kompenzáciu chronických sprievodných ochorení, dôležité najmä doplnenie deficitu vitamínu D a ostatných mikroživín.

Kľúčové slová: iatrogénia, pain syndrome, pandemic COVID-19, SARS-CoV-2, postkovidový syndróm.

Abstract

Introduction: In an effort to help patients with COVID-19, various treatment protocols have been developed and are constantly changing. Various antivirals and other potentially useful drugs (often “*off label*”, without prior approval or testing) have been used in treatment. Thanks to quick decisions, it was possible to stabilize the situation with the pandemic all over the world. The relatively rapid development of vaccines against *SARS-CoV-2* with the aim of achieving collective immunity also has a large share in this. On the other hand, “quick decisions” contributed to the emergence of such problems as adverse effects of the drugs used.

Objective: In the post, we want to draw the attention of the wider public to the other side of the treatment of the disease COVID-19, namely the possibility of iatrogeny, which significantly contributes to the emergence of post-covid syndrome and chronic pain. We place more emphasis on the importance of preventive measures than on the uncertain outcome of the treatment of the disease COVID-19.

File and methodology: We analyzed a wide range of available literature related to the disease COVID-19 and its consequences, with the help of comparing the available data, we developed some recommendations regarding its prevention and treatment, as well as the treatment of post-covid complications.

Results: The results and comparison of the available data are very comprehensive, summarized and presented in the form of text and tables.

Conclusion: Vaccination is an effective means of combating the *SARS-CoV-2* virus, which caused a pandemic and crippled countries, families, societies and individuals around the world. In order to nationally achieve the so-called collective immunity, it is necessary to revaccinate more than 60 – 70 % of the population in the case of COVID-19. Vaccination is essential in terms of saving lives, but it will not end the pandemic overnight. That’s why we have to use other prevention options. In the process of activation of antiviral immunity (linked to the synthesis of interferon), in the prevention of “cytokine storm” and for the compensation of chronic accompanying diseases, it is especially important to supplement the deficiency of vitamin D and other micronutrients.

Keywords: iatrogeny, pain syndrome, pandemic COVID-19, *SARS-CoV-2*, post-covid syndrome

Úvod

Ochorenie COVID-19 oficiálne zaregistrovala World Health Organization (WHO) 31. decembra 2019, kedy Ministerstvo zdravotníctva Čínskej ľudovej Republiky nahlásilo 44 prípadov SARS v meste Wuhan v provincii Hubei. Zistilo sa, že ochorenie COVID-19 je spôsobené novým koronavírusom *SARS-CoV-2*. 11. marca 2020 WHO označila šírenie ochorenia COVID-19 za **pandémiu** (Dobrovanov, et al., 2020; Dmytriiev, Dobrovanov, 2021; Dobrovanov, Furkova, 2021).

Nebezpečenstvo infekcie COVID-19 spočíva v jej vyššej nákazlivosti (niekoľkonásobne vyššej ako pri chrípke), dlhej inkubačnej dobe (až 14 dní) a komplikujúcou je skutočnosť, že nositeľmi infekcie môžu byť asymptomatickí pacienti. Ochorenie COVID-19 môže mať ťažký priebeh najmä u pacientov so sprievodným chronickým ochorením (Dobrovanov, Furkova, 2021).

Tieto vlastnosti ochorenia COVID-19 kladú zvýšené požiadavky na organizáciu systému zdravotnej starostlivosti. Najmä vysoká nákazlivosť je v súčasnosti príčinou ochorenia COVID-19 u veľkého počtu ľudí po celom svete. Táto skutočnosť spôsobila preťaženie zdravotných systémov mnohých štátov. Závažný priebeh infekcie (najmä pľúcna forma) u pacientov s chronickou patológiou vyžaduje veľmi často použitie umelej pľúcnej ventilácie (UPV), ktorá je spojená s vysokou úmrtnosťou (Dmytriiev, Dobrovanov, 2021; Dobrovanov, Furkova, 2021).

Predpokladá sa, že aktuálne najdôležitejším preventívnym opatrením je zníženie rýchlosti šírenia koronavírusovej infekcie, čo by viedlo k zníženiu počtu hospitalizácií a preťažnosti liečebných zariadení. Pokusy bojovať s koronavírusovou infekciou iba karanténnymi opatreniami (nosenie rúšok, rukavíc, dezinfekcia a umývanie rúk, obmedzenie sociálnych kontaktov, izolácia atď.) však neovplyvňuje najdôležitejší preventívny zdroj – **aktiváciu vrodenných antivírusových imunitných systémov** (Dobrovanov, Furkova, 2021).

V procese aktivácie antivírusovej imunity (nadviazanej na syntézu interferónu), je v prevencii ochorenia COVID-19 dôležité najmä odstránenie deficitu vitamínu D a použitie iných mikroživín.

Mimoriadne dôležitú úlohu má v prevencii ochorenia COVID-19 **očkovanie**. Cieľom očkovania je dosiahnutie kolektívnej imunity, čo bude viesť k postupnej eliminácii vírusu v populácii po celom svete (Preet, Gupta, 2020).

Stratégia liečby COVID-19 v súčasnosti

Stratégia liečby ochorenia COVID-19 zahŕňa predovšetkým:

1. **Prevenciu a liečbu „cytokínovej búrky“**
2. **Liečbu/stabilizáciu komorbidít**

Pri medikamentóznej liečbe ochorenia COVID-19 (najmä pľúcnej formy) je veľmi dôležité zabrániť rozvoju „**cytokínovej búrky**“ – lavínového zvýšenia koncentrácie prozápalových cytokínov, ktoré vedie k poškodeniu pľúc a hypoxii. Dôsledkom tohto stavu je potreba oxygenoterapie (kyslíková liečba alebo umelá pľúcna ventilácia). Práve ovplyvnením „cytokínovej búrky“ je možné dosiahnuť zníženie úmrtnosti pacientov s ochorením COVID-19 (Dobrovanov, Furkova, 2021).

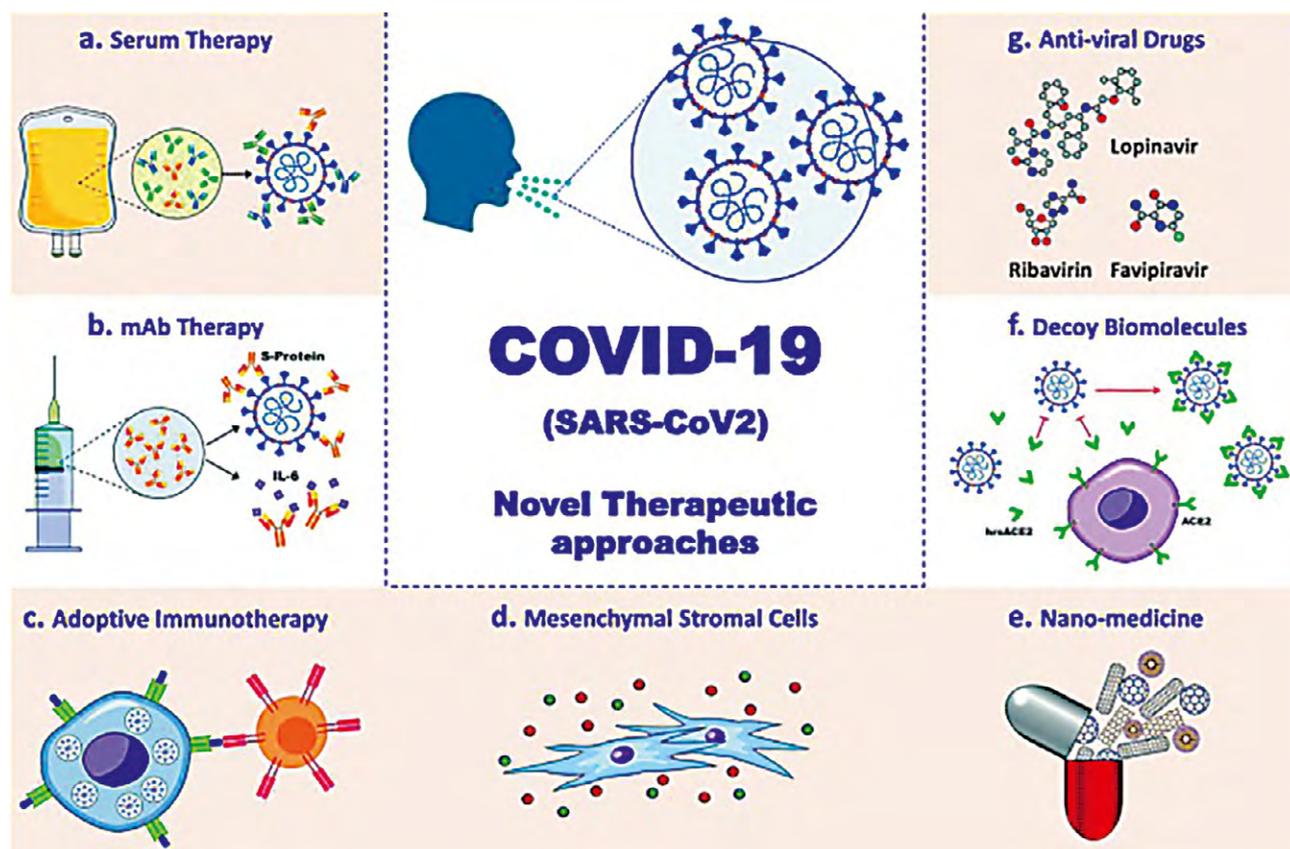
Syntézu prozápalových cytokínov, vrátane interleukínu 1, chemokínu CCL2, interleukínu-6, interferónu-gama urýchľuje u pacientov prítomnosť inej chronickej choroby (ateroskleróza, obezita, diabetes mellitus, bronchiálna astma, artériová hypertenzia atď.). Interleukíny zvyšujú aktiváciu leukocytov a rozklad granúl mastocytov (Dobrovanov, Furkova, 2021; Kralinský, et al., 2020).

Pre prevenciu ochorenia COVID-19 a stratégiu liečby je veľmi dôležitá aj stabilizácia vedľajších chronických komorbidít, pretože prítomnosť takých komplikácií ako *kardiomyopatia*, *tromboembolizmus*, *obezita*, *arteriová hypertenzia*, *ochorenia koronárnych artérií*, *diabetes mellitus* je u pacientov spojená s rizikom závažnejšieho priebehu ochorenia (Dobrovanov, Furkova, 2021; Kralinský, et al., 2020; Rana, et al., 2021).

Dôležitým je aj vek pacienta – *senium*.

Protokoly liečby tohto novovzniknutého ochorenia sa stále menia a pribúdajú nové možnosti liečby (Obrázok 1) (Kralinský, et al., 2020; Rana, et al., 2021):

- Sérová terapia
- mAb terapia
- Adoptívna imunoterapia
- Mezenchymálne stromálne bunky
- Nanomedicína
- Antivírusové lieky
- Biomolekuly
- Iné



Obrázok 1: Nové možnosti terapii ochorenia COVID-19. (Zdroj: Podľa Rana, et al., 2021)

Medikamentózna liečba COVID-19, nežiaduce účinky liekov

CAVE! Niektoré spomínané lieky u pediatrických pacientov boli/sú používané „off label“. Vzhľadom na nedostatok údajov z kontrolovaných štúdií podporujúcich účinnosť liekov na liečbu COVID-19, bolo/je ich používanie posudzované vždy individuálne. Ich indikáciu je potrebné zaznamenať v zdravotnej dokumentácii pacienta. Niektoré lieky spomíname len z historického uhlu pohľadu.

Na liečbu a prevenciu ochorenia sú vo svete rôzne názory. Čoraz viac pracovísk sa prikláňa k liečbe odporúčanej alianciou FLCCC pod vedením uznávaného celosvetového odborníka v odbore intenzívnej medicíny, lekára Paula Marika z USA, ktorý patrí medzi najpublikovanejších svetových vedcov. Spoločne so svojim tímom vytvorili tzv. „MATH+“ protokol na liečbu hospitalizovaných pacientov a „I-MASK+“ protokol na prevenciu a včasnú liečbu v domácom prostredí (MATH+ Protocol; I-MASK+ Protocol). Protokoly sa neustále aktualizujú, tak ako prichádzajú nové poznatky. Úspech liečby závisí aj od správneho načasovania, nakoľko od cca 5. dňa nelepšieho sa stavu pacienta už dochádza k postihnutiu pľúc a je nevyhnutné čo najskôr začať komplexnú protizápalovú a antikoagulačnú liečbu podľa nemocničného protokolu. Inak sa postihnutie pľúc ďalej zhoršuje, pridružujú sa komplikácie a potom už môže byť neskoro.

V každom prípade liečba ochorenia COVID-19 je komplikovaná, zahŕňa „**koktail liekov**“, ktoré nie vždy pomáhajú, ale **vedia pacientom aj uškodiť** (Mark, 2020).

Pod nežiaducim účinkom lieku ponímame každú škodlivú a nechcenú reakciu, ktorá sa zjavuje pri bežných liečebných alebo preventívnych dávkach lieku. Spravidla je mierneho charakteru, a vymizne po prerušení užívania lieku. Nemusí sa prejaviť u každého pacienta. Pacienti sa stretnú s informáciami o nežiaducich účinkoch v písomnej informácii pre používateľov liekov. Nežiaduce účinky môžu byť aj závažné (ohrozenie života, hospitalizácia).

Z pohľadu rizika (frekvencie) rozdeľujeme nežiaduce účinky na veľmi časté, časté, menej časté, zriedkavé a vzácne. Ak je **nežiaduci účinok veľmi častý**, znamená to, že sa prejavuje u viac ako 100 užívateľov z 1000. **Častý nežiaduci účinok** je u 10 – 100 pacientov z 1000, **menej častý** u 1 – 10 ľudí z 1000. Pokiaľ sa nežiaduci účinok vyskytuje u menej ako 1 človeka z 1000, hovoríme o **zriedkavom účinku**. A ak sa objavuje ešte zriedkavejšie, ide o **vzácnny nežiaduci účinok** (Kim, et al., 2020).

Najčastejšie používané lieky pri liečbe ochorenia COVID-19 sú:

1. Kortikosteroidy

Zo skupiny kortikosteroidov bol Dexametazón predmetom rôznych štúdií vrátane štúdie *Recovery*, ktorá overila jeho účinnosť a priniesla skvelé správy. Dexametazón síce nedokáže vyliečiť COVID-19, ale účinne tlmí masívny zápal, ktorý je pri tomto ochorení príčinou mnohých úmrtí (Robinson, et al., 2021; Edalatifard, et al., 2020).

WHO (Svetová zdravotnícka organizácia) vydáva takzvané guidelines (usmernenia) ako postupovať pri liečbe rôznych ochorení. Do usmernenia v postupe liečby COVID-19 bol zaradený aj Dexametazón. Tento liek je lacný, dostupný a účinný. Odporúča sa jeho *intravenózne* alebo *perorálne podávanie* (Robinson, et al., 2021; Edalatifard, et al., 2020).

Kortikoidy (nežiaduce účinky) (Robinson, et al., 2021; Buchman, 2001; Ference, Last 2009):

Nežiaduce účinky sú závislé na dávke a trvaní liečby, takže frekvencia ich výskytu sa nedá určiť:

Tabuľka 1. Prehľad nežiaducich účinkov kortikoidov.

Infekcie	Maskovanie infekcií, prejavov a exacerbácií vírusových infekcií, hubových infekcií, bakteriálnych, parazitických a oportúnnych infekcií, aktivácia strongyloidázy.
Poruchy krvi a lymfatického systému	Stredne ťažká leukocytóza, lymfocytopénia, eozinopénia, polycytémia.
Poruchy imunitného systému	Oslabenie imunitného systému.
Poruchy endokrinného systému	Pri dlhšom užívaní – supresia nadobličiek a rozvoj Cushingovho syndrómu (typické príznaky: mesiacovitá tvár, obezita trupu a pletora).
Poruchy metabolizmu a výživy	Retencia sodíka s možnými opuchmi, zvýšené vylučovanie draslíka (riziko arytmie), nárast telesnej hmotnosti, znížená glukózová tolerancia, diabetes mellitus, hypercholesterolémia a hypertriglyceridémia, zvýšená chuť do jedla.
Psychické poruchy	Depresia, podráždenosť, eufória, zvýšená aktivita, psychózy, mánia, halucinácie, emočná labilita, úzkosť, poruchy spánku, sklony k samovražde.
Poruchy nervového systému	Pseudotumor cerebri, prejav latentnej epilepsie, zvýšený počet záchvatov pri zjavnej epilepsii.
Poruchy oka	Katarakta, najmä so zadnou subkapsulárnou nepriehľadnosťou, glaukóm, zhoršenie príznakov vredov rohovky, zvýšená incidencia vírusových a plesňových očných ochorení, zhoršenie bakteriálneho zápalu rohovky, ptóza, mydriáza, chemóza, iatrogénna perforácia skléry, chorioretinopatia, rozmazané videnie.
Poruchy ciev	Artérová hypertenzia, zvýšené riziko aterosklerózy a riziko trombózy, vaskulitída (aj ako príznak z vysadenia po dlhodobej liečbe), zvýšená krehkosť kapilár.
Poruchy gastrointestinálneho traktu	Vred žalúdka, gastrointestinálne krvácanie, pankreatitída, bolesť žalúdka, čkanie.
Poruchy kože a podkožného tkaniva	Strie, telangiektázie, petechie, ekchymózy, hypertrichóza, steroidné akné, periorálna dermatitída, poruchy pigmentu.
Poruchy kostrovej a svalovej sústavy a spojivového tkaniva	Myopatia, svalová atrofia a slabosť, osteoporóza (závislá na dávke, možná aj pri krátkodobej liečbe), aseptická nekróza kostí, poruchy šliach, tenditída, pretrhnutie šliach, epidurálna lipomatóza, inhibícia rastu u detí.
Poruchy reprodukčného systému	Poruchy vylučovania pohlavných hormónov (následne: nepravidelná menštruácia až amenorea, hirsutizmus, impotencia).
Celkové poruchy a reakcie v mieste podania	Spomalené hojenie rán.

Komplikáciám je vždy lepšie predchádzať, ako ich riešiť dodatočne. Potlačením imunity kortikosteroidmi síce nenastane cytokínová búrka, ale na druhej strane sa znižuje schopnosť organizmu brániť sa proti vírusu samotnému. Z tohto dôvodu by takúto terapiu mali dostať **len pacienti s ťažkým priebehom**, nakoľko pri ľahšom priebehu by kortikosteroidy spôsobili viac škody, ako úžitku. U pacientov s ľahším priebehom nevedlo použitie Dexametazónu k žiadnemu zlepšeniu.

2. Antivirotiká

V uplynulom roku vedci skúmali aj antivirotické lieky (pôvodne – proti ebole, malárii či AIDS), od ktorých mali veľké očakávania. Skúmali sa rôzne antivirotiká – Remdezivir, Lopinavir-Ritonavir, Hydroxychlorochín, Tocilizumab, Ivermektín, artemizinin, Paxlovid, molnupiravir.. Niektoré z nich sú používané aj v súčasnosti.

Bohužiaľ, ukázalo sa, že nemajú žiadny vplyv na úmrtnosť COVID-19 pozitívnych pacientov. Štúdia WHO nepreukázala ani ich účinok na skrátenie hospitalizácie alebo liečby na umelej pľúcnej ventilácii (Kalra, et al., 2020; Nina, Dash, 2020; Kim, et al., 2020).

Tabuľka 2. Prehľad nežiaducich účinkov antivirotik.

Frekvencia	Nežiaduca reakcia
Poruchy imunitného systému	
Zriedkavé	Precitlivenosť
Neznáme	Anafylaktická reakcia
Poruchy nervového systému	
Časté	Bolesť hlavy
Poruchy srdca a srdcovej činnosti	
Neznáme	sínusová bradykardia
Poruchy gastrointestinálneho traktu	
Časté	Nauzea
Poruchy pečene a žilových ciest	
Veľmi časté	Zvýšená koncentrácia pečeňových enzýmov
Poruchy kože a podkožného tkaniva	
Časté	Vyrážka
Laboratórne a funkčné vyšetrenia	
	Často – predĺžený protrombínový čas
Iné komplikácie počas liečby	
Zriedkavé	Reakcia súvisiaca s podávaním infúzie

3. Krvné deriváty (plazma)

Plazma je tekutá zložka krvi. Tvorí asi 55 % našej krvi a obsahuje najmä vodu (90-92 %), zvyšnú časť jej objemu tvoria bielkoviny (8 %) a anorganické látky (1 %) (MacLennan, et al., 2006; Duan, et al., 2020). Najdôležitejšie proteíny plazmy tvoria albumíny (10 %), globulíny (imunoglobulíny) a koagulačné faktory (4 %).

Keď sa človek stretne s nejakou cudzorodou látkou (vírusom, baktériou atď.), ľudské telo si na obranu voči nej vytvorí protilátky a odloží si ich „na horšie časy“. To znamená, že keď sa s cudzorodou látkou opäť stretne, bude na ňu pripravené. Protilátky sú vlastne jedným z typov bielkovín obsiahnutých v plazme, a preto experti prišli na nápad terapie plazmou. Takáto terapia bola **prechodným riešením** u kriticky chorých pacientov na začiatku pandémie COVID-19, kedy ešte neboli žiadne účinné lieky ani vakcíny.

Pacientovi s COVID-19 sa podávala plazma iného pacienta, ktorý „koronu“ prekonal a vyliečil sa – teda jeho plazma obsahovala protilátky, ktoré chorému pacientovi mohli pomôcť ešte v ranných štádiách liečby.

Riziko podávania plazmy, nežiaduce účinky (Maclennan, et al., 2006; Duan, et al., 2020):

- Riziko infekcií: baktérie, vírusy (HIV, HCV, HBV, CMV a ďalšie).
- Akútne poškodenie pľúc spojené s transfúziou (TRALI – *Transfusion associated lung injury*).

4. Antikoagulanciá a antiagregačná liečba

Ochorenie COVID-19 je možné charakterizovať aj ako komplexnú, multisystémovú a zápalovú vaskulopatiu so signifikantným rizikom mortality. Koagulopatia je jednou z najzávažnejších následkov ochorenia COVID-19 a taktiež aj zlým prognostickým faktorom.

Antikoagulanciá

Pri ochorení COVID-19 dochádza k dysregulácii koagulačnej kaskády (narušenie rovnováhy prokoagulačných a antikoagulačných mechanizmov hemostázy), a to v prospech prokoagulačných mechanizmov. Následkom toho môže vzniknúť *hlboká žilová trombóza, embólia do arteria pulmonalis, akútne koronárny syndróm, ischemia mezenterických ciev, trombotická cievna mozgová príhoda, akútna končatinová ischemia a syndróm disseminovanej intravaskulárnej koagulácie (DIC)* (Kováčsová, et al., 2022).

Podľa nemocničného protokolu sú práve pre prevenciu vzniku hore uvedených komplikácií často používané v liečbe ochorenia COVID-19 nízkomolekulové heparíny – *Low Molecular Weight Heparin (LMWH)* (Kim, et al., 2020).

Antikoagulačná liečba spočíva v podávaní **profylaktickej** alebo **terapeutickej dávky LMWH** (pri zvýšených D-diméroch ≥ 2 alebo pri rapídnom vzostupe D-dimérov počas hospitalizácie) v závislosti od hmotnosti pacienta.

Počas terapie nízkomolekulovými heparínmi je dôležité monitorovať koncentráciu anti-Xa (anti-faktor Xa aktivita heparínu v jednotkách IU/ml) u vybraných skupín pacientov. Vyšetrenie slúži na kontrolu účinnosti terapie LMWH. Koncentrácia Anti-Xa zodpovedá skôr antikoagulačnému efektu LMWH, ako priamej koncentrácii LMWH. Najvyššie hodnoty Anti-Xa sa dosiahnú za 3 – 5 hodín po subkutánnom podaní LMWH (Kováčsová, et al., 2022).

Na reprofelizovanom infekčnom COVID oddelení II. chirurgickej kliniky Lekárskej fakulty univerzity Komenského v Bratislave, IV. Internej kliniky a Gastroenterologickej kliniky Slovenskej zdravotníckej univerzity a Univerzitnej nemocnici Bratislava (Nemocnica svätého Cyrila a Metoda) bolo od 30. 09. 2020 do 28. 04. 2021 liečených 717 pacientov so stredne-ťažkým a ťažkým priebehom ochorenia COVID-19 (I. a II. vlna pandémie).

Vo februári roku 2021 dosahovala úmrtnosť na týchto oddeleniach 33 %, tretina pacientov vyžadovala vysokoprietokovú oxygenáciu.

V tomto období bolo Slovensko najhorším na svete v počte hospitalizovaných prípadov a úmrtí na počet obyvateľov. Liečba bola často komplikovaná komorbiditami, ktoré zhoršovali priebeh ochorenia.

Spomínaný súbor pacientov a údaje boli nami štatisticky spracované, vyhodnotená efektivita niektorých liekov a príčiny ťažkého stavu pacientov (Kováčsová, et al., 2022).

Zatiaľ čo v úvode pandémie sa infekcia COVID-19 považovala prioritne za respiračné ochorenie, postupne pribúdajúce štúdie priniesli poznatky o tom, že infekcia COVID-19 spôsobuje aj závažný hyperkoagulačný stav, ktorý vyúsťuje do arteriálnej a venózne trombózy.

Práve preto, vzhľadom na opakovane zaznamenané významné krvácanie u kriticky chorých pacientov s infekciou COVID-19, boli nami tiež spracované štatistické údaje za účelom zhodnotenia rizika a benefitu plnej antikoagulačnej liečby.

Celkom za obdobie od 30. 09. 2020 do 28. 04. 2021 bol vyhodnotený súbor 717 pacientov, z ktorých 468 (65,3 %) dostalo terapeutickú dávku LMWH. U 13 z nich (2,7 %) došlo k závažnému krvácaniu a 5 pacienti (1 %) exitovali v dôsledku krvácania.

Na základe spracovaných údajov, numerického a grafického vyhodnotenia vlastného súboru pacientov bolo dokázané, že benefit plnej antikoagulačnej liečby u kriticky chorých pacientov s infekciou COVID-19 jednoznačne prevyšuje potenciálne riziko život ohrozujúceho krvácania (Kováčsová, et al., 2022).

Antiagregačná terapia

Medzi život ohrozujúce komplikácie, ktoré môže COVID-19 spôsobiť, patrí vznik krvných zrazenín (trombov). Dôvodom sú krvné doštičky zodpovedné za koaguláciu (zrážanie) krvi, ktoré sú pri tomto ochorení hyperreaktívne.

Antiagreganciá sú lieky, ktoré zabraňujú zhlukovaniu (agregácii) trombocytov, a tým vzniku primárneho doštičkového trombu. Patria do skupiny antitrombotík, liekov na zníženie zrážanlivosti krvi.

Od 6. novembra roku 2020 roku sa stal predmetom najväčšej klinickej štúdie skúmajúcej možnosti liečby hospitalizovaných pacientov s COVID-19 široko dostupný a známy liek Aspirín (Acylpyrín; kyselina acetylsalicylová).

Kyselina acetylsalicylová je najčastejšie používaným antiagregans.

Účinky kyseliny acetylsalicylovej sú **antipyretické** (tlmí horúčku), **analgetické** (tlmí bolesť), **antiflogistické** (potláča zápal) a **antikoagulačné** (pôsobí proti zrážaniu krvi). Všetky z nich by mohli pri liečbe COVID-19 pomôcť, no centrom výskumu je momentálne posledný spomenutý účinok – **antikoagulačný** (Králinský, et al., 2020; RECOVERY Protocol; Kim, et al., 2020). Kyselina acetylsalicylová blokuje cyklooxygenázu v doštičkách a tým zabraňuje tvorbe protrombotického tromboxanu A₂ (TXA₂), zároveň ale blokuje syntézu vazodilatačného a antiagregačne pôsobiaceho prostaglandínu PGI₂ v endotelialných bunkách.

Nežiaduce účinky antikoagulačnej a antiagregačnej liečby: krvácanie pri predávkovaní, alergická reakcia, trombocytopenia, možná osteoporóza, modriny, Reyov syndróm u detí.

5. Vitamín D

Cytokínovú búrku nám prirodzene pomáha regulovať aj vitamín D, ktorý sa v tele vyskytuje v troch formách. Jednou z nich je kalcifediol (25-hydroxyvitamín D3), ktorého koncentráciu vieme stanoviť v krvi. Pri suplementácii kalcifediolu (je dostupný v liekovej forme), telo ho ľahko absorbuje a jeho koncentrácia v krvi sa rýchlo zvýši (Furková, Dobrovanov, 2020). Aj pre tieto vlastnosti si spomínanú formu vitamínu vybrali španielski vedci do svojej pilotnej klinickej štúdie.

Výskumu sa zúčastnilo 76 pacientov s COVID-19, pričom všetci z nich dostali najlepšiu dostupnú liečbu. 50 pacientov dostalo okrem nej aj kalcifediol. Výsledkom bolo, že iba jediný človek potreboval intenzívnu starostlivosť a žiaden z pacientov nezomrel. Zo zvyšných 26 pacientov (kontrolná vzorka), ktorí kalcifediol nedostali, skončilo na JIS (jednotka intenzívnej starostlivosti) až 13 pacientov (50 %) a 2 pacienti zomreli (RECOVERY Protocol).

Tieto výsledky sú významné a naznačujú, že podávanie vitamínu D práve v tejto forme dokáže zmierniť priebeh ochorenia a výrazne znížiť počet pacientov, ktorí potrebujú intenzívnu starostlivosť. Je však nutné skúmať ich aj ďalej (na väčšej, lepšie porovnateľnej vzorke) nakoľko v štúdiu neboli zahrnuté rizikové faktory pacientov ako obezita, vysoký krvný tlak či diabetes, ktoré komplikujú priebeh ochorenia COVID-19 (Dobrovanov, Furková, 2021; RECOVERY Protocol; Furková, Dobrovanov, 2020).

Imunoregulačný účinok aktívnej formy vitamínu D je spôsobený širokou škálou účinkov kalcitriolu na metabolizmus a aktivitu makrofágov, T a B buniek. Kalcitriol pomáha znižovať koncentrácie rôznych prozápalových cytokínov, ktoré majú tiež antivírusové vlastnosti. Prítomnosť receptora vitamínu D (VDR) a enzýmov metabolizujúcich vitamín D3 (CYP27B1 atď.) v monocytoch, makrofágoch, B- a T-bunkách naznačuje, že bunky imunitného systému môžu syntetizovať a využívať aktívnu formu vitamínu 1,25 (OH) 2D3 pre normalizáciu bunkovej imunity.

Každopádne, vitamín D má významnú úlohu pri správnom fungovaní našej imunity a jeho dostatočné koncentrácie v krvi majú vplyv na priebeh ochorenia COVID-19.

Nežiaduce účinky sú zriedkavé (toxická dávka je 40 000 IU/24 hod).

Nežiaduce účinky (Marcinowska-Suchowierska, et al., 2018; Galior, et al., 2018; Vincentis, et al., 2020): *hyperkalciémia a hyperkalciúria, pruritus, vyrážky a urtikária (menej časté).*

6. Vitamín C

Viacero **relevantných vedeckých štúdií** zistilo, že vitamín C je **efektívny na skrátenie doby trvania vírusových infekcií pre svoje silné antioxidantné účinky**. Keďže ochorenie COVID-19 sa radí medzi vírusové ochorenia, v odborných kruhoch sa predpokladá vhodnosť aplikácie C vitamínu v čase akútneho štádia infekcie SARS-CoV-2 (Hiedra, et al., 2020). Skrátenie doby trvania infekčného ochorenia sa pritom odhaduje až na **8 % u dospelých a 14 % u detí** (RECOVERY Protocol; Hiedra, et al., 2020).

Nežiaduce účinky sa pri optimálnej dávke prakticky nevyskytujú, ale pri vysokých dávkach vitamínu C v ojedinelých kazuistikách boli popísané prípady akútnej renálnej insuficiencie (Cheng, 2020; Mchugh, et al., 2008).

7. Antibiotiká

Liečba antibiotikami je veľmi rozšírená a účinná, avšak iba v boji proti bakteriálnym infekciám. Keďže COVID-19 je spôsobený vírusom, antibiotiká pri ňom účinné nie sú. Pri koronavírusovej infekcii sú antibiotiká podávané jedine v situácii, keď u pacienta hrozí (kvôli oslabeniu organizmu) riziko komplikácie v podobe pridruženej bakteriovej infekcie. Najčastejšie sa to stáva u hospitalizovaných pacientov s ťažšou formou ochorenia (Singh, et al., 2014; Cunha, 2001).

Tabuľka 3. Prehľad najčastejších/všeobecných nežiaducich účinkov antibiotík.

Nežiaduce účinky antibiotík
<ul style="list-style-type: none"> alergické prejavy
<ul style="list-style-type: none"> biologické účinky (najmä širokospektrálne ATB): <ul style="list-style-type: none"> narušený mikrobióm → dysmikróbia: <ul style="list-style-type: none"> črevo: črevná dysmikróbia – nedostatok vitamínu K, hnačky, infekcie <i>Cl. difficile</i> reprodukčné orgány: vaginálna dysmikróbia, vaginóza, kandidová vaginitída dutina ústna: soor rezistencia: bakteriálna superinfekcia rezistentnými kmeňmi
<ul style="list-style-type: none"> toxické účinky – bývajú často závislé na dávke
<ul style="list-style-type: none"> kumulatívne, napr. nefrotoxicita, neurotoxicita, hepatotoxicita, fototoxicita, poškodenie rastových chrupaviek...

(Sources: Singh R, et al., 2014; Cunha, 2001; Westphal, et al., 1994; Kritikos, et al., 2020)

Na liečbu sekundárnych infekcií počas ochorenia COVID-19 často používame **antibiotiká zo skupiny fluorochinolónov**, ktoré ale môžu viesť k ťažkým chronickým komplikáciám (Tsai, Yang, 2011). Sú to antibakteriálne lieky, používané približne od roku 1987. Spočiatku boli vyhradené len pre liečbu najťažších infekcií, čoskoro sa však dostali medzi účinné, bezpečné, lacné a teda často používané antibiotiká. Trvalo vyše 20 rokov, kým sa zistilo, že s tou bezpečnosťou to nie je až také ideálne. Okrem kožných prejavov, bolestí hlavy a závratov môžu fluorochinolóny ojedinele spôsobiť aj **závažné poškodenie nervového systému, muskuloskeletálneho systému** – najmä po vyššej celkovej dávke sa zjavuje poškodenie šliach, až pretrhnutie Achillovej šľachy (hlavne u starších ľudí) (Boes, et al., 2020; Bennett, et al., 2019). Pre istú mieru teratogenity a nepriaznivý účinok na vývoj kĺbových chrupaviek sa spravidla neodporúča ich podávanie **deťom**, s výnimkou závažných a neliečiteľných infekcií, **tehotným a dojčiacim ženám**. Okrem toho môžu fluorochinolóny spôsobiť poruchy srdcového rytmu, ojedinele aj život ohrozujúce, ako i mnoho iných nezávažných a prechodných zdravotných ťažkostí. Európska agentúra EMA 12. mája 2016 napokon zverejnila stanovisko, že pacienti s nekomplikovanými infekčnými chorobami by nemali byť liečení touto skupinou antibiotík, pokiaľ sú k dispozícii iné možnosti liečby, a to z dôvodu nebezpečenstva možného trvalého poškodenia zdravia. Týka sa to hlavne pacientov s nezávažnými infekciami dýchacích a močových ciest (Richards, et al., 2019).

8. Umelá pľúcna ventilácia a oxygenoterapia

Pacienti s ťažším priebehom vyžadujú okrem symptomatickej liečby aj hospitalizáciu, podpornú oxygenoterapiu (podávanie kyslíka) a pri ešte vážnejších stavoch aj umelú pľúcnu ventiláciu (UPV) (Dmitriiev, et al., 2020; Dmitriiev, et al., 2021; Gattinoni, 2016).

Nežiaduce účinky oxygenoterapie (Nishimura, et al., 2016; Nimmagadda, et al., 2017; Thomson, Paton; Dobrovanov, et al., 2021):

- **Poškodenie pľúc** (toxicita kyslíku pri jeho vysokej koncentrácii → ARDS, chronická pľúcna fibróza, emfyzém)
- **Poškodenie CNS** (rýchlosť progresie je priamo úmerná parciálnemu tlaku) → poruchy videnia (tunelové videnie), tinnitus, nauzea, zášklby mimických svalov, závrat, zmätenosť (obraz je variabilný) → tonickoklonické kŕče, porucha vedomia
- **Poškodenie zraku** → hyperoxemická myopia, retinopatia
- **Poškodenie iných orgánov** → deštrukcia erytrocytov, poškodenie myokardu, endokrinných žliaz (nadobličiek, gonád a štítnej žľazy) i obličiek.

Nežiaduce účinky UPV (Gattinoni, et al., 2016; Tobin, Manthous, 2017; Lohser, Slinger, 2015):

- **Ventilátorová pneumonia**
- **Nozokomiálne infekcie**
- **Poškodenie dýchacích ciest pacienta dlhodobým tlakom tracheálnej kanyly**, nedostatočne alebo nadmerne zvlhčenou zmesou vdychovaných plynov alebo nadmernou koncentráciou kyslíka vo vdychovanej zmesi
- **Poškodenie pľúc v dôsledku pretlaku**
- **VILI** (ventilator-induced lung injury) alebo s ventiláciou spojené poškodenie pľúc
- **Pneumothorax**
- **Emfyzém**
- **Edém pľúc**
- **Iné**

Diskusia a záver

V dnešnej dobe sú súčasťou všetkých protokolov liečby kortikoidy, antivirotiká, vitamíny, lieky na stabilizáciu vedľajších sprievodných komorbidít, antibiotiká (Kralinský, et al., 2020). Preto benefity preventívnych opatrení sú v porovnaní s týmto „liečebným koktejmom“ enormné. *Napríklad, kortikoidy môžu narušiť metabolizmus, spôsobiť cukrovku, potlačiť imunitu* (Kim, et al., 2020; Robinson, et al., 2021; Buchman 2001). *Antibiotiká zas môžu spôsobiť kolitídy či lieky na tlak negatívne pôsobiť na krvný obeh* (Cunha, 2001). *Navyše, keď sa pacient vyhne očkovaniu (aj iným preventívnym opatreniam) a príde v ťažkom stave na jednotku intenzívnej starostlivosti nevieme, či mu tieto lieky pomôžu chorobu prežiť* (Rana, et al., 2021; Kim, et al., 2020).

Účinným prostriedkom pre boj s vírusom SARS-CoV-2, ktorý spôsobil pandémiu a ochromil krajiny, rodiny, spoločnosti i jednotlivcov na celom svete, je **očkovanie**. Vedecké kapacity i historické fakty jasne dokazujú, že akýkoľvek vírus vieme najefektívnejšie poraziť bezpečnou a účinnou vakcínou. Očkovanie proti ochoreniu COVID-19 predstavuje nielen ochranu jednotlivca, ktorý je zaočkovaný, ale aj kolektívnu ochranu komunity a celej spoločnosti. Keď je človek zaočkovaný, je menej pravdepodobné, že by mohol preniesť infekčnú chorobu na iné osoby. To znamená, že očkovanie môže pomôcť chrániť tých, ktorí sami nemôžu byť očkovaní (Polack, et al., 2020; Fernandes, et al., 2021).

K tomu, aby bola celonárodne dosiahnutá tzv. kolektívna imunita, je v prípade COVID-19 potrebné preočkovať viac ako 60 – 70 % populácie.

Očkovanie má z hľadiska záchrany životov zásadný význam, ale neukončí pandémiu zo dňa na deň. Preto musíme používať aj iné možnosti prevencie.

V procese aktivácie antivírusovej imunity (nadviazanej na syntézu interferónu), je v prevencii „cytokínovej búrky“ a pre kompenzáciu chronických sprievodných ochorení, dôležité najmä **doplnenie deficitu vitamínu D a ostatných mikroživín**.

Vakcíny určené na prevenciu ochorenia COVID-19 sú podávané intramuskulárne a môžu v priebehu hodín až dní, po podaní, vyvolať lokálne ale aj celkové reakcie. Nahlásené podozrenia na nežiaduce účinky sú obvyklé a sú v súlade so známymi nežiaducimi účinkami (Tabuľka 4), ktoré sú uvedené aj v dokumentácii k lieku (Polack, et al., 2020; Riad, 2021; Fernandes, et al., 2021; Kantor, 2020).

Tabuľka 4. Porovnanie vedľajších účinkov vakcíny a následkov COVID-19. (Polack, et al., 2020; Riad, 2021; Fernandes, et al., 2021; Kantor, 2020).

Dlhodobé (vedľajšie) účinky	
Vakcína	COVID-19
Uvedené vedľajšie účinky.	Časť ľudí pociťuje dlhotrvajúce symptómy aj po vyliečení.
Dlhodobé vedľajšie účinky – raritný jav.	76 % pacientov (Lancet) malo pretrvávajúce príznaky aj 6 mesiacov po vyliečení
Pri žiadnej z registrovaných vakcín v EÚ nedošlo k spätnej deregistrácii kvôli neskôr sa objavujúcim vedľajším účinkom.	56 % pacientov (Australská štúdia) malo poškodené pľúca aj tri mesiace po prepustení z nemocnice.
Rôzne vakcíny sa na dobrovoľníkoch testujú posledné 3 roky, nie je známy žiadny prípad dlhodobých vedľajších účinkov.	Zatiaľ nie je úplne jasné, ako dlho môžu následky Covidu pretrvávať, a či v niektorých prípadoch nebudú trvalé.

Najčastejšie hlásené nežiaduce reakcie sú krátkodobé a nezávažné (Kantor, 2020). Ide napríklad o bolesť v mieste vpichu, ktorá sa môže rozvinúť do bolesti ramena až končatiny, do ktorej bola vakcína podaná, zvýšenú teplotu až horúčku, zimnicu a triašku, bolesť hlavy, svalov a kĺbov, slabosť, únavu, nevoľnosť a iné. Takéto hlásenia majú miernu alebo strednú intenzitu a do niekoľkých dní od podania očkovacej látky ustúpia.

Bezpečnostný profil vakcín na prevenciu ochorenia COVID-19 sa v mesačných intervaloch prehodnocuje na lokálnej úrovni a na úrovni Európskej únie. Na úrovni Európskej únie sa zistilo, že bezpečnostný profil zaregistrovaných vakcín je väčšinou v súlade s dokumentáciou k liekom a prínosy vakcíny vysoko prevyšujú všetky potenciálne riziká.

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ZHORŠENÁ KOMUNIKÁCIA S PACIENTOM V POSTCOVIDOVOM OBDOBÍ

IMPAIRED COMMUNICATION WITH THE PATIENT IN THE POST-COVID PERIOD

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Abstrakt

Úvod: Hlavným cieľom práce je sledovať prítomnosť a mieru závažnosti syndrómu vyhorenia ako následku problematickej, nevládnutej alebo neefektívnej komunikácie medzi zdravotníckym pracovníkom a pacientom, a to aj v súvislosti s postcovidovým obdobím, ktoré mohlo byť jedným z faktorov skôr negatívne ovplyvňujúcich kvalitu a efekt komunikácie medzi pacientom a zdravotníkom pri poskytovaní zdravotnej starostlivosti.

Materiál a metodika: Základný súbor tvorilo 64 sestier a 61 fyzioterapeutov, pracujúci na oddeleniach alebo ambulanciách štátnych (verejných) alebo súkromných zdravotníckych zariadení, bez limitácie vzdelania, s limitáciou veku pod 60 rokov, bez rozdielu pohlavia. Probandi boli oslovení cez sociálne siete, ako aj cestou odborných organizácií združujúcich sestry a fyzioterapeutov. K zberu údajov bola zvolená metóda dotazníku vlastnej konštrukcie, s využitím možnosti tvorby aj distribúcie dotazníku pomocou softvéru Google Formuláre, obsahoval 60 otázok. Získané informácie boli spracované metódami deskriptívnej štatistiky, pre kategorické premenné bol použitý Chí-kvadrát test, Mann-Whitneyho U-test a Kruskal-Wallisov test.

Výsledky: Takmer 9 z desiatich respondentov uviedlo, že sa s agresiou zo strany pacienta stretli opakovane. Súčasne reprezentanti oboch povolání udávajú stúpajúci počet agresívnych pacientov v poslednom období. U sestier, ktorých súbor bol štatisticky významne starší, je zvládanie agresie stále horšie tolerované. Tri štvrtiny fyzioterapeutov a dve tretiny sestier vníma ako zdroj agresie neprimeranú reakciu pacienta na vzniknutú situáciu. Najčastejšou formou agresie je verbálna agresia, u mladších sestier aj fyzická forma agresie zo strany pacienta. Pre zvládanie agresie pacienta sestry preferujú čas strávený s pacientom, čo môže byť podmienené tým, že sestry hlavne na oddeleniach sú zvyknuté komunikovať s pacientom počas dňa podstatne častejšie a dlhšie a vedia posúdiť aj mieru prínosu času, ktorý venujú pacientom. Zvýšený výskyt agresie v práci môže byť jedným z dôvodov častejšieho výskytu syndrómu vyhorenia u sestier.

Záver: Zvládnutie efektívnej komunikácie v rámci zdravotnej starostlivosti je veľmi náročné. Správna komunikácia medzi zdravotníkom a pacientom, ako aj medzi zdravotníkmi

pracovníkmi navzájom je jedným z kľúčových faktorov, ktorý môže zabrániť, prípadne aspoň oddialiť vznik a rozvoj syndrómu vyhorenia u zdravotníckych pracovníkov.

Kľúčové slová: komunikácia, covid pandémia, sestry, fyzioterapeuti, syndróm vyhorenia.

Abstract

Introduction: The main goal of the work is to monitor the presence and degree of severity of burnout syndrome as a consequence of problematic, unmanaged or ineffective communication between a healthcare worker and a patient, also in connection with the post-covid period, which could be one of the factors rather negatively affecting the quality and effect of communication between the patient and healthcare professionals in the provision of health care.

Material and Methods: The basic set consisted of 64 nurses and 61 physiotherapists, working in departments or clinics of state (public) or private health facilities, without limitation of education, with limitation of age under 60 years, without gender difference. Probands were approached through social networks, as well as through professional organizations bringing together nurses and physiotherapists. The method of self-constructed questionnaire was chosen for data collection, using the possibility of creating and distributing the questionnaire using the Google Forms software, it contained 60 questions. The obtained information was processed by descriptive statistics methods, Chi-square test, Mann-Whitney U-test and Kruskal-Wallis test were used for categorical variables.

Results: Almost 9 out of ten respondents stated that they had encountered aggression from the patient repeatedly. At the same time, representatives of both professions report an increasing number of aggressive patients in recent times. In nurses, whose group was statistically significantly older, the handling of aggression is still worse tolerated. Three quarters of physiotherapists and two thirds of nurses perceive the patient's inappropriate reaction to the situation as a source of aggression. The most common form of aggression is verbal aggression, with younger nurses also physical aggression on the part of the patient. In order to manage patient aggression, nurses prefer time spent with the patient, which may be conditioned by the fact that nurses, especially in the wards, are used to communicating with the patient significantly more often and longer during the day, and they also know how to assess the benefit of the time they devote to patients. The increased occurrence of aggression at work may be one of the reasons for the more frequent occurrence of burnout syndrome in nurses.

Conclusion: Mastering effective communication within health care is very challenging. Correct communication between a healthcare professional and a patient, as well as between healthcare professionals, is one of the key factors that can prevent, or at least delay, the onset and development of burnout syndrome in healthcare professionals.

Keywords: communication, covid pandemic, nurses, physiotherapists, burnout syndrome.

Úvod

Komunikácia vo všeobecnosti je nielen prostriedkom dorozumievania, pochopenia, vyjadrenia názorov, pocitov a potrieb, ale predovšetkým spôsobom kontaktov medzi ľuďmi. Prax ukazuje, že i ten najlepší terapeuticky postup bez adekvátnej spoluúčasti pacienta nemusí priniesť zlepšenie. Podobne, ak sa pacient účastní liečby len v ordinácii a neprenáša nič do bežného života, je nádej na terapeutickú zmenu relatívne malá. V tomto zmysle patrí komunikácia s pacientom medzi liečebné nástroje. Rozhovor s pacientom je popri liečebných úkonoch ďalšou priamou súčasťou liečby.

Čím sú dnes zdravotníci ohrození? Pracovný stres, neefektívna komunikácia s pacientom, rastúce nároky v zamestnaní, alebo strach z prípadného zlyhania sú príznaky terajšej doby, ktoré niekto zvláda bez problémov, ale v druhom môžu zanechať hlbšie stopy. Zvýšený tlak krvi, bolesť hlavy a búšenie srdca môžu signalizovať, že s organizmom sa niečo deje. Ak sa problémy neriešia, môže stav vyústiť až do syndrómu vyhorenia (burn out). Prichádza strata chuti do života, nezáujem o veci okolo, o prácu, rozladenosť. Ide o závažný psychologicko-medicínsky problém s vysokým dopadom na kvalitu života sestry a fyzioterapeuta a ich výkonu. Prejavuje sa stratou energie a ideálov, čo následne vedie k stagnácii, frustrácii a apatii (Poschkamp, 2013). Práca v zdravotníctve je principiálne spojená s vyššou mierou stresu (distres), ktorý sa logicky dlhodobo zvyšoval počas obdobia covidovej pandémie (Vitale, 2021).

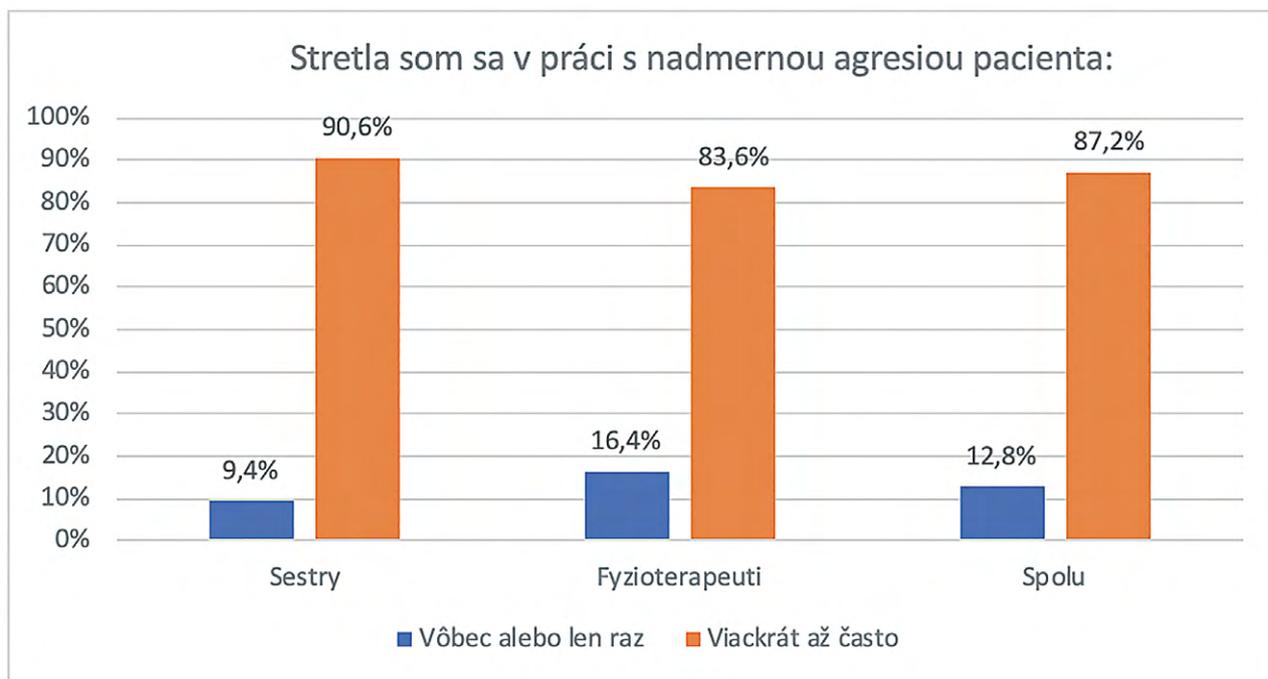
Metodika

Definovaný prieskumný problém bol: Aký je vplyv súčasnej covidovej pandémie na podmienky práce zdravotníkov (sestier a fyzioterapeutov) s dôrazom na problémy komunikácie personálu zdravotníckych zariadení s pacientom, ako aj na výskyt a mieru syndrómu vyhorenia ako následku aktuálnych pracovných podmienok s možnými komunikačnými problémami.

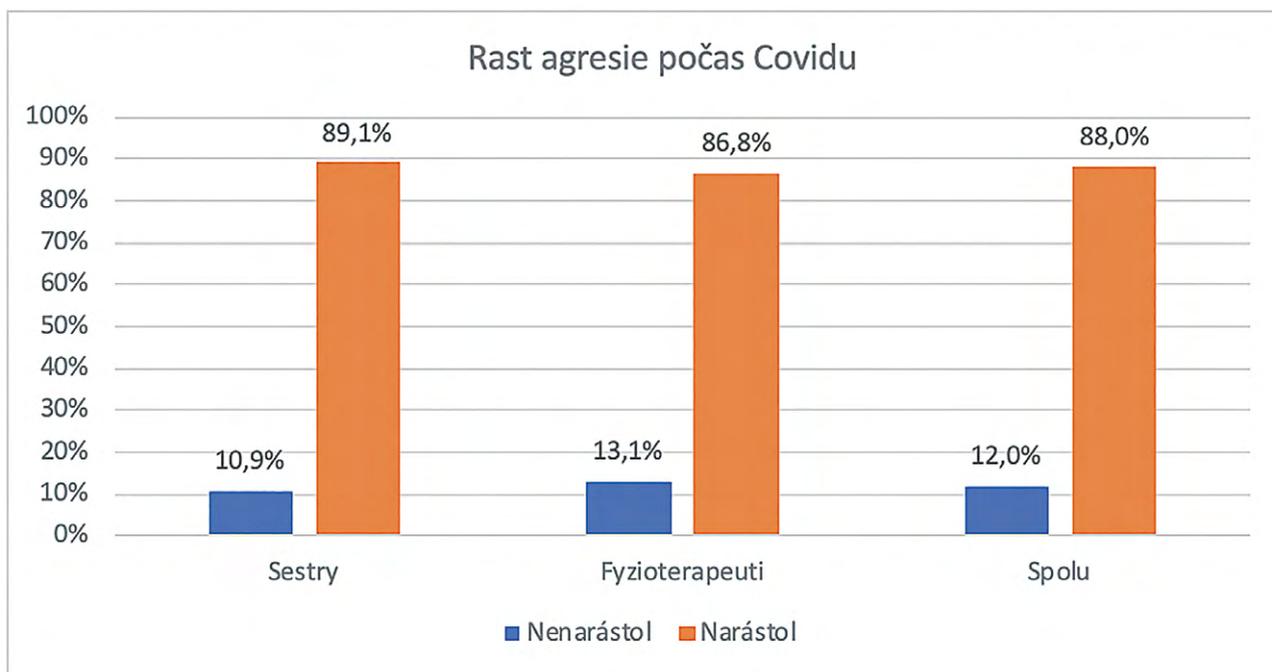
Hlavným cieľom prieskumu bolo sledovať prítomnosť a mieru závažnosti syndrómu vyhorenia ako následku problematickej, nevládnutej alebo neefektívnej komunikácie medzi zdravotníckym pracovníkom a pacientom v súvislosti s covidovou pandemiou. Základný sledovaný súbor tvorili sestry a fyzioterapeuti, pracujúci na oddeleniach alebo ambulanciách štátnych (verejných) alebo súkromných zdravotníckych zariadení, bez limitácie vzdelania (absolventi stredných škôl, absolventi I. a II. stupňa vysokoškolského vzdelania) s limitáciou veku pod 60 rokov, bez rozdielu pohlavia. Probandi boli oslovení cez sociálne siete, ako aj cestou odborných organizácií združujúcich sestry a fyzioterapeutov. Zber dát bol limitovaný na obdobie 8 týždňov. Prierezové dáta s čiastočným retrospektívnym zisťovaním a porovnávaním boli zisťované dotazníkovou metódou, s využitím možnosti tvorby aj distribúcie dotazníku pomocou softvéru Google Formuláre, obsahoval 60 otázok. Získané informácie boli spracované metódami deskriptívnej štatistiky. Údaje o frekvencií odpovedí sú v tabuľkách v absolútnej (n) a relatívnej (%) početnosti. Pre spracovanie kategorických premenných bol použitý Chí-kvadrát test, u ordinálnych premenných Mann-Whitneyho U test, pri porovnaní viac ako dvoch skupín premenných Kruskal-Wallisov test. Bolo spracovaných 125 kompletných dotazníkov, z toho 64 dotazníkov vyplnili sestry a 61 fyzioterapeuti.

Výsledky

Odpovede na prvé otázky ohľadom výskytu agresie zo strany pacientov neprekvapili: takmer 9 z 10 opýtaných bez rozdielu povolania uviedlo, že sa s agresiou stretli opakovane (graf 1). Súčasne reprezentanti oboch povolání bez rozdielu pohlavia udávali stúpajúci počet agresívnych pacientov v poslednom období (graf 2).

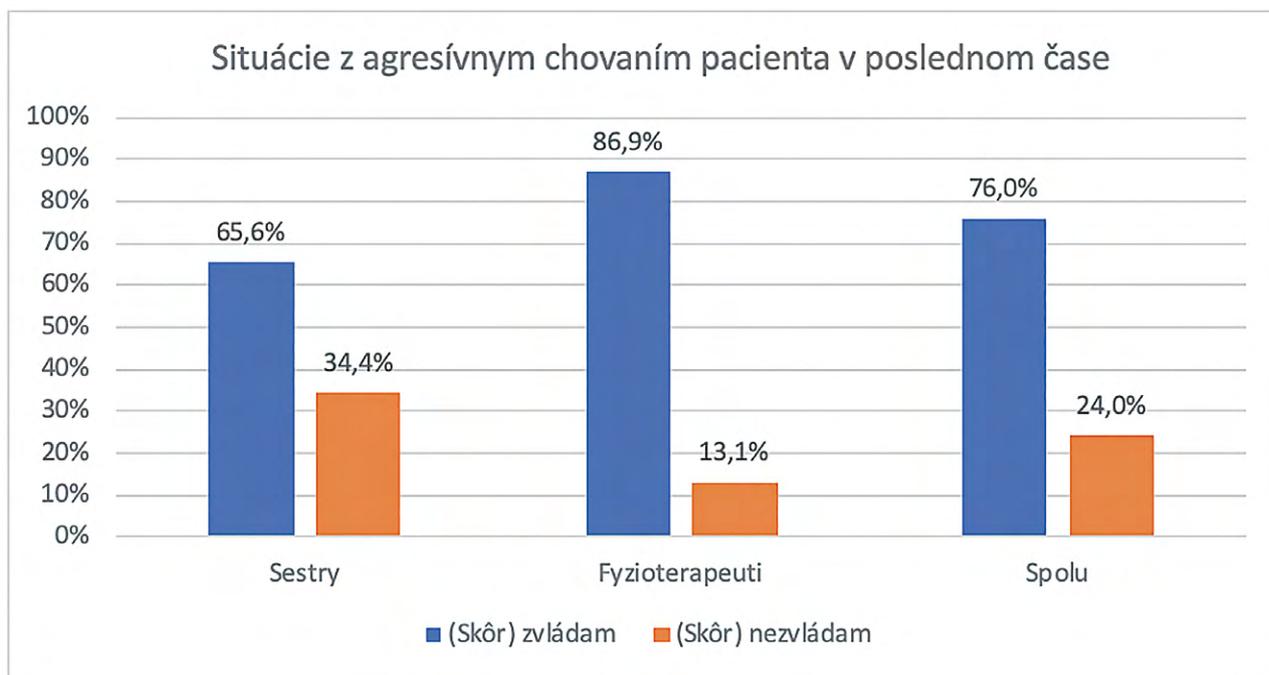


Graf 1. Stretnutie zdravotníckeho pracovníka s nadmernou agresiou.



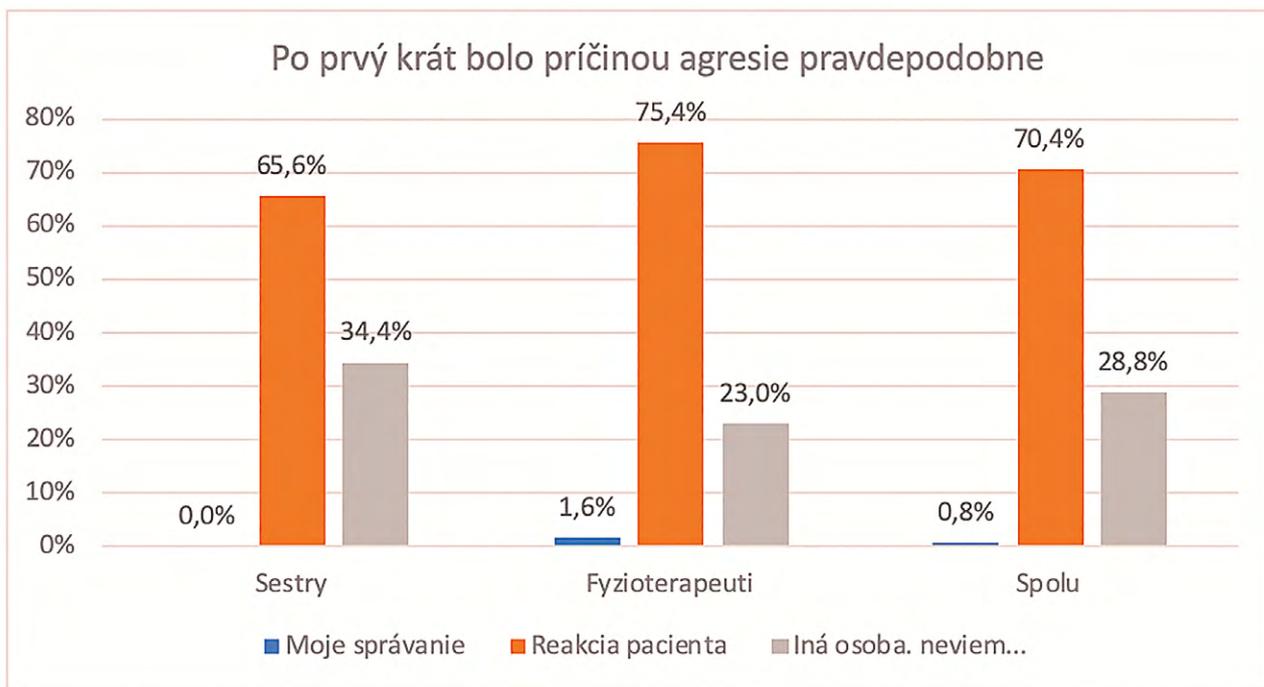
Graf 2. Nárast miery agresie počas covidovej pandémie.

V skupine sestier (z vyšším priemerným vekom ako v skupine fyzioterapeutov), bolo zvládanie agresie stále horšie tolerované. Možno aj z dôvodu, že zažili vo svojej dlhoročnej profesionálnej praxi aj obdobia s úctivejším chovaním pacientov k zdravotníckemu personálu a zmenu chovania pacientov (aj v súvislosti s pandemiou) tolerovali preto horšie (graf 3).



Graf 3. Schopnosť zvládať agresivitu pacienta v posledných mesiacoch pandémie.

Tri štvrtiny fyzioterapeutov a dve tretiny sestier (bez ohľadu na ich vek) vníma ako zdroj agresie neprimeranú reakciu pacienta na vzniknutú situáciu (rozdiel nemal štatistickú významnosť). Len proband zo 125 uviedol, že zdrojom agresie pacienta bolo jeho chovanie k pacientovi. Štvrtina probandov nevie presne definovať dôvod (podnet) agresívneho chovania pacienta, štatisticky nevýznamne viac u sestier bez ohľadu na vek. Ako možné príčiny agresie probandi uvádzali rozdielne názory na testovanie (44 vs. 42 odpovedí), očkovanie (54 vs. 53 odpovedí), rozdielne názory na následky prekonania ochorenia (44 vs. 42 odpovedí), samotné následky prekonanej infekcie COVID (14 vs. 14), strach z ochorenia COVID (47 vs. 39) a strach o osud príbuzného (33 vs. 23 odpovedí). Častejšie sú ako agresori uvádzaní muži (graf 4).



Graf 4. Možný dôvod prvej situácie s agresivitou pacienta s pohľadu probandov.

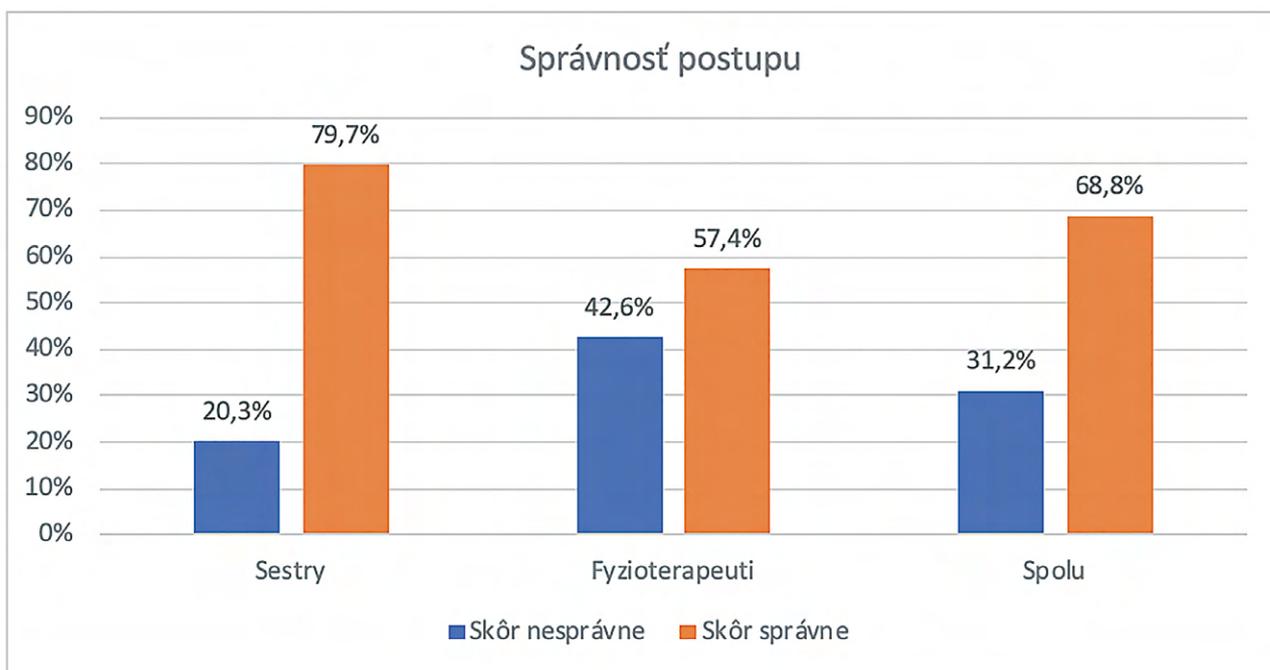
Jedna z otázok sa týkala vedomostí o správnom, resp. optimálnom postupe pri zvládaní agresívneho pacienta v súlade s publikovanými odporúčaniami. Správnosť odpovede bola daná súhlasom so všeobecne známym publikovaným štandardným postupom pri komunikácii s agresívnym pacientom. Literatúra odporúča nedotýkať sa agresívneho pacienta, byť proti nemu v rovnakej výške (ak sedí – sedieť pred ním), nebyť v miestnosti s agresívnym pacientom sám, čo najmenej gestikulovať a pokiaľ sa dá, pozerať mu do očí (Kristová, 2020).

Štatisticky významne častejšie uviedli správne odpovede sestry. To dokumentuje dôležitosť profesionálnej skúsenosti zdravotníckych pracovníkov získanej praxou. Možno totiž predpokladať, že staršie sestry (často iba so stredoškolským vzdelaním) neabsolvovali intenzívne vzdelávanie v oblasti komunikácie s pacientom a správne odpovede zadali na základe svojich životných skúseností vo svojej profesii (graf 5).

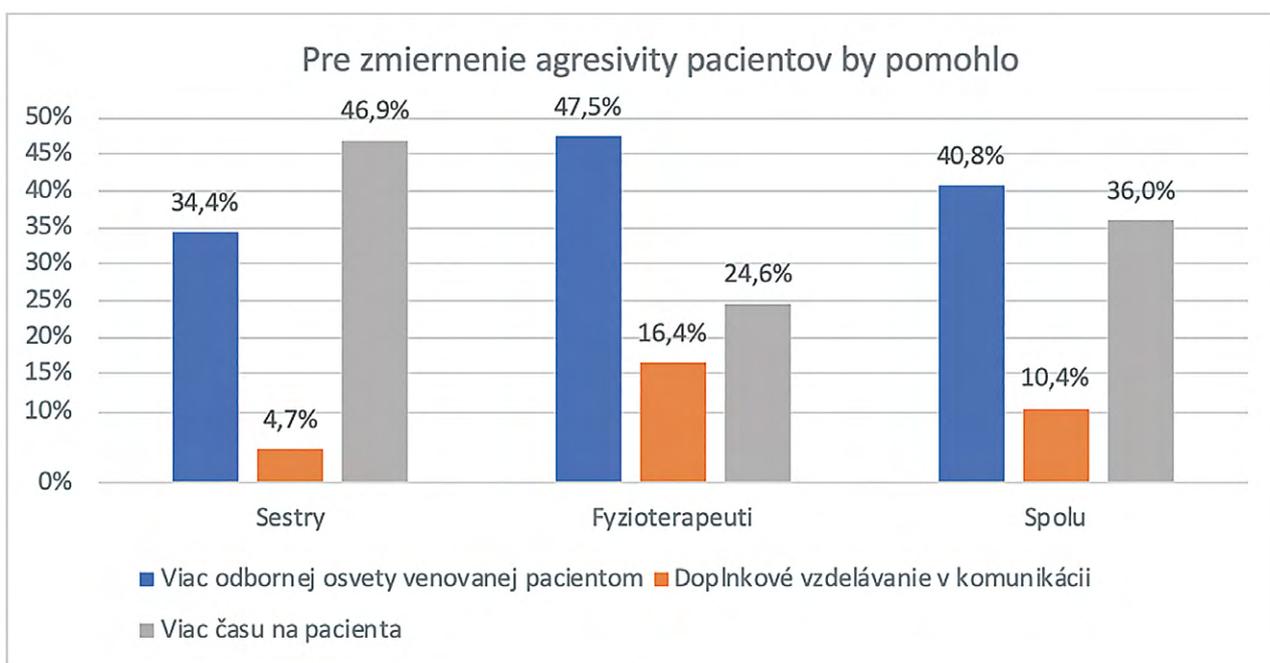
Pre zlepšenie zvládania agresívnych pacientov neexistuje ideálny postup, dominujú dva podobné postupy:

- do vzdelávania v rámci odbornej osvetu,
- venovať pacientovi viac času, čo je tiež určitá forma edukácie pacienta.

Spolu tvoria tieto dve modality od cca 67 do 80 % (graf 6).



Graf 5. Voľba správneho postupu pri zvládaní agresívneho pacienta.

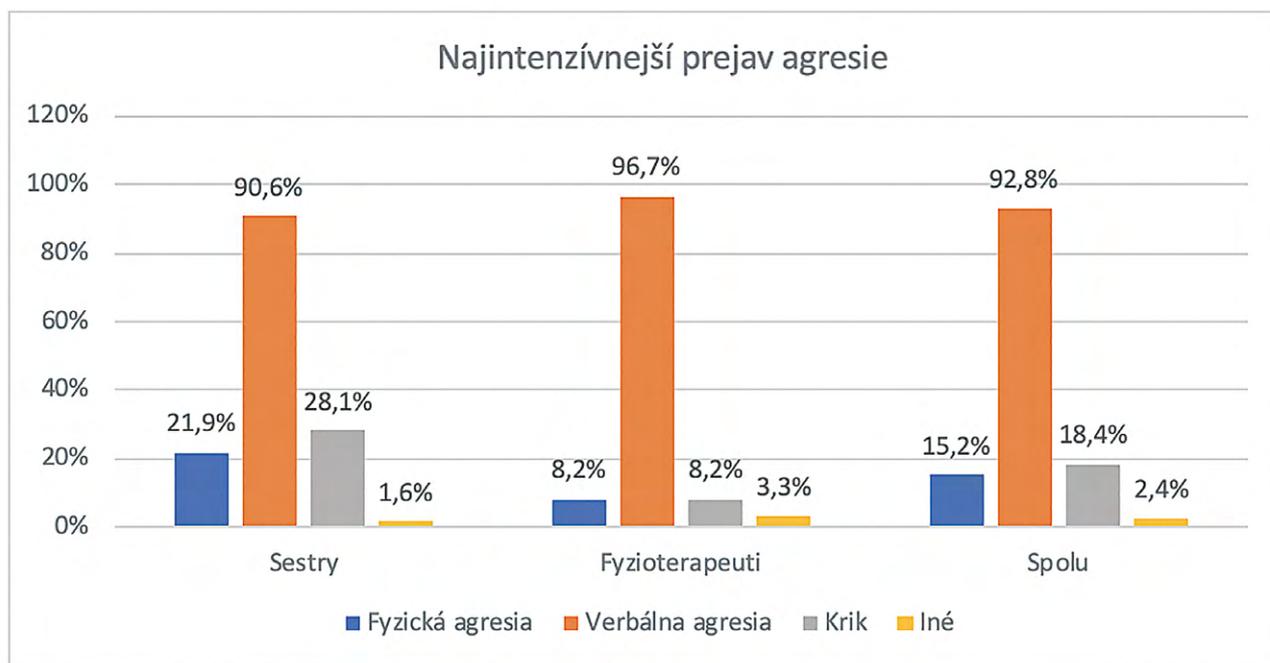


Graf 6. Voľba vhodnej možnosti pre zmiernenie agresívneho pacienta.

Preferencia času stráveného s pacientom zo strany sestier môže byť podmienená tým, že sestry hlavne na oddeleniach sú zvyknuté komunikovať s pacientom počas dňa podstatne častejšie a dlhšie a vedia lepšie posúdiť aj mieru prínosu času, ktorý venujú pacientom. Sestry z oddelení preferujú pri zmiernovaní agresie pacienta viac času venovaného pacientovi v 63,9 % odpovedí, ambulantné sestry v 26,9 % prípadov. Skoro polovica fyzioterapeutov preferuje viac odbornej osvetu venovanej pacientovi a sestry 34 %. Problémom reálnej praxe však zostáva skutočnosť, že v súčasnej situácii v zdravotníctve, zaťaženej následkami covidovej pandémie, je času na kľudný rozhovor s pacientom stále menej.

Zdroje informácií a možnej pomoci pri zvládaní agresie hľadajú fyzioterapeuti a sestry rôzne, viacerí odpovedajúci si zvolili viac odpovedí. Je to potvrdením skutočnosti, že ideálne riešenie asi neexistuje. Všetci probandi bez rozdielu veku a profesie preferujú hlavne konzultácie s kolegami. Vyhľadávajú informácií na internete hľadajú hlavne sestry, z nich viac mladšie sestry, resp. sestry s kratšou praxou, čo má logické vysvetlenie: mladší ľudia viac inklinujú k moderným technológiám. Možnosť absolvovať do vzdelávanie v rámci nejakého kurzu zvolilo najviac 10 % probandov v ktorejkoľvek kategórii bez rozdielu veku a profesie.

Najčastejšou formou agresie je podľa výsledkov verbálna agresia. Štatisticky častejšie (bez rozdielu veku) sa však sestry stretávajú s krikom pacienta, tie mladšie štatisticky významne aj s fyzickou agresiou. Vysvetlením môže byť fakt, že k žene, zvlášť mladšej si trúfa agresívne vystúpiť viac osôb ako k mužovi, resp. staršej žene. Brachiálnu agresiu uvádzalo 22 % sestier a 8 % fyzioterapeutov (graf 7).



Graf 7. Najčastejšie formy agresie zo strany pacientov.

Jednou z principiálnych otázok bola otázka priamo zameraná na prejavy syndrómu vyhorenia u fyzioterapeutov a sestier. Bez ohľadu na vek porovnávaných skupín bolo skóre prítomnosti syndrómu vyhorenia štatisticky významne vyššie u sestier ako u fyzioterapeutov. Ako jedna z možností sa núka aj také vysvetlenie, že na rozdiel od fyzioterapeutickej komunity sa u sestier všeobecne akceptuje skutočnosť, že ich je v porovnaní s potrebným počtom stále menej – z viacerých dôvodov unikajú mimo zdravotnícky segment a tie zostávajúce sú preto stále viac pracovne, a tým aj psychicky preťažené.

Odpovede na celkové hodnotenie kvality života a práce, resp. spokojnosti so životom s prácou priniesli výsledky, ktoré preukázali v skupine sestier (bez ohľadu na vek) väčšiu nespokojnosť so životom, reálny život viac vzdialený od ideálu ako aj celkovo horšie hodnotenie kvality života v porovnaní s fyzioterapeutmi. U vekovo starších k tomu ešte treba priradiť aj

štatisticky významne častejšie odpovede udávajúce častejší výskyt stresu v živote, ako aj menej vyjadrenú spokojnosť so zvoleným povoláním sestry. Analýza odpovedí na otázku ohľadom kvality života (s ohľadom na vzdelanie) ukázali, že štatisticky významne horšie vnímajú kvalitu života stredoškolsky vzdelané sestry. Mohlo by to mať súvis aj s opakovanými nepremyslenými legislatívnymi zmenami v posledných rokoch, ktoré zneistili spoločenské aj profesijné postavenie stredoškolsky vzdelaných sestier v hierarchii zdravotníckych pracovníkov. Odpovede na celkové hodnotenie kvality života a práce, resp. spokojnosti so životom možno hodnotiť tak, že sú v konkordancii s hodnotením miery a intenzity syndrómu vyhorenia u sestier, ktorého existenciu a intenzitu štatisticky významne viac u sestier ako fyzioterapeutov preukázalo vyhodnotenie polytomickej škálovacej otázky koeficientom.

Niektoré výsledky nášho prieskumu sú v súlade s publikovanými dátami tykajúcimi sa výskytu syndrómu vyhorenia u fyzioterapeutov. Medzi fyzioterapeutmi sa zriedkavo vyskytujú prípady kompletného vyhorenia, zato čiastočné príznaky vyhorenia sú pozorovateľné u 53 % fyzioterapeutov. V porovnaní so sestrami bol v našom sledovaní syndróm vyhorenia intenzívnejší a častejší u sestier ako u fyzioterapeutov. Väčšia tendencia k vzniku syndrómu vyhorenia bola tiež pozorovaná u tých fyzioterapeutov, ktorí žijú v husto osídlených oblastiach a tiež u tých, ktorí počas svojej kariéry vystriedali väčší počet pracovných miest (Linzer, 2013).

Medzi odporúčaniami k prevencii vzniku syndrómu vyhorenia sú v literatúre uvádzané aj také, ktoré sú realizovateľné bez ekonomickej (finančnej) nákladnosti – vyžadujú tímovú spoluprácu pri dodržiavaní etiky medzi zdravotníkmi, zároveň sú podmienené určitou mierou spokojnosti so životom a prácou. Exaktné a dobrovoľné (často aj podvedomé) dodržiavanie zásad správnej komunikácie môže byť jedným z dôležitých faktorov, ktorý by mohol byť tiež považovaný za potrebný (ak nie nenahraditeľný) pri prevencii vzniku a rozvoja syndrómu vyhorenia u zdravotníckych pracovníkov všetkých profesií (Kristová, 2020; McCarthy, 2021).

Záver

Zvládnutie efektívnej komunikácie v rámci zdravotnej starostlivosti je veľmi náročné. Rozhovor s chorým nám umožňuje nadviazanie kontaktu, odovzdávanie správ a je nepreberným zdrojom informácií o pacientovi. Základným nástrojom pre odovzdávanie informácií je hovorená reč, mnohokrát je ale potrebné vedieť použiť aj iné dorozumievacie prostriedky, a to u pacientov so zníženou schopnosťou komunikovať. Špecifiká efektívnej komunikácie sú:

- Nezabúdať na pozdrav a predstavenie sa.
- Pacientovi vytvoriť priestor na rozprávanie.
- Aktívne počúvať.
- Minimalizovať rušivé vplyvy.
- Používať vhodné otázky.
- Prejavovať porozumenie.
- Empatické počúvanie, asertívne správanie.
- Vyhýbať sa intrúzii.
- Vedieť poskytnúť psychickú podporu.

Komunikáciou, ako aj celým svojím správaním pôsobíme na pacienta v kladnom i zápornom slova zmysle. Toto by sme mali mať neustále na mysli a komunikovať vždy s citom, empatiou a asertívne.

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EMPLOYEES SATISFACTION WITH WORKING FROM HOME DURING THE COVID-19 PANDEMIC

SPOKOJNOSŤ ZAMESTNANCOV S PRÁCOU VYKONÁVANOU Z DOMU POČAS PANDÉMIE COVID-19

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Abstract

Introduction: The literature provides evidence that work flexibility in terms of time and space has long been recognised as a key factor in significant productivity gains while enabling individuals to better manage challenging work and life situations. Home office allows flexibility and thanks to the COVID-19 pandemic it has become a recommended form of work.

Aims: The survey also included a goal dedicated to evaluating employees' satisfaction with working from home as well as determining their preferences of work organization for the future.

Material and method: The object of investigation consisted of 368 employees working from home. The data was obtained through an online questionnaire survey, processed into a database and statistically analysed using the SPSS 28.0 program.

Results: Less than a third of employees had encountered working from home even before the COVID-19 pandemic. During the pandemic, most employees (29 %) worked from home 2 days a week. 68 % of respondents perceived the experience of working from home positively. Most respondents perceived the workload while working from home at the same level as when working at the workplace. Around half of respondents felt equally productive while working from home compared to working from work, but around one-third felt more productive when working from home. It was difficult for both sexes to maintain fixed working hours (not to exceed the set working hours, 23 % of women also found it difficult to maintain a balance between personal and professional life; to work in social isolation and to deal with anxiety related to COVID-19. Most employees expressed interest in a hybrid way of organizing work for the future, ideally in a 60:40 ratio (workplace vs. household).

Conclusion: Companies face a new challenge of setting internal policies for a hybrid model of work, taking into account in particular the principles of employee health protection when working from home and effective control tools.

Key words: home office, teleworking, employees, COVID-19, Slovakia

Abstrakt

Úvod: Literatúra poskytuje dôkazy o tom, že pracovná flexibilita z hľadiska času a priestoru sa už dlho považuje za kľúčový faktor významného zvýšenia produktivity a zároveň umožňuje jednotlivcom lepšie zvládať náročné pracovné a životné situácie. Home office umožňuje flexibilitu a vďaka pandémie COVID-19 sa stal odporúčanou formou práce.

Ciele: Súčasťou prieskumu bol aj cieľ zameraný na hodnotenie spokojnosti zamestnancov s prácou z domu, ako aj na zistenie ich preferencií organizácie práce do budúcnosti.

Materiál a metodika: Predmetom vyšetrovania bolo 368 zamestnancov pracujúcich z domu. Údaje boli získané prostredníctvom online dotazníkového prieskumu, spracované do databázy a štatisticky analyzované pomocou programu SPSS 28.0.

Výsledky: Len menej ako tretina zamestnancov sa stretla s prácou z domu ešte pred pandemiou COVID-19. Počas pandémie najviac zamestnancov (29 %) vykonávalo prácu z domu 2 dni v týždni. 68 % respondentov vnímalo skúsenosť s prácou z domu pozitívne. Väčšina respondentov vnímala pracovnú záťaž počas výkonu práce z domu na rovnakej úrovni ako počas práce na pracovisku. Približne polovica respondentov sa cítila rovnako produktívna počas práce z domu v porovnaní s prácou na pracovisku, ale približne jedna tretina sa cítila produktívnejšia pri práci z domu. Pre obidve pohlavia bolo náročné udržať fixný pracovný čas (neprekračovať stanovenú dĺžku pracovnej doby, pre 23 % žien bolo aj náročné udržať rovnováhu medzi osobným a pracovným životom; pracovať v sociálnej izolácii a vysporiadať sa s úzkosťou spojenou so situáciou COVID-19. Väčšina zamestnancov prejavila záujem o hybridný spôsob organizácie práce do budúcnosti, ideálne v pomere 60:40 (pracovisko vs. domácnosť).

Záver: Spoločnosti stoja pred novou výzvou nastavenia vnútorných politík pre hybridný model práce zohľadňujúci predovšetkým zásady ochrany zdravia zamestnancov pri práci z domu a účinných nástrojov pre kontrolu.

Kľúčové slová: home office, práca na diaľku, zamestnanci, COVID-19, Slovensko

Introduction

On 30 January 2020, the Director-General of the World Health Organization declared the novel coronavirus outbreak a public health emergency of international concern (WHO, 2020). The first case was confirmed in Slovakia and reported in WHO statistics on 6 March 2020 (WHOa, 2020). Since that day, the lives of all of us have changed significantly, and we have begun to see the world as a world before and after the pandemic.

In our study, we analyse how the pandemic affected the business environment and companies in terms of ordering work from home in all spheres and professions where the situation allowed. There are many technical problems and health risks associated with working from home, whether permanently or occasionally, which need to be addressed and which are still not sufficiently understood.

Working from home can be considered a valuable way to successfully manage work-life balance; however, at the same time, it can have potentially harmful effects on physical and mental health, and can even blur the boundaries between work and private life (Messenger, 2019). A relevant example of our time is the COVID-19 pandemic, which has moved millions of workers around the world from offices to their homes for the purpose of self-isolation (Raishiené, et al., 2020). In connection with the COVID-19 pandemic, employers have started to take various preventive measures, one of which is teleworking or working from home.

Working from home (home office, teleworking) are all concepts that represent a specific type of work that is not tied to the employer's workplace, but to another agreed place of work, most often the employee's residence (household), throughout working hours. Despite the fact that the latest amendment to the Labour Code came into force with effect from 1 March 2021 in connection with addressing the impacts of the COVID-19 pandemic, the term "home office" is not defined in it. Section 52 defines only the concepts of domestic work and telework (Zákon č. 311/2001 Z. z.). The possibility of occasionally working from home is often offered by employers to their employees as a corporate benefit or as a preventive measure "temporary adjustment of the conditions of work", which reduces the risk of employee contact with a possible source of infection. Home office as an institute is not elaborated in the Labour Code. There is no legal definition of the term home office, as well as the conditions for its implementation. In the case of home office, this is occasional, not regular work from home.

An increasing amount of scientific literature on the subject shows that flexible work in terms of time and space has long been recognised as a key factor in significant productivity gains (Eurofound, 2011, 2012; Harker, MacDonnell, 2012). Although a teleworking revolution has been predicted for many years, this expected change did not occur before the COVID-19 crisis (EU-OSHA, 2021). In fact, in 2019, only around 5 % of employees from the 27 EU (EU-27) Member States worked mostly from home. Taking into account also those who work from home on an occasional basis, this figure rises to around 11 % of the total number of employees in the EU-27. The use of teleworking varies across EU countries.

Data from Eurofound also suggests that there has been a dramatic increase in working from home among workers in Europe. Around 37 % of the EU working population switched to teleworking as a result of the pandemic, and 24 % of them had their first experience of working from home (Eurofound, 2020b). Before the pandemic, employees considered working from home as a benefit, however, COVID-19 lockdown changed this and made working from home mandatory (Kniffin, et al., 2021). Flexibility in working conditions has increased dramatically since the outbreak of the COVID-19 pandemic, as it is an unforeseen global event that is so disruptive that some researchers are investigating it as a "natural experiment" whose far-reaching effects can be judged by comparing the situation "before" and "after" the epidemic (Dunatchik, et al., 2021).

Objectives

The design of the cross-sectional study was chosen primarily for the purpose of a “quick” assessment of employees’ working conditions at home, a subjective assessment of health, as well as employees’ experiences and preferences in relation to working from home during the COVID-19 pandemic. An extensive cross-sectional study aimed to evaluate the public health aspects of working from home. In this article, we focus on evaluating only one goal from the entire survey. The aim was to gauge employees’ satisfaction with the work-from-home regulation.

Research method

Design

This was an observational cross-sectional study using an online survey. The survey was carried out in the time period April – May 2022 through an online questionnaire tool among employees of companies and organizations providing this form of work.

Sample

Respondents were selected using the standard methodology used in surveys – the snowball method. This method was chosen in order to achieve a larger number of respondents to the monitored population easier and faster. The basic criteria for inclusion of an employee in the monitored population were: to be employed (not self-employed), to work more than 20 hours/week, age from 18 to 65 years and to work from home during the pandemic.

The monitored population consisted of 368 employees of companies and organizations from all over the Slovak Republic who worked from home during the COVID-19 pandemic and met the above criteria. The sample consisted of 238 (65 %) women and 130 (35 %) men.

Data collection and analysis

Data collection took place between April and May 2022. The data was collected through an online questionnaire through a web survey provider. To carry out the survey, we used a non-standardized questionnaire inspired by several questionnaires used in foreign studies. The questionnaire was created to gain a more detailed view of the public health aspects of working from home during the COVID-19 pandemic. The questionnaire consisted of 37 questions, which were open type with the respondent’s answer and closed type dichotomic so-called filter type with the possibility to answer yes/no or with the possibility to choose one or more answers.

In total, the questionnaire consisted of 5 parts. In particular, Part C focused on employees’ experiences in relation to working from home – before the COVID-19 pandemic, during the COVID-19 pandemic, frequency of work from home, level of work productivity, workload level, evaluation of the difficulty of this period in terms of maintaining work-life balance, maintaining work habits, work and rest patterns and employees’ preferences in terms of the form and organisation of work for the future. This part of the questionnaire was inspired by

a survey entitled “Teleworking Survey: Learning from The COVID-19 Crisis” (OECD, 2020), some of the questions included were assessed using a 5-step Likert scale with choices “from most challenging to least demanding”. The data obtained through the questionnaire was processed into a database and subsequently analysed using the SPSS statistical program version 28.0 (SPSS Inc., Chicago; IL, USA). For descriptive purposes, standard methods of frequency, frequency and percentage have been used.

Results

Before the COVID-19 pandemic, only 29 % respondents had encountered the form of working from home in some way, the remaining 71 % did their work exclusively from their workplace (Table 1).

Table 1. Composition of respondents by working from home experience before COVID-19 pandemic.

Working from home before COVID-19	N	%
Yes	107	29
No	261	71
Total	368	100

After the outbreak of the COVID-19 pandemic, the situation changed and 40 % respondents declared that they had worked from home for 1 – 3 years, 31 % only during the quarantine period, 16 % for more than three years, 8 % respondents for less than one year and 5 % respondents used this form of work for only a few weeks (Figure 1).

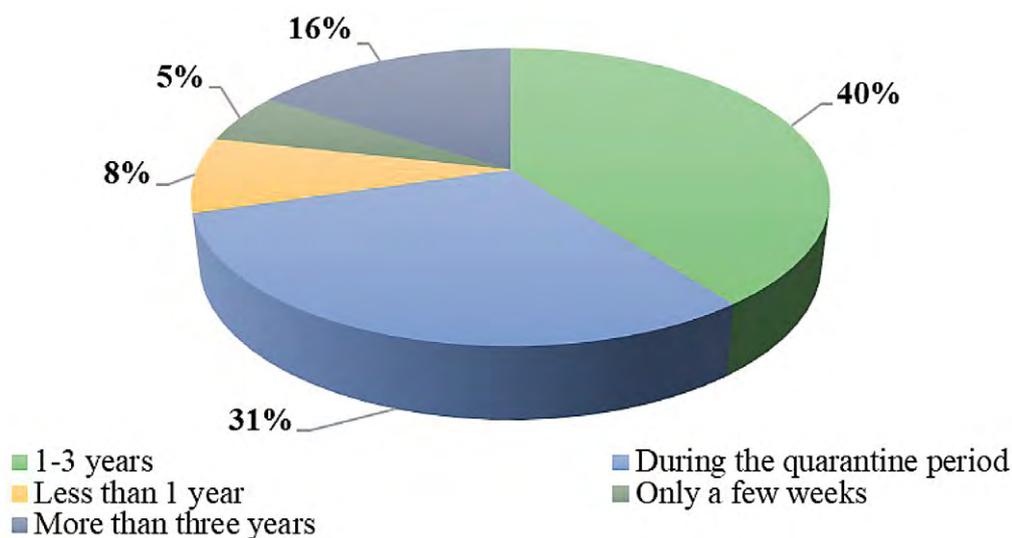


Figure 1. Percentage of respondents by length of teleworking experience.

Most respondents, namely 29 % worked from home regularly 2 days a week, 23 % respondents did it 1 and also 3 days a week, 19 % respondents worked from home all working week and 6 % respondents did it 4 days a week (Figure 2).

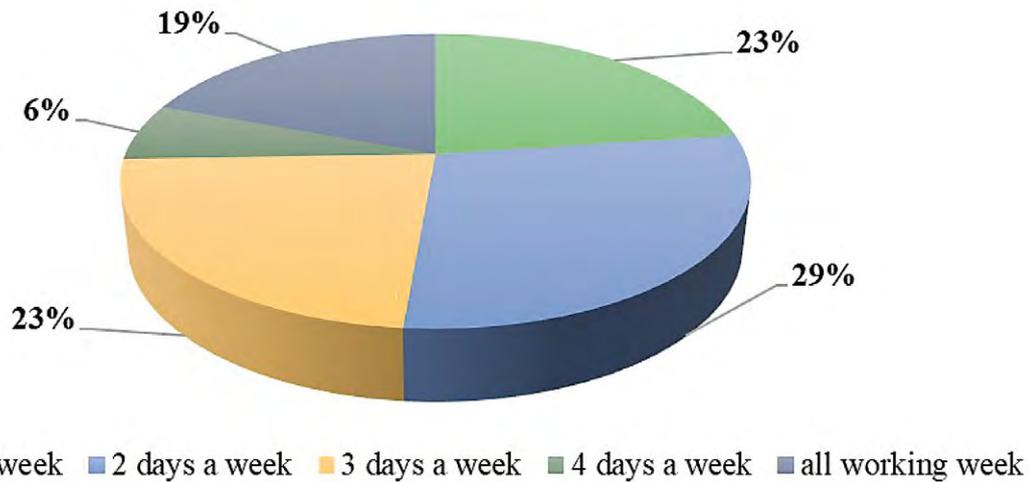


Figure 2. Percentage of respondents by number of days of the week performing work from home.

Overall, from the surveyed population, 68 % respondents perceived the experience of working from home positively. Only 10 % respondents were negatively affected by working from home. Neutral feelings about working from home were expressed by 22 % of respondents (Figure 3).

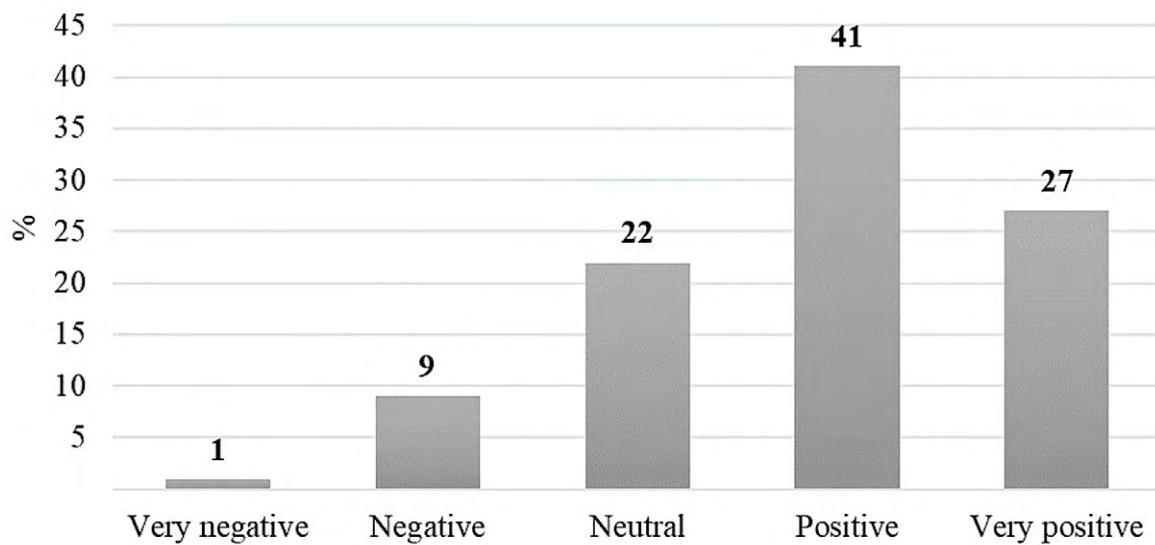


Figure 3. Percentage of respondents according to subjective perception of experience Working from home.

In terms of gender, 43 % men and 40 % women perceived the experience of working from home positively, 24 % men and 28 % women even very positively (Figure 4).

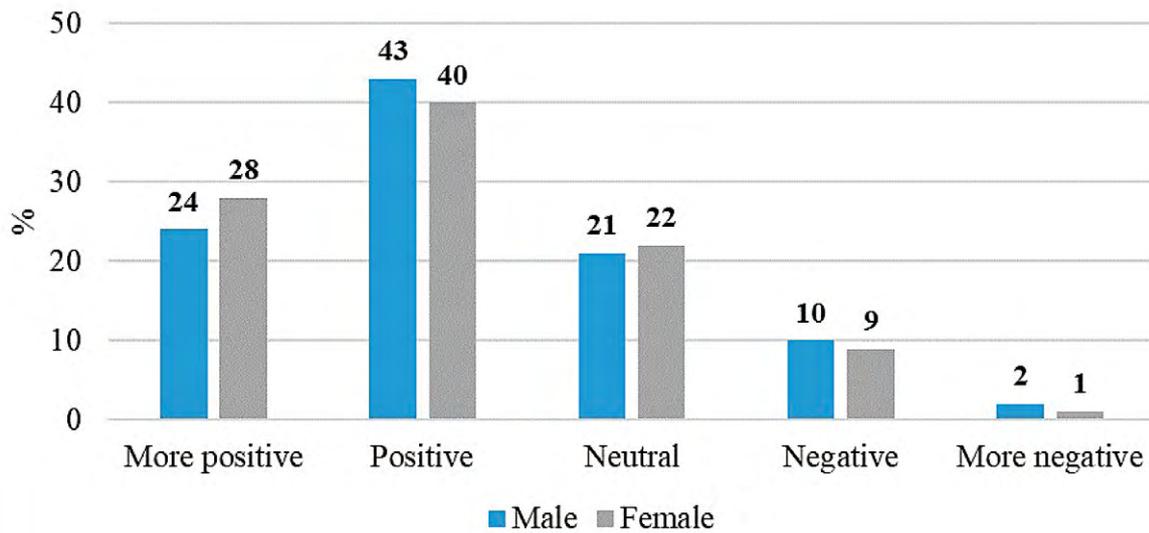


Figure 4. Percentage of respondents according to subjective perception of experience with working from home by gender.

While working from home, 22 % women and 16 % men perceived their productivity as slightly higher, and 23 % women and 20 % men even perceived their productivity as significantly higher compared to their productivity in the workplace. 8 % women and 12 % men felt less productive when working from home, and 4 % women and 5 % men felt they were even significantly less productive when working from home than in the workplace. 43 % women and 47 % men expressed a neutral feeling (Figure 5).

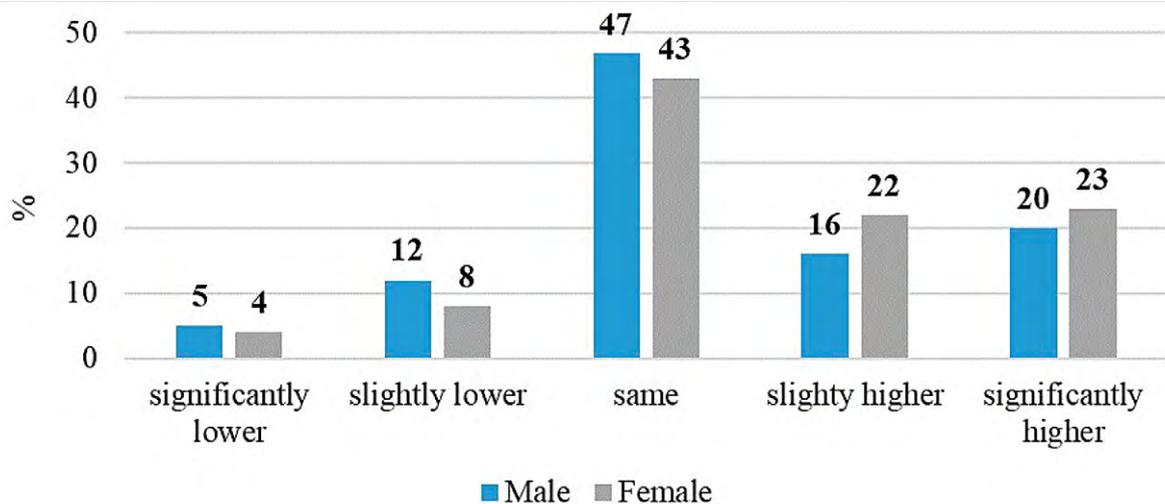


Figure 5. Composition of the observation population according to subjective perception of productivity during work from home by gender

While working from home, 55 % women and 62 % men perceived the workload at the same level as when working in the workplace, 21 % women and 15 % men as slightly larger, and 7 % women and 5 % men as significantly larger. Conversely, 13 % women and 15 % men perceived it as smaller and 4 % women and 2 % men as significantly smaller compared to what they have in the workplace (Figure 6).

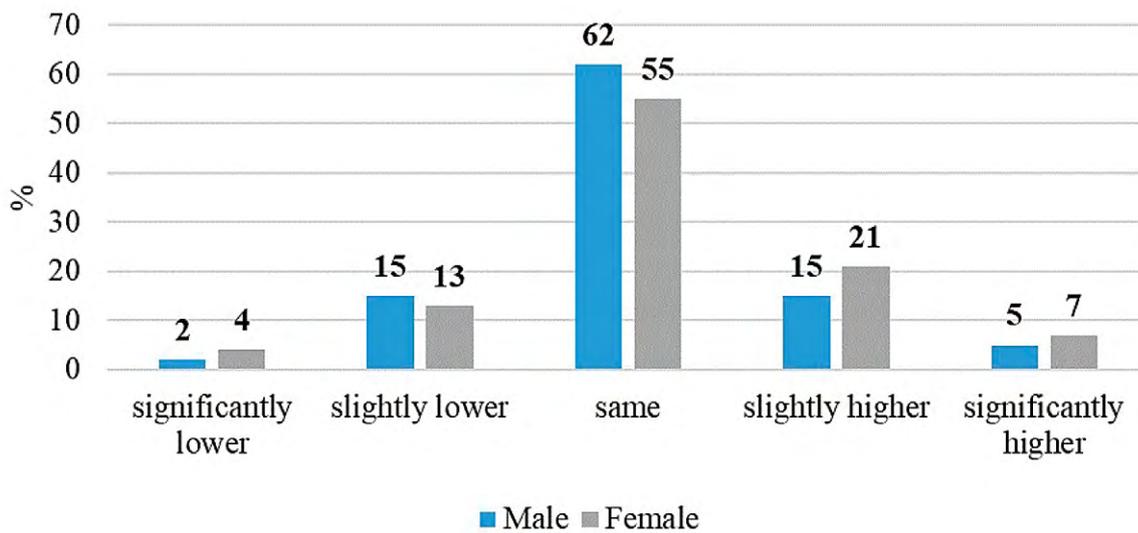


Figure 6. Percentage of respondents according to subjective perception of workload while working from home by gender.

Respondents' responses to the question of how difficult it was for them to cope with certain situations while working from home showed that it was difficult for both sexes to maintain fixed working hours (not to exceed the set working hours) (71 (30 %) women vs. 23 (18 %) men, and even 15 % of women and men said that it was very difficult for them. 55 (23 %) women also found it difficult to maintain a work-life balance; work in social isolation and deal with anxiety associated with the COVID-19 situation. For the remaining claims, more respondents replied that the situations were easy for them. More than a third of respondents were neutral on all claims (Table 2).

After the experience of working from home during the COVID-19 pandemic, gender differences emerged in the preferred form of work for the future.

Table 2. Population’s responses to individual claims by gender

Claim	Gender	The most challenging	Challenging	Neither challenging nor unpretentious	Unpretentious	The most demanding
Maintain a work-life balance	male	6	17	39	24	14
	female	9	23	32	25	11
Maintain fixed working hours (do not exceed fixed working hours)	male	15	18	37	22	8
	female	15	30	36	14	5
Take regular breaks during work	male	8	15	38	25	14
	female	11	22	37	21	9
Working in social isolation	male	7	12	42	23	16
	female	8	23	36	18	15
Coping with anxiety associated with the COVID-19 situation	male	1	12	44	22	21
	female	9	23	39	14	15

Most women, 32 % would prefer to work 50 % of their working time from home and 50 % in the workplace, while only 24 % of men chose this option. The second most frequently preferred combination for women compared to men 27 % vs. 33 % was to spend 60 % of working time working at the workplace and 40 % from home (Figure 7).

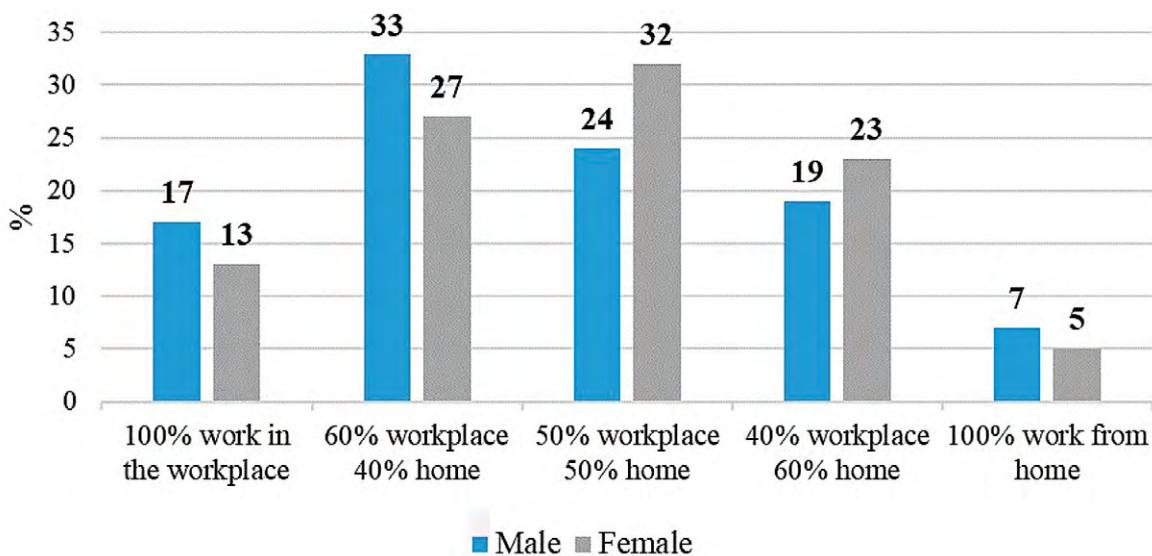


Figure 7. Percentage of respondents by preferred form of work for the future by gender.

As Figure 7 shows, the third most frequently preferred combination for women compared to men 23 % vs. 19 % was the opposite ratio, at 40 % of working time to work at the workplace and 60 % from home. Only 7 % men and 5 % women would like to work from home 100 %, and only 17 % men and 13 % women would like to do 100 % of work from home in the future.

Discussion

The OECD survey (2021) reveals a dramatic increase in the proportion of regular remote workers defined as working from home at least once a week, from almost 31 % before the pandemic to almost 58 % during the first wave of the pandemic. The intensity of teleworking can be further characterised with an intensive scale, i.e. the intensity of teleworking at the level of individual workers, expressed in the number of days per week. While before the pandemic, only 10 % of the total workforce worked from home for a full working week and 13 % only one or two days a week, the former rose to 43 % during the first wave, while the latter dropped to just 4 %, confirming the claim that the rise in remote work was almost entirely driven by “Work-from-Home-Only” workers (Bick-Blandin-Mertens, 2021). In our cohort, before the COVID-19 pandemic, only 29 % of respondents had encountered a form of work from home in some way, the remaining 71 % did their work exclusively from their workplace (Figure 1). After the onset of the COVID-19 pandemic, the situation changed and 40 % of respondents declared that they worked from home within 1-3 years (i.e. during the entire duration of the pandemic), 31 % only during the validity of quarantine measures, 16 % more than three years, 8 % of respondents less than one year and 5 % of respondents used this form of work for only a few weeks. Most respondents, 29 %, worked from home regularly 2 days a week (Figure 2).

Furthermore, the OECD survey (2021) shows that the experience of employers and employees was overwhelmingly good, with approximately 63 % of managers and 74 % of employees having an overall positive assessment of the remote working experience in terms of company performance and employee subjective well-being. On the other hand, only about 12 % of employees and 15 % of managers report a negative experience during a crisis. This resonates well with findings from other studies (Ozimek, 2020; Barrero, et al., 2020). In a study by Moens, et al. (2022), more than half of respondents said that due to the COVID-19 pandemic, they now have a more positive view of working from home, and 62.7 % of them hope to be able to work from home in the future. The results of our study also support the findings of the above-mentioned foreign studies. Overall, out of the surveyed population, 68 % of respondents perceived the experience of working from home positively. Working from home negatively affected only 10 % of respondents (Figure 3).

In a study by Moens, et al. (2022), 40.6 % and 15.7 % of respondents said that working from home had a positive to very positive impact on their productivity, 17.1 % and 4.6 % of respondents respectively reported the opposite feeling that working from home had a negative to significant negative effect on their productivity levels. In our study, we came

to similar conclusions. 20 % of respondents expressed a positive impact and 22 % a very positive impact, while a negative impact on productivity was reported by 10 % and a very negative impact by 4 % of respondents (Figure 5).

Taylor, Scholarios, Howcroft (2021) also asked respondents in the survey about the level of workload, whether it was higher, equal to or lower while working from home than in the workplace. 52.4 % of respondents answered that it was about the same, 37.6 % of respondents answered that it was higher at home than at the workplace, and 10 % answered that it was higher in the workplace. In our country, 57 % of respondents perceived the workload while working from home as much as in the workplace, 19 % as slightly higher and 7 % as significantly higher compared to the workplace. On the contrary, 14 % of respondents perceived it as lower and 3 % as significantly lower than in the workplace (Figure 6). Overall, what stands out from our results is that the hybrid way of working brought about by the COVID-19 pandemic is here and is likely to remain with us in some form.

After the experience of working from home during the COVID-19 pandemic, respondents in our cohort, albeit with minimal gender differences, unequivocally expressed their support for a hybrid form of work organization for the future. Most women, 32 %, would like to work 50 % of their working time from home and 50 % in the workplace, while 24 % of men chose this option (Figure 7). A 2021 English study cites different conclusions. While only 6 % of respondents in our study would prefer to work from home all week, in a study from England 31 % would like to see this option. A return to 5 days spent in the workplace could be imagined in our group 14 %, in England only 5.7 %. At most, 37.3 % of respondents in the English study would prefer to work in a ratio of 2:3 or 3:2 at home and at the workplace, in our country just over a third of respondents said the same (Taylor, et al., 2021).

In our cohort, we also focused on these aspects and found out how very challenging it was for respondents to deal with certain situations while working from home. One of the challenging aspects of working from home is separate and balanced work and personal time. This is especially challenging for working parents who are also caring for their children (Okuyan, Begen, 2021). 23 % of women in our cohort said they found it challenging to maintain a work-life balance, but also to work in social isolation or deal with anxiety related to COVID-19. The data also showed that both sexes found it difficult (30 % women vs. 18 % men) to even very difficult (15 % of women and men equally) to maintain fixed working hours and not exceed the set working hours (Table 2). Ipsen, et al., (2021) also came to very similar conclusions on a sample of 4,643 respondents from 8 European countries (Austria, Germany, Denmark, Sweden, Finland, the Netherlands, Spain and Italy), with 38 % of respondents agreeing or strongly agreeing that they worked more hours at home than usual.

Conclusion

The topic of long-term teleworking is a new public health issue. From our point of view, all health protection authorities should deal with its solution at national and local level. Companies face a new challenge of setting internal policies for a hybrid model of work, taking into account in particular the principles of employee health protection when working from home and effective control tools.

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Conflict of interest

The author have no conflicts of interest to declare. There is no financial interest to report. We certify that the submission is original work and is not under review at any other publication.

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Author contributions:

The author hereby declares to be actively involved in the research and has approved its publication

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Topics 2

Rehabilitation

Physiotherapy and Therapy

GAIT ANALYSIS AFTER HIP ARTHROPLASTY USING THE MOKA SYSTEM – CASE STUDY

ANALIZA CHODU PO ENDOPROTEZOPLASTYCE STAWU BIODROWEGO ZA POMOCĄ SYSTEMU MOKA – STUDIUM PRZYPADKU

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Abstract

Introduction: It is possible to reduce time of rehabilitation process by using minimally invasive surgical techniques. However to make it possible it is crucial to determine causes of current compensations. As well as defining the aim of rehabilitation. Measurements with movement monitoring systems based on camera need to be done in laboratory conditions. It is limitation for patients in first period after surgery. Is it possible to improve rehabilitation and determine causes of compensations earlier by using non-camera movement monitoring systems?

Research Purpose: Comparison of the patient's gait pattern before surgery, 2 weeks after surgery, after 6 weeks and after 3 months.

Material and methods: 56 years old male had total left hip arthroplasty performed using direct anterior approach. Following tests were conducted: Up&Go test as well as 6 Minute Walking Test, during which gait were analysed by MoKA (Movement Kinematics Analysis) motion sensors. Tests were performed once before surgery, followed 3 times after surgery: 2, 4 and 8 weeks after. Before and after each test subjective pain level was measured using VAS (Visual Analogue Scale).

Results: Compensatory changes were noticed in pelvis as well as both lower limbs kinematics in frontal plane. As time after surgery passed, compensatory changes and pain level were less significant. 8 weeks after surgery hypercompensation were noticed. In sagittal plane, lower limbs range of motion during gait increased with time.

Key words: Inertial Measurement Unit, total hip arthroplasty, gait, Movement Kinematics Analysis

Streszczenie

Wstęp: Metody operacyjne charakteryzujące się mniejszą inwazyjnością, umożliwiają skrócenie procesu rehabilitacji. Aby to jednak było możliwe, konieczne jest sprecyzowanie

celów usprawniania, poprzez określenie przyczyn kompensacji. Systemy wykorzystujące w tym celu kamery wymagają od terapeuty wykonania pomiarów w warunkach laboratoryjnych. Jest to pewnego rodzaju ograniczenie dla pacjenta we wczesnym okresie pooperacyjnym. Czy wykorzystanie systemu monitorowania ruchu niewymagającego użycia kamer może usprawnić i przyspieszyć proces rehabilitacji?

Cel badania: Porównanie wzorca chodu wzorca chodu pacjenta przed operacją, po 2 tygodniach po operacji, po 6 tygodniach oraz po 3 miesiącach.

Materiał i Metody: Mężczyzna w wieku 56 lat został poddany operacji endoprotezoplastyki stawu biodrowego lewego z dostępu przedniego. Przeprowadzono testy UP&GO, 6 minutowy test marszowy (6MWT), podczas 6MWT ruch był monitorowany za pomocą czujników MoKA (Movement Kinematics Analysis). Próby wykonano przed operacją, 2 tygodnie, 4 tygodnie i 8 tygodni po operacji. Przed i po każdej serii testów określano subiektywnie ból za pomocą skali VAS.

Wyniki: Zauważono zmiany kompensacyjne miednicy i kończyn dolnych w płaszczyźnie czołowej. Wraz z ustępowaniem dolegliwości bólowych zmiany kompensacyjne się zmniejszały. Ostatecznie doprowadzając do hiperkompensacji wzorców. W płaszczyźnie strzałkowej zakresy ruchu kończyn dolnych podczas chodu zwiększały się wraz z upływem czasu.

Słowa kluczowe: Inertial Measurement Unit, endoprotezo plastyka stawu biodrowego, chód, Movement Kinematics Analysis

Introduction

Arthroplasty (alloplasty) of the hip joint is currently considered as a common treatment for people who have been diagnosed with destruction of articular surfaces. For this reason, these surgeries are performed very often. Approximately 48,000 arthroplasty procedures are performed annually in Poland, and the number waiting for this procedures is twice as long (Kliniki, 2023).

The most common causes of hip joint destruction are rheumatoid arthritis, osteoarthritis, dysplasia, avascular necrosis of the femoral head, and post-traumatic degenerative changes. Endoprosthetic surgery involves removing degenerated joint surfaces and adjacent bone fragments and replacing them with artificial elements that create a new joint (Sieczka, Bohatyrewicz, Pituch, 2017). The aim of modern operative procedures is to allow physical activity as early as possible as well as rehabilitation process. This is possible because hip replacement surgery is less invasive than it was years ago. The use of the Direct Anterior Approach (DAA) allows the preservation of muscle continuity (Post, et al., 2016). Thanks to that, stability and joint movement control is possible from the first day after surgery.

The primary goal of postoperative rehabilitation is gait re-education as the most basic motor function. Re-gaining correct, proper gait stereotype is sometimes very hard to reach due to

compensation that has been present for years. To deal with specific obstacles, you should first of all know the type as well as the level of functional changes. That is why movement monitoring and analysis can improve the rehabilitation process.

In previous studies, most commonly data was provided by camera-based movement monitoring systems (Xu, et al., 2015; Kidzinski, et al., 2020; Fanton, et al., 2022). Due to the limitation of the measuring equipment, measurements were performed on a short distance or a treadmill. Performing an analysis on a treadmill is not a reliable examination because it forces the patient to walk at a pace. Short distance walking is also not completely objective as well, because the appearance of a stereotype by the human body can be changed with muscle tiredness. Presented in this research Movement Kinematics Analysis system (MoKA) uses inertial measurement unit sensors – IMU – mounted on the subject's body. These sensors have the functions of a gyroscope, an accelerometer and a magnetic sensor, which allows the registration of changes in sensor position. An IMU can be configured in the system, which allows the recording of a human movement, allowing body movement registration without the need to use a camera (Roetenberg, et al., 2005; Bin, et al., 2018). No need for laboratory environment allows to analyze the gait in hospital corridors, and thus determining type of changes in the gait stereotype earlier.

Research Purpose

Comparison of the patient's gait pattern before surgery, 2 weeks after surgery, after 6 weeks and after 3 months.

A case report

A 56-year-old man underwent arthroplasty of the left hip joint by DAA. The reason for the surgery was a osteoarthritis of the hip joint and joint pain that had been present for over 12 months. The patient is 172 cm tall and weighs 75 kg (BMI = 25.35). From the medical history it can be learned that in 2014 the patient underwent arthroscopy of the right knee joint and currently is suffering pain in lumbar spine. Moreover, permanently medicated and has no chronic disease.

Research methodology

For gait pattern analysis following tests were used: UP&GO test and a 6-minute walk test (6MWT). Patient had no orthopedic assistance during each mobility test, before surgery as well as in every post-surgery test. 6MWT every time was performed with control of MoKA sensors. Additionally before and after each examination the subjective level of pain sensations was determined using an 11-point (0 – 10) VAS (Visual Analogue Scale) pain scale.

- UP&GO test: Patient starting from a sitting position on a chair. It was on a signal that he got up, circled the cone 3 m from the starting point and ended up sitting on a chair.
- 6MWT: was performed in a 32.5 m long hospital corridor. For the duration of the test (6 minutes), the patient moves at his own pace along the entire length of the corridor.

After reaching the wall, he turns around and continues walking in the opposite direction. During a 6-minute walking test, the biomechanical parameters of movement were examined using the MoKA system.

Results

In the pre-operative examination, the subject achieved a distance of 525 meters in 6MWT. Two weeks after the surgery, he covered 390 meters. In further measurements, he achieved better and better results – in the test after 4 weeks it was already 495.5 m, and in the last test – after 8 weeks it was 609.5 m.

Pelvis movements in the frontal plane

Figure 1 shows the measurement results for the first minute of the 6MWT test. In the 1st minute of the preoperative examination, a rotation of the pelvis to the right (to the side of the affected leg) by an average of 2.13' (SD = 2.24') was observed. Two weeks after the surgery, pelvic rotation to the right was noticed, but it was smaller – average 0.29' (SD = 1.12').

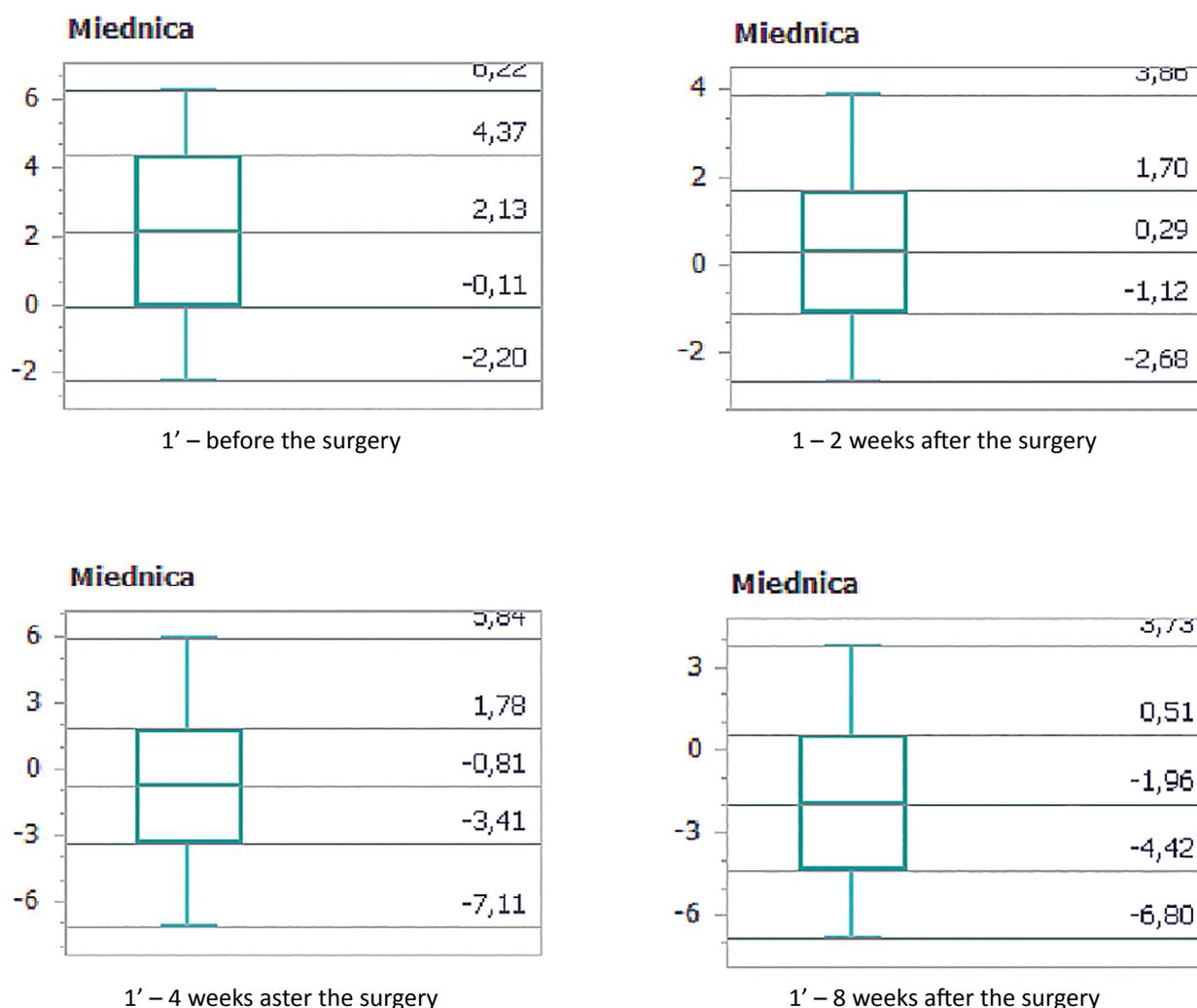


Figure 1. Pelvic rotation – 1st minute measurements from following examinations

In the examination 4 weeks after the surgery, there is a noticeable rotation of the pelvis to the left (to the side of the uninvolved leg) by an average of $-0.81'$ (SD = $2.6'$). Examination 8 weeks after surgery shows a further increase in pelvic rotation to the left – mean: $-1.96'$, (SD = $2.47'$).

A similar tendency was noticed in the measurements from the 6th minute of consecutive tests. Before the operation, the pelvis was rotated to the right (to the side of the affected leg) by an average of $3.28'$ (SD = $2.21'$). Two weeks after the surgery, pelvic rotation was also noted to the right – average $0.72'$ (SD = $1.42'$). In turn, in the 6th minute of the examination 4 weeks after surgery, the average pelvic rotation to the left (to the side of the uninvolved leg) was on average $-0.01'$ (SD = $2.40'$), and in the examination after 8 weeks – also to the left – $-2.18'$ (SD = $2.51'$) – Figure 2.

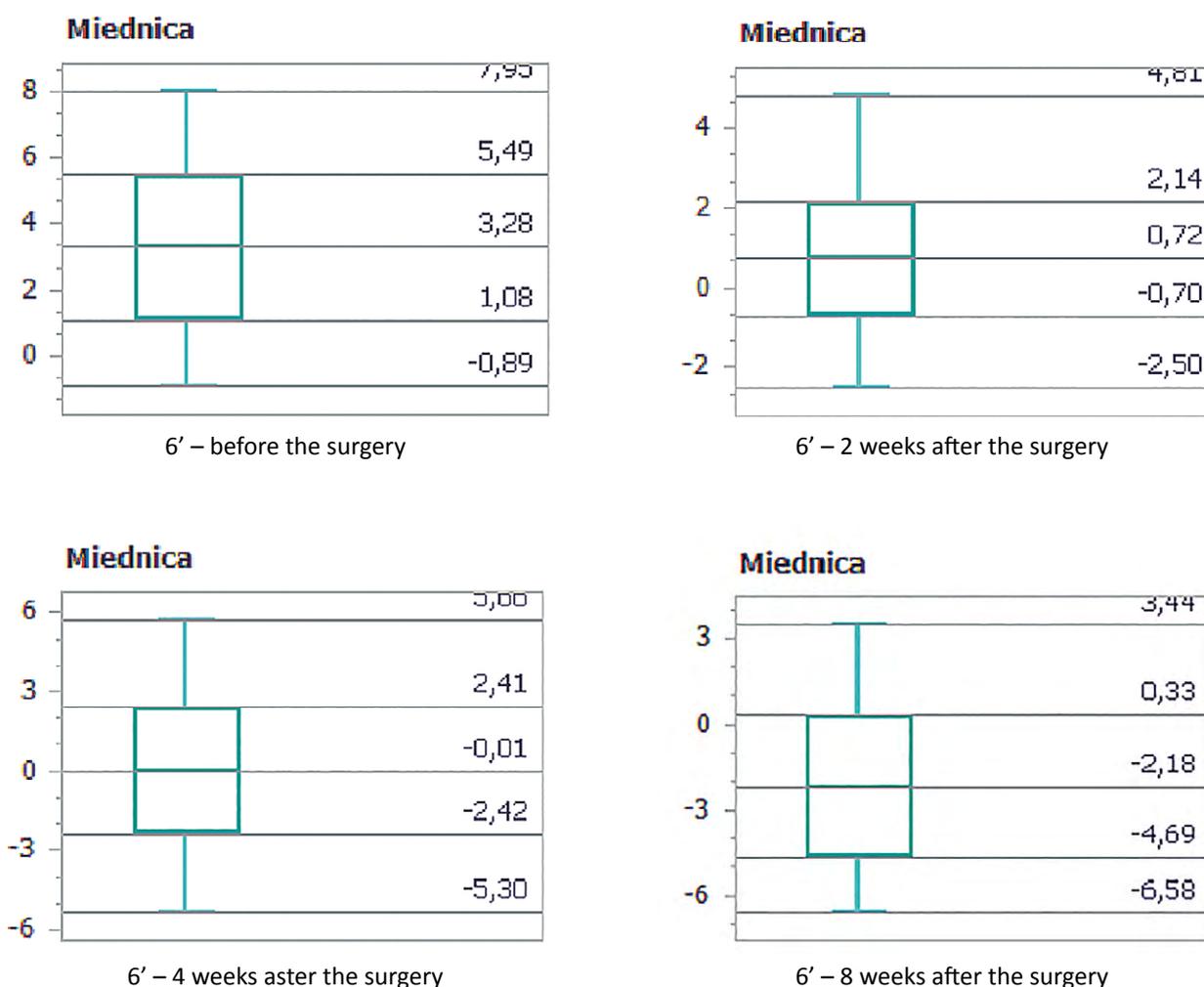


Figure 2. Pelvic rotation – frontal plane: 6th minute measurements from following examinations

It can be noticed that before the operation and in the early postoperative stage, the pelvis falls in the frontal plane to the side of the affected/operated leg. Then, over time, this tendency evens out and then begins to transfer to the opposite leg.

Pelvic movements in the sagittal plane

In the 1st minute of the preoperative examination, an average pelvic anterior tilt of 20.51' (SD = 1.73') was observed. Two weeks after the surgery, it was slightly smaller – at 18.39' (SD = 1.72'). In turn, 4 weeks after the surgery, it was very similar: 18.50' (SD = 1.41'). (Figure 1). Eight weeks after surgery it was 21.20' (SD = 1.15') (Figure 3).

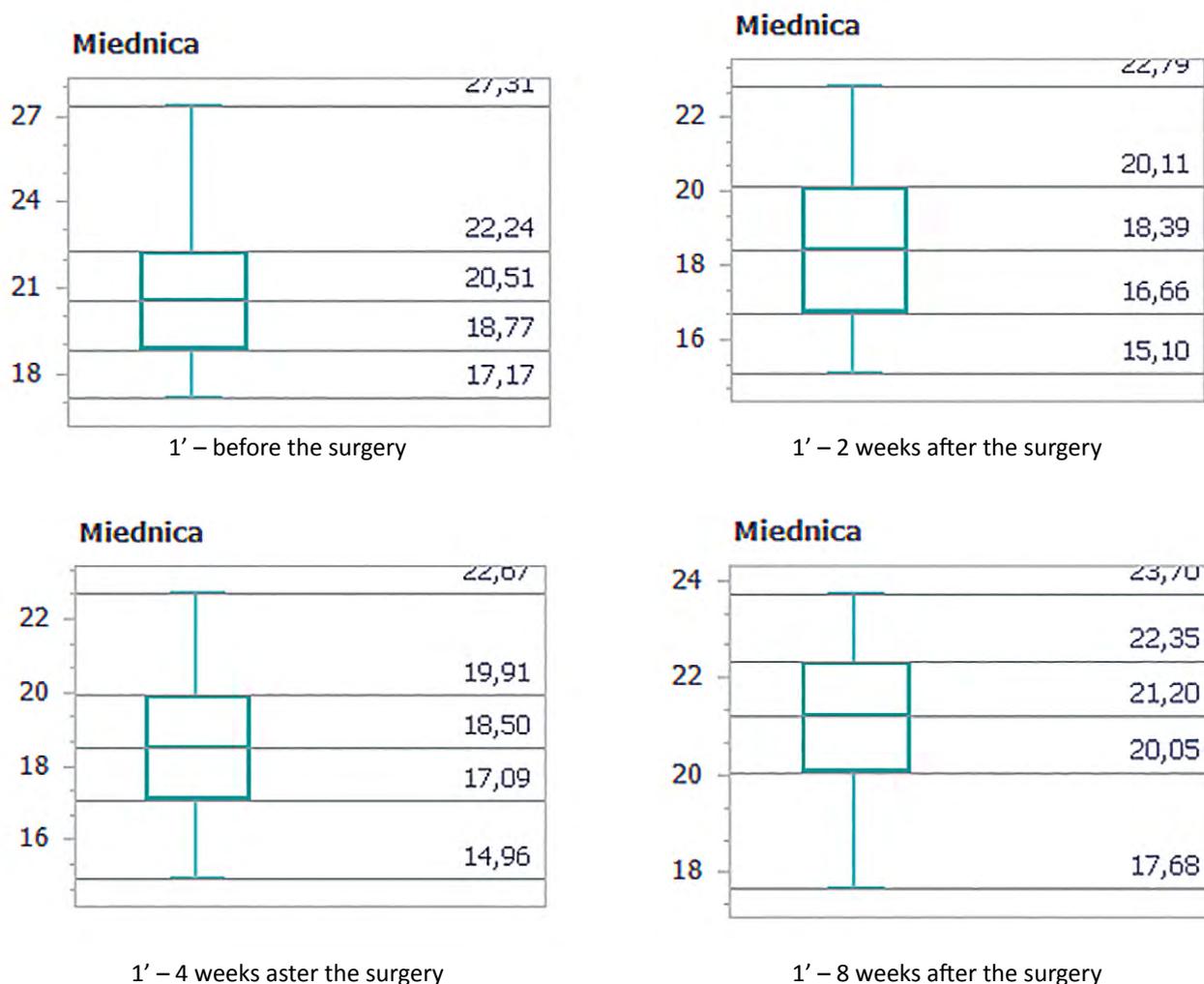


Figure 3. Pelvic anterior tilt- 1st minute measurements from following examinations

In the preoperative examination, at 6 minutes, the average pelvic anterior tilt was 21.17' (SD = 1.35'). Two weeks after surgery, it was smaller and averaged 19.10' (SD = 1.82'). Four weeks after the surgery, it was very similar to the previous one – it was 19.14' (SD = 1.47'). In the last examination, 8 weeks after surgery, a significant increase in anterior tilt was observed. It was 22.46' (SD = 1.32') – Figure 4. The observed changes are very similar to those recorded in the first minute of subsequent tests.

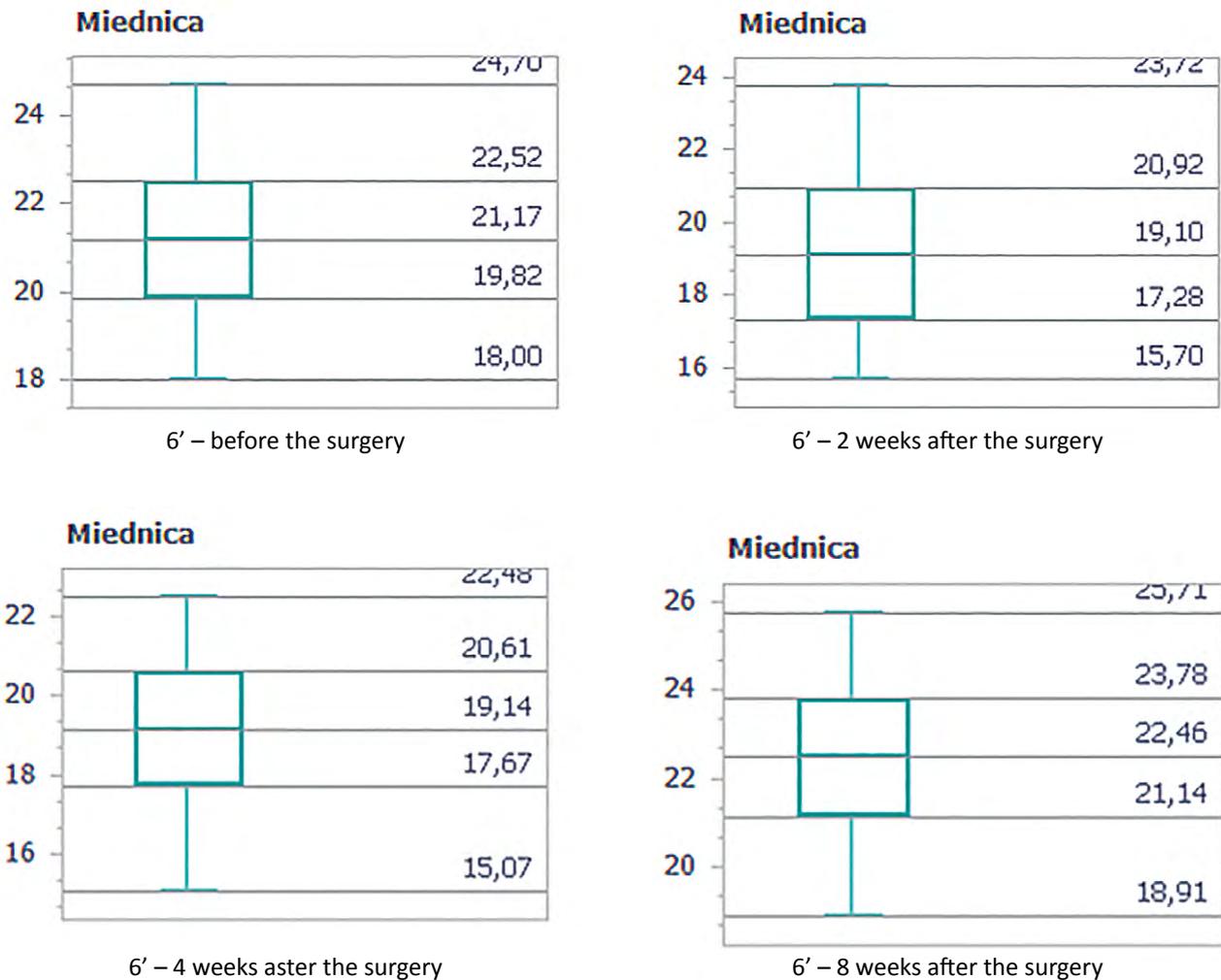


Figure 4. Pelvic anterior tilt- 6th minute measurements from following examinations

Movements of the lower limbs in the frontal plane

Table 1 shows the limb rotation in individual tests from the first and sixth minute of the test. In the study 4 weeks after surgery, data was lost in the sixth minute, hence the lack of results.

Table 1. Lower limb rotation from the following examinations

examination	minute	Right limb		Left limb	
		Average (SD)	Direction of the rotation	Average (SD)	Direction of the rotation
Pre-operative	1	0,36' (6,32')	Right	3,56' (4,84')	Right
	6	1,19' (6,69')	Right	2,44' (5,00')	Right
2 weeks after surgery	1	5,19' (8,75')	Right	3,36' (5,55')	Right
	6	5,59' (8,95)	Right	3,60' (5,27)	Right
4 weeks after surgery	1	-2,67' (3,44)	Left	5,60' (9,10)	Right
	6	No data			
8 weeks after surgery	1	2,56' (3,12)	Right	1,25' (4,58)	Right
	6	3,77' (2,80)	Right	1,06' (4,51)	Right

Movements of the lower limbs in the sagittal plane

The average inclination of the lower limb was assessed in the sagittal plane. As in the previous measurements, variability was also taken into account – using standard deviations – table 2.

Table 2. lower limb inclination from the following examinations

Examination	minute	Left Lower limb (SD)	Right Lower limb (SD)
Pre-surgery	1	12,79 (12,01)	15,36 (23,81)
	6	13,82 (21,47)	16,34 (23,29)
2 weeks after surgery	1	10,67 (19,05)	12,32 (19,90)
	6	11,58 (18,82)	12,01 (20,11)
4 weeks after surgery	1	11,90 (24,40)	10,26 (20,45)
	6	No data	
8 weeks after surgery	1	13,75 (25,13)	13,83 (23,87)
	6	13,72 (24,75)	14,26 (24,05)

UP&GO test

In the Up&Go test, the patient covered the designated distance in 8.48 seconds in the first test, in 8.28 seconds in the second test, in 6.14 seconds in the third test, and in 5.14 seconds in the fourth test.

Pain – according to VAS

The patient estimated the pain level before the first examination at 2/10, and after their completion at 3/10. In the second examination, the pain level was 2/10 before the tests, and 3/10 after the tests. Before the third examination, the pain in the operated area did not appear (0/10), after the tests it remained at the level of 1/10. Before the start of the fourth examination, the pain did not appear (0/10), but after the end of the tests, it appeared in the area of the sacroiliac joint on the right side at a level of 1/10 (0/10 in the operated area).

Discussion

Distance analysis in the 6MWT test confirms the effectiveness of the surgical procedure used. The transient decline in functional ability immediately after surgery was more than compensated at the 8-week postoperative examination. A significant increase in functional ability after surgery was even more visible in the up&go test, where the result of the fourth test was more than 3 seconds better than the result of the test before surgery. There was also improvement in pain. In this case, beneficial changes were noted in the third study – 4 weeks after surgery. The feeling of postoperative pain is individual and is related to various factors, primarily the occurrence of complications. Research shows that there is no relationship between the intensity of pain felt immediately after surgery and the intensity of pain in the long term (Zachodnik, Geisler, 2022). The presented patient had generally low pain intensity.

Analyzing the patient's posture in the frontal plane, asymmetry of pelvic movements can be noticed in the preoperative examination and in the first examination – after surgery. The pelvis sagged on the right side. As time passed during the study, the movement asymmetry deepened. In the 2-week examination, the pelvic drop to the side of the non-operated lower limb was much smaller than the asymmetry resulting from dysfunction observed before the surgery. After 4 weeks, pelvic movements close to symmetry were recorded during walking. In the 4th examination (8 weeks after the procedure), hypercompensation was noticed by pelvic drop on the left side.

Analyzing the movements of the lower limbs in the frontal plane, it can be seen that the combined rotation to the right of the pelvis and the right lower limb (adduction component) indicates a shift of the pelvis and body weight to the right. This position allows you to relieve the painful hip joint. Rotation of the left lower limb to the right indicates an attempt to control balance – along with a slight shift of the right limb to the left. In the examination 2 weeks after the procedure, the operated lower limb was significantly rotated to the right both at the beginning and at the end of the examination, which suggests a mechanism for unloading it. In the third examination, the support plane decreased significantly, which could be related to the alignment of pelvic rotation in the frontal plane. This may also be interpreted as hypercompensation of the operated limb. In the last examination, an increase in the support plane was again noticed, however in this case it was combined with a much more axial position of the right lower limb.

Flexion angles of the lower limbs – compared in subsequent studies, indicate a progressive process of gait symmetrization. The greatest differences recorded in the pre-operative measurement between the left and right limb gradually decreased to achieve almost full symmetry in the last examination – 8 weeks after surgery, regardless of the time of measurement.

The use of the MoKA system in the presented study enabled a precise qualitative assessment of the movements performed during the 6MWT. The data obtained thanks to it are devoid of a certain element of subjectivity that occurs when using optical devices. The phenomenon of hypercompression observed in the subject during the recovery process requires confirmation in other studies, explaining the complexity of biological and biomechanical processes after surgery, and thus may have a positive impact on the rehabilitation process.

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6 MINUTE WALK TEST (6MWT) – EXERCISE TOLERANCE ASSESSMENT FOR EVERYONE. REFERENCE SUGGESTIONS

6 MINUTOWY TEST CHODU (6MWT) – OCENA TOLERANCJI WYSIŁKOWEJ DLA KAŻDEGO. PROPOZYCJE WARTOŚCI REFERENCYJNYCH

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Abstract

Introduction: The six-minute walk test (6MWT) is widely considered a safe method of assessing exercise capacity, both for sick people and after various types of treatments and surgeries, as well as for healthy people. Currently, it may be a good option for people who do not know their capabilities in this area. Especially for those who have had COVID-19 and/or are not physically active.

Objective of the work: It was decided to examine the exercise capacity of adults using the 6MWT test and on this basis to propose reference values. Additionally, it was decided to examine selected factors that may influence the 6MWT test result: morphological parameters, the occurrence of chronic diseases, and physical activity.

Material and methods: 279 people were examined: 135 women (48.39 %) and 144 men (51.61 %) aged 18 – 65. Anthropometric measurements were performed and physical activity was assessed using the IPAQ questionnaire. The subjects performed 6MWT on a sports track with a circumference of 400 m. Gait parameters were examined using the SMART system. The respondents were arbitrarily divided into age groups: 18 – 34, 35 – 44, 45 – 55 and 55 – 65. The reference values were the distances separately for each gender and for each age group. This distance is the middle quartile of results.

Results: For all respondents: women's distance – average: 673 m (450 – 832); men – average: 715 m (400 – 925). Comparison of age groups showed differences only in women – distance: $p < 0.001$; step length: $p < 0.001$. There were no differences in men. Only in women, the level of activity differentiated the distance ($p < 0.01$) and number of steps ($p < 0.05$). There were no differences in men. There were no relationships between the occurrence of chronic diseases and the tested 6MWT parameters. Regression analysis showed the influence of %FAT on distance in women: $R^2 = 0.242$, $\beta = -0.49$ ($p < 0.0001$). In men, the following factors influenced the distance: ($R^2 = 0.245$), age $\beta = 0.16$ ($p < 0.05$), body height $\beta = 0.21$ ($p < 0.05$), weight $\beta = -0.31$ ($p < 0.05$) and %FAT $\beta = -0.26$ ($p < 0.05$).

Conclusions: 6MWT is a safe way to assess exercise capacity. In women, age affects test results. %FAT is an important factor negatively affecting test results in both sexes.

Keywords: 6MWT, exercise capacity, morphological parameters, physical activity

Streszczenie

Wstęp: Sześciominutowy test chodu jest powszechnie uważany za bezpieczną metodę oceny możliwości wysiłkowych, zarówno dla osób chorujących oraz po różnego rodzaju zabiegach i operacjach, jak i zdrowych. Obecnie może być dobrą propozycją dla osób, które nie znają swoich możliwości w tym zakresie. Szczególnie dla tych, które chorowały na COVID-19 i/lub nie są aktywne fizycznie.

Cel pracy: Postanowiono zbadać możliwości wysiłkowe osób dorosłych za pomocą testu 6MWT i na tej podstawie zaproponować wartości referencyjne. Ponadto postanowiono zbadać wybrane czynniki mogące mieć wpływ na wynik testu 6MWT: parametry morfologiczne, występowanie chorób przewlekłych oraz aktywność fizyczną.

Materiał i metody: Zbadano 279 osób: 135 kobiet (48,39 %) i 144 mężczyzn (51,61 %) w wieku 18 – 65 lat. Wykonano pomiary antropometryczne oraz oszacowano aktywność fizyczną przy użyciu kwestionariusza IPAQ. Badani wykonali 6MWT na bieżni sportowej o obwodzie 400 m. Parametry chodu zbadano za pomocą systemu SMART. Badanych arbitralnie podzielono na grupy wieku: 18 – 34 lata, 35 – 44, 45 – 55 oraz 55 – 65. Za wartości referencyjne przyjęto dystans osobno dla każdej płci i dla każdego przedziału wieku. Dystans ten to środkowy kwartył wyników.

Wyniki: Dla ogółu badanych: dystans kobiety – średnia: 673 m (450 – 832); mężczyźni – średnia: 715 m (400 – 925). Porównanie grup wieku wykazało różnice tylko u kobiet – dystans: $p < 0,001$; długość kroku: $p < 0,001$. U mężczyzn nie było różnic. Tylko u kobiet poziom aktywności różnicował dystans ($p < 0,01$) i liczbę kroków ($p < 0,05$). U mężczyzn nie było różnic. Nie odnotowano związków między występowaniem chorób przewlekłych a badanymi parametrami 6MWT. Analiza regresji wykazała u kobiet wpływ %FAT na dystans: $R^2 = 0,242$, $\beta = -0,49$ ($p < 0,0001$). U mężczyzn wpływ na dystans miały: ($R^2 = 0,245$) wiek $\beta = 0,16$ ($p < 0,05$), wysokość ciała $\beta = 0,21$ ($p < 0,05$), masa $\beta = -0,31$ ($p < 0,05$) oraz %FAT $\beta = -0,26$ ($p < 0,05$).

Wnioski: 6MWT jest bezpiecznym sposobem oceny możliwości wysiłkowych. U kobiet wiek ma wpływ na wyniki testu. %FAT jest istotnym czynnikiem negatywnie wpływającym na wyniki testu u obydwu płci.

Słowa kluczowe: 6MWT, możliwości wysiłkowe, parametry morfologiczne, aktywność

Introduction

Originally, the six-minute walk test (6MWT) was developed to assess the functional capacity of people suffering from circulatory and respiratory diseases, and then in a number of other

diseases (ATS, 2016; Montes, et al., 2010; Mathai, et al., 2012; Martin, et al., 2013). Currently, due to its numerous advantages: simplicity and low cost of implementation – compared to laboratory tests and repeatability of results, it is used both in clinical populations (King, et al., 1999; Beriault, et al., 2009; Galiè, et al., 2016), as well as non-clinical (Steffens, et al., 2013; Duncan, et al., 2015). The essence of 6MWT is to cover the longest possible distance by walking. Walking is the most natural form of human locomotion. Therefore, 6MWT is a safe form of activity that allows the assessment of the exercise capacity of the tested people, regardless of age or current level of fitness. These advantages are particularly important in the period after the COVID-19 pandemic. Restrictions related to the pandemic, the associated decrease in physical activity – PA in many people, and increased sedentary behavior, as well as the passage of the disease itself has resulted in a decrease in the general level of fitness and deterioration of the general health of the population (Wunsch, et al. 2022). The problem of the decline in PA and the lack of return to the previous level of activity particularly concerns people who have contracted COVID-19 (Halpin, et al., 2020; Jimeno-Almazán, et al., 2021; Huang, et al., 2021). In addition to somatic symptoms, the problem in these people is the fear of movement – kinesiphobia (Herrero-Montes, et al., 2023). The above-mentioned premises suggest taking safe forms of PA, which include walking.

Therefore, 6MWT is a safe form of activity that allows the assessment of the exercise capacity of the tested people, regardless of age or current level of fitness. These advantages are particularly important in the period after the COVID-19 pandemic. Restrictions related to the pandemic, the associated decrease in physical activity – PA in many people, and increased sedentary behavior, as well as the passage of the disease itself, have resulted in a decrease in the general level of fitness and deterioration of the general health of the population (Wunsch, et al., 2022). The problem of the decrease in PA and the lack of return to the previous level of activity particularly concerns people who have suffered from COVID-19 (Halpin, et al., 2020; Jimeno-Almazán, et al., 2021; Huang, et al., 2021). In addition to somatic symptoms, the problem in these people is the fear of movement – kinesiphobia (Herrero-Montes, et al., 2023). The above-mentioned premises suggest taking safe forms of PA, which include walking.

The literature review conducted by the authors indicates that the results of empirical work using 6MWT mostly concern “corridor” tests – performed in closed rooms. The justification is the clinical nature of these tests. There are also works in the literature using 6MWT, which present reference data for healthy people (Poh, et al., 2006; Kim, et al., 2014). Comparison of these data indicates the differences that occur. The source of these differences are anthropometric and demographic factors, the racial origin of the respondents, attitude towards the study, level of daily activity, and a number of others (Zou, et al., 2017). This constitutes a premise for conducting research in individual populations – taking into account potential factors that may influence the result of this test. The lack of research on the Polish population additionally justifies conducting research in this direction.

Aim of study

It was decided to test the exercise capacity of adults using the 6MWT and propose reference values on this basis. In addition, it was decided to examine selected factors that may influence the 6MWT test result: morphological parameters, occurrence of chronic diseases and physical activity.

Material and methods

279 people were examined: 135 female (48.39 %) and 144 male (51.61 %) aged 18 – 65. Recruitment for the study was carried out via social media and among friends of research team members. The selection criteria were: voluntariness – confirmed by written consent to participate in the research, age – 18 – 65 years and no health contraindications to performing exercise tests. This criterion was verified by conducting a medical examination before the test. All participants were informed in detail about the research process, and about the possibility of withdrawing from the study at any time – without giving reasons.

The study consisted of three stages. In the first stage, the respondents completed a questionnaire containing questions about gender, age, and the presence of chronic diseases. The physical activity of the respondents was estimated based on the short version of the International Physical Activity Questionnaire – IPAQ (Craig, et al., 2003; Biernat, et al., 2007; Meh, et al., 2021). This tool enables the estimation of the level of physical activity (PA). Respondents answer questions about the weekly time devoted to intense and moderate activity, walking, and time spent in a sitting position. Using an algorithm, the effort load in metabolic equivalent – MET is calculated for each activity level. The sum of weekly activity in these three intensity areas allows for a qualitative assessment of the total activity of the subjects. The division into three groups is assumed: active people, averagely active people, and physically passive people (with insufficient weekly energy expenditure for health needs).

The second stage of the study consisted of anthropometric measurements. The following measurements were taken: body height, weight and, using a body composition analyzer, the percentage of body fat.

The third stage of the study is to perform 6MWT. The subjects performed the test on an athletics track with a circumference of 400 m, wearing sports shoes. During the test, they were monitored by the SMART system (Activity Monitoring and Training Rationalization System). This system integrates an individually configured system of IMU (inertial measurement unit) sensors and a heart rate (HR) sensor working with a proprietary application. IMU sensors integrate an accelerator, gyroscope and magnetic sensor. This enables measurement of the change in position in the space of this sensor. After installation according to a specific scheme, it is possible to obtain qualitative and quantitative data regarding the movements performed by the subject in natural conditions – which made it possible to obtain the number of steps. The distance covered during the 6MWT was measured with an accuracy of 1 m. By dividing the distance by the number of steps, data on the average step length were obtained.

Statistical analysis

For the sake of clarity of the results, the necessary reductionism has been made. All respondents were divided into age groups: I – 18 – 34 years (early adulthood), II – 35 – 44 (adulthood), III – 45 – 55 (maturity), and IV – 55 – 65 (late adulthood).

Descriptive statistics of the subjects were performed. ANOVA was used for gender comparisons. Intergroup comparisons were made using Kruskal-Wallis ANOVA. The impact of individual factors (independent variables) on the distance covered by the respondents (dependent variable) was calculated using backward stepwise regression. Assumed level of significance: $p < 0.05$.

Results

Descriptive statistics of the examined morphological parameters of female and group comparisons indicate relatively large differences: the smallest in the case of body height – no statistically significant differences between the groups, much greater in relation to the remaining examined parameters – in each case $p < 0.005$.

Statistically significant differences also concerned intergroup comparisons regarding declared activity (Table 1).

Table 1. Female: Descriptive statistics and intergroup comparisons of the examined morphological parameters, gait and activity variables

Variable	Group I (n =36)		Group II (n =47)		Group III (n =39)		Group IV (n =13)		p
	mean (SD)	median min-max	mean (SD)	median min-max	mean (SD)	median min-max	mean (SD)	median min-max	
height [cm]	165 (6.12)	166 148 – 176	164 (6.00)	165 150 – 180	162 (6.64)	163 147 – 185	162 (6.21)	164 150 – 169	
mass [kg]	62.90 (8.23)	62.50 46.70 – 78.50	64.00 (12.09)	61.10 40.00 – 95.20	66.11 (10.38)	64.60 52.00 – 106.60	74.95 (16.73)	68.20 60.50 – 118.90	<0.05
BMI	22.70 (2.51)	22.25 17.60 – 27.50	23.56 (4.34)	21.90 16.80 – 36.10	24.95 (3.73)	24.50 18.40 – 39.20	28.37 (6.05)	28.40 21.70 – 44.80	<0.01
FAT %	24.25 (6.25)	22.85 10.70 – 39.10	25.42 (6.52)	25.60 15.00 – 41.10	26.72 (6.38)	24.90 15.80 – 44.80	33.98 (6.57)	34.10 23.40 – 48.60	<0.001
6MWT-distance	698.72 (53.03)	698 575 – 835	663.57 (71.95)	668 450 – 810	682.80 (66.30)	667.00 545 – 842	602.38 (59.32)	614.00 478 – 700	<0.001
6MWT-number of steps	794.56 (61.01)	809 600 – 870	802 (66.19)	819 655 – 960	801.67 (73.69)	802 570 – 958	756.00 (63.68)	757.00 654 – 860	
6MWT average step length [cm]	88 (8)	87 75 – 116	83 (7)	83 67 – 97	86 (10)	85 71 – 118	80 (10)	81 68 – 107	<0.001
IPAQ -sum MET	3328 (3457)	2592 470 – 17304	1554 (1568)	1110 140 – 6399	1783 (1486)	1354 132 – 6330	880 (576)	791 198 – 1822	<0.01

The data for male was completely different than for women. Intergroup comparisons showed differences only in body height and BMI (Table 2).

Table 2. Male: Descriptive statistics and intergroup comparisons of the examined morphological parameters, gait and activity variables

Variable	Group I (n =36)		Group II (n =47)		Group III (n =39)		Group IV (n =13)		p
	mean (SD)	median min-max	mean (SD)	median min-max	mean (SD)	median min-max	mean (SD)	median min-max	
height [cm]	181 (6.85)	180 162 – 194	180 (4.66)	179 171 – 191	178 (7.53)	178 162 – 192	174 (5.86)	174 164 – 187	<0.01
mass [kg]	81,80 (15.78)	81.25 57.50 – 136.70	85.22 (10.70)	83.50 62.70 – 109.10	82.11 (13.26)	81.40 60.10 – 113.20	78.49 (15.48)	75.85 57.60 – 113.60	
BMI	24.81 (4.34)	34.10 18.90 – 42.20	26.39 (2.99)	26.10 19.90 – 34.00	25.70 (3.63)	25.00 20.10 – 35.00	25.63 (4.16)	25.50 19.50 – 35.30	<0.05
FAT %	17.91 (5.53)	16.95 8.90 – 36.50	20.04 (5.44)	20.00 8.20 – 31.00	20.19 (5.20)	20.50 9.30 – 30.70	19.77 (6.47)	18.85 11.00 – 31.40	
6MWT-distance	711.06 (98.20)	720 400 – 910	702.29 (70.72)	700 508 – 853	734.43 (71.90)	730 600 – 925	723.50 (99.63)	734,00 531 – 900	
6MWT-number of steps	761.35 (87.54)	766.50 454 – 902	789.39 (64.90)	786.00 637 – 945	798.03 (67.29)	797.00 639 – 1008	787.53 (53.05)	795.00 702 – 864	
6MWT average step length [cm]	94 (13)	93 62 – 157	89 (8)	89 73 – 107	92 (9)	92 75 – 112	91 (9)	90 73 – 113	
IPAQ -sum MET	2744 (3715)	1525 297 – 20060	2336 (2090)	1755 198 – 8172	2276 (1888)	1995 66 – 6480	2118 (1361)	2217 198 – 4200	

Comparison of gait parameters between female and male – for all respondents showed differences ($p < 0.0001$) – men covered a longer distance. This was not due to a greater number of steps in men ($p > 0.05$), but to their greater length ($p < 0.0001$), and this concerned groups II, III, and IV. This was a consequence of differences in body height. Interestingly, in group I there were no differences in distance or number of steps. The differences concerned only the average step length ($p < 0.05$) – Figure 1.

Regarding 6MWT variables, intergroup comparisons in female showed differences in distance and average step length. In male, no differences were found in age group comparisons regarding the tested 6MWT parameters (Figure 1).

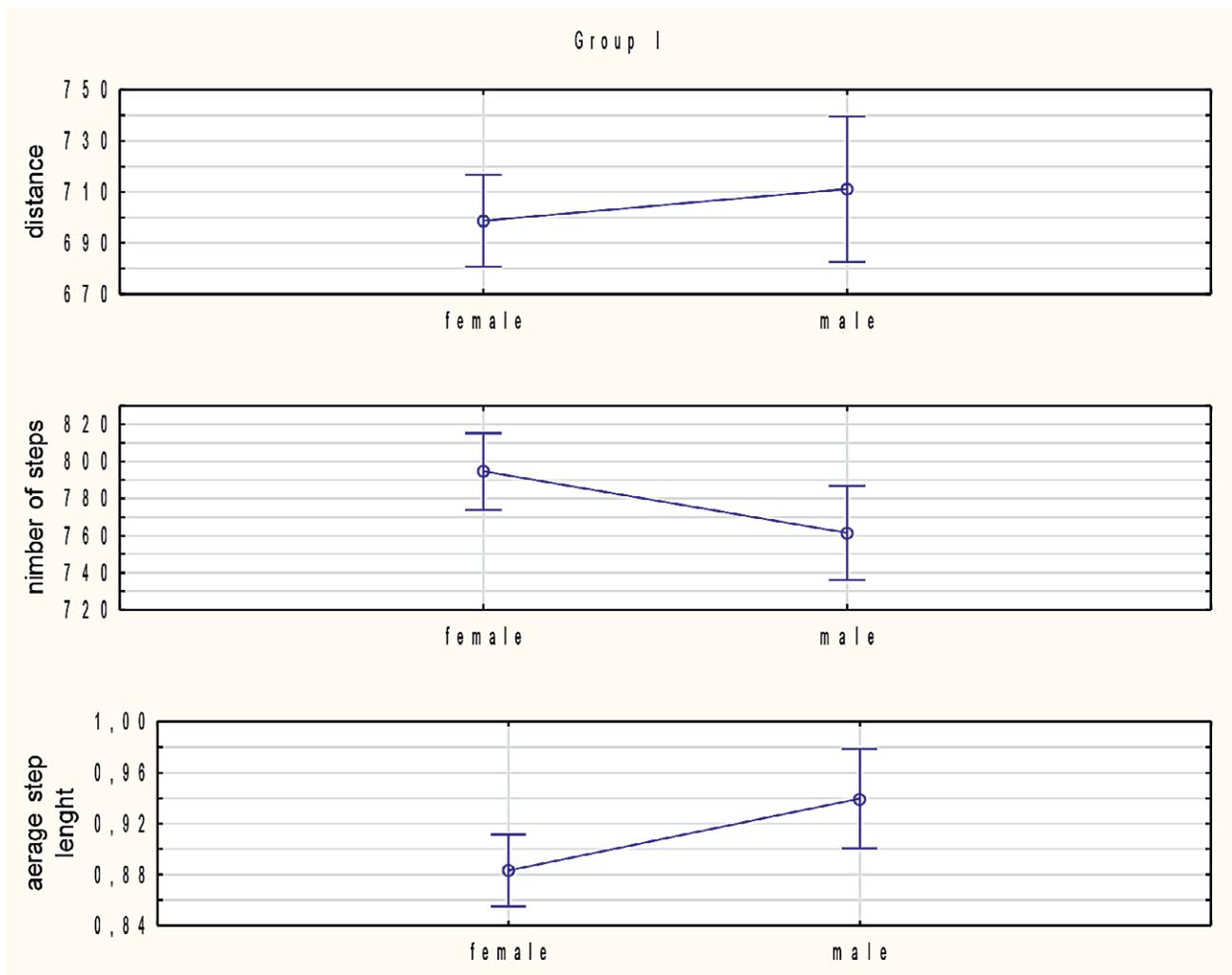


Figure 1. Group I (18 – 34 years old) comparison of gait parameters of female and male

Comparison of groups of people who did not have a chronic disease with people who declared a chronic disease showed no differences in either females or males ($p > 0.05$).

In order to examine the relationship between activity and 6MWT results, a qualitative assessment of the declared physical activity was first performed. In female, an insufficient level of activity was recorded in 21.51 % of the respondents, an average level in 55.91 %, and a high level of activity in 22.58 % of the respondents. Among male, 20 % were passive, 51 % moderately active, and 29 % active. Analysis of 6MWT parameters – due to the presented level of activity, showed differences only in female. They concerned distance: $p < 0.01$ and the number of steps: $p < 0.05$ (Figure 2). No differences were noted in male.

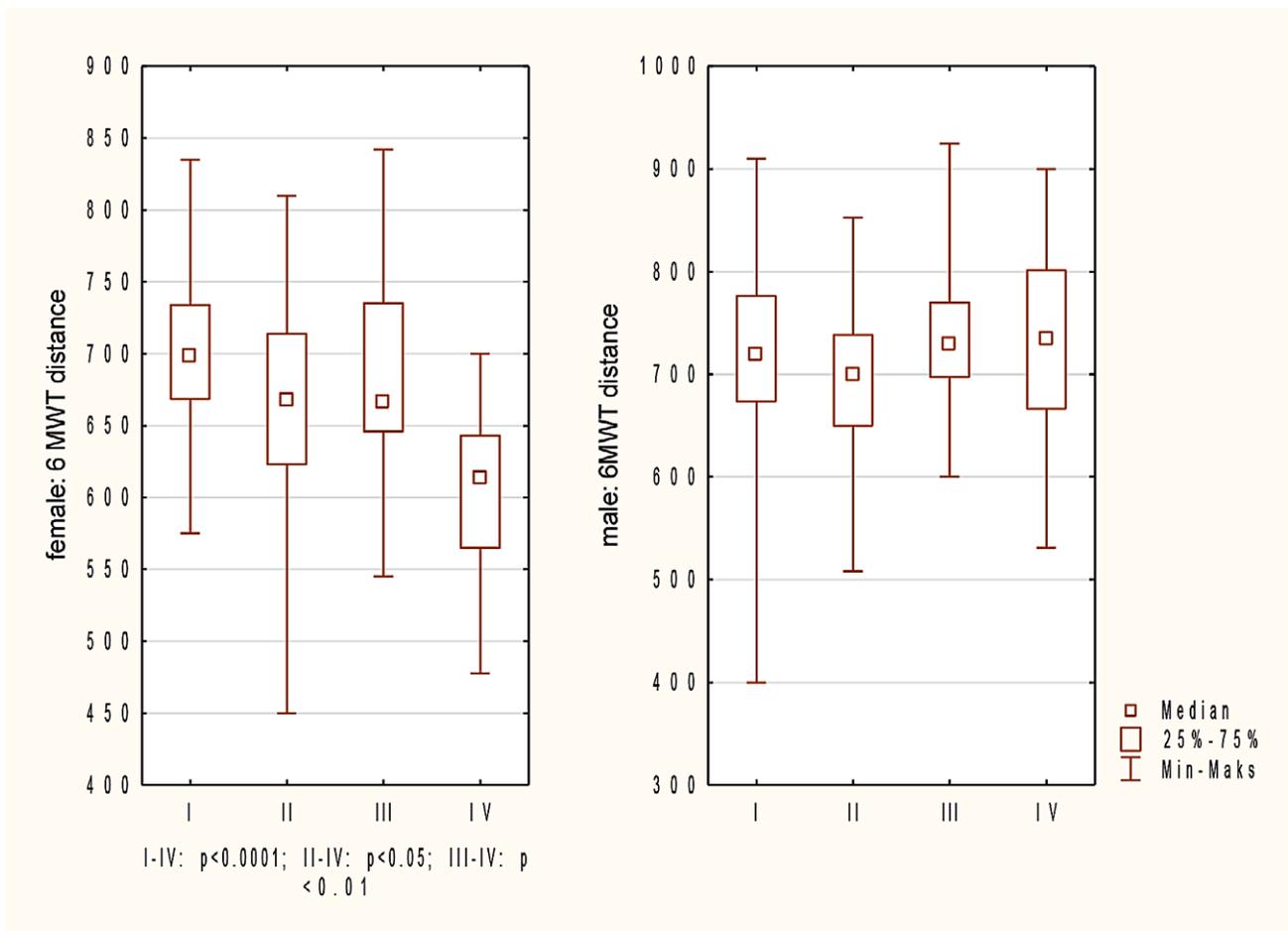


Figure 2. 6MWT – comparison of age groups of female and male

The influence of the examined morphological variables on gait parameters was also examined. Regression analysis showed the influence of % FAT on distance in female: $R^2 = 0.242$, $\beta = -0.49$ ($p < 0.0001$). In male, the following factors influenced the distance ($R^2 = 0.245$): age $\beta = 0.16$ ($p < 0.05$), body height $\beta = 0.21$ ($p < 0.05$), weight $\beta = -0.31$ ($p < 0.05$) and % FAT $\beta = -0.26$ ($p < 0.05$).

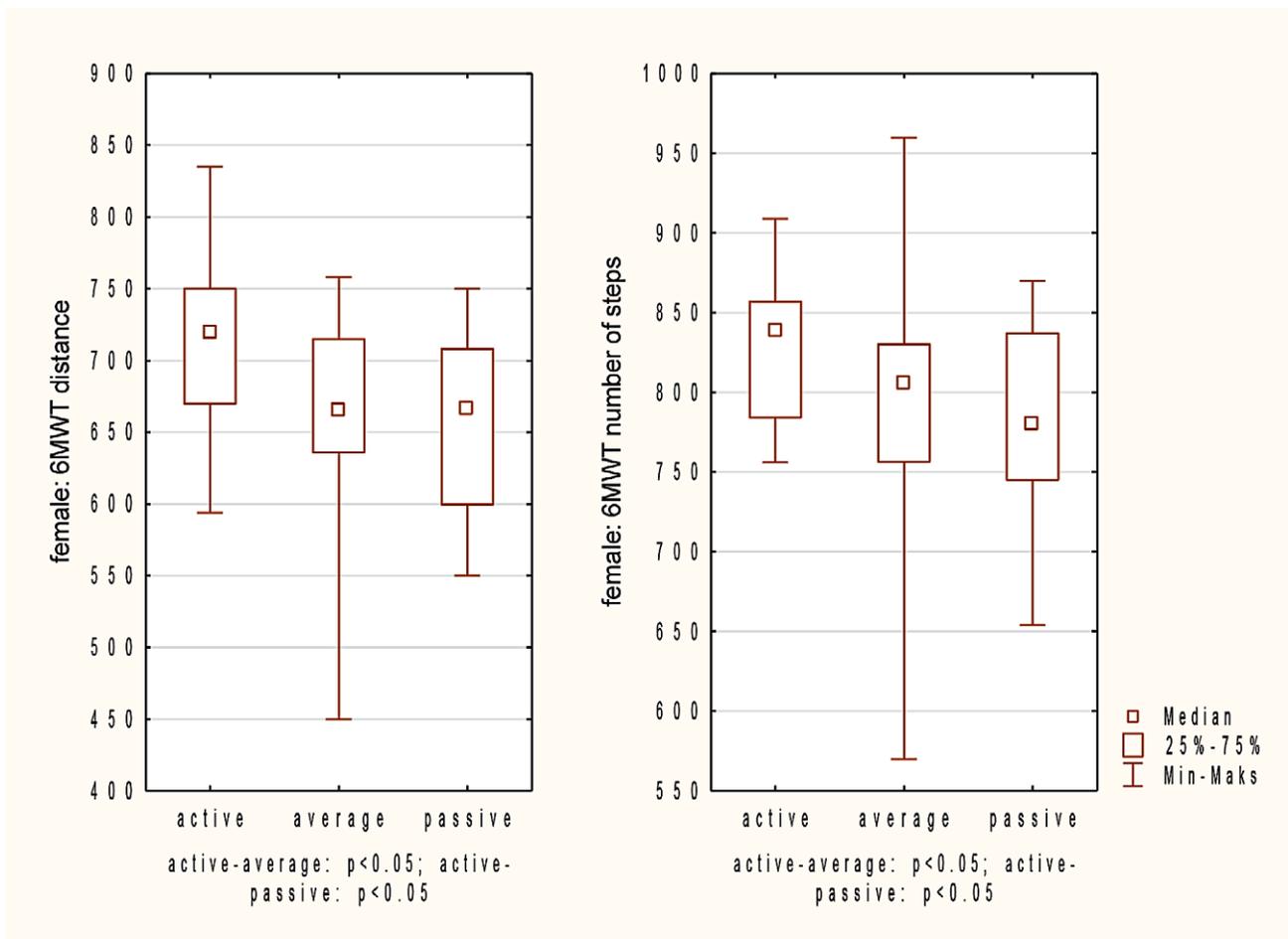


Figure 3. Female 6MWT: variation in distance and number of steps – depending on activity level

In line with the aim of the research, reference data regarding distance was proposed – taking into account the adopted age ranges. The middle quartiles in these groups were used as the basis for these data. They are presented in table 3.

Table 3. Middle quartiles for the 6MWT distance [m] – by age groups

Age group	female	male
I: 18–34 years	669–734 m	674–776 m
II: 35–44 years	623–714 m	650–738 m
III: 45–54 years	646–735 m	697–770 m
IV: 55–65 years	565–643 m	667–800 m

The lack of statistically significant differences between groups I – III in female and between all groups in male suggests treating these groups as relatively homogeneous. Therefore, it is proposed to adopt the reference values for women aged 18 – 54 as: 623 – 735 meters. However, for the age group 55 – 65 years: 565 – 643 meters. For men aged 18 – 65, the range is 650 – 800 meters.

Discussion

Numerous studies prove the significant benefits of walking. Researchers mention not only the improvement of a number of biological indicators in people who walk regularly (Hanson, Jones, 2015), but also the beneficial impact of this form of activity on the mental sphere (Song, et al., 2018; Kelly, et al., 2018). This safe form of activity seems to be particularly suitable for people with limited exercise capacity, especially those with chronic diseases. It may be especially recommended for people who have had COVID-19 (Delbressine, et al., 2021). The obvious need for a qualitative assessment of current exercise capacity leads to knowing the reference values of 6MWT performed “outdoor”, which was the inspiration to undertake this study.

This study was conducted in the optimal conditions possible, which influenced its results – they were higher than those reported by other authors (Gibbons, et al., 2001; Camarri, et al., 2006; Chetta, et al., 2006). In our opinion, these “high” values can serve as a motivational factor for people who want to use them to improve their performance.

Comparison of the distance covered between female and male showed differences. First of all, they resulted from dimorphic differences in body height and, consequently, from longer steps. The exception was group I, where a greater number of steps in female resulted in a lack of statistical significance of the difference in the 6MWT distance – compared to male (Figure 1). Motivational factors probably also played a role. It can be hypothesized that for young men, due to the amount of effort involved, walking is often not a challenge, hence the lack of differences. This should also explain the lack of differences in men between age groups and the beneficial effect of age on the distance indicated by the regression analysis.

Differences in the 6MWT distance occurred in women and concerned the oldest subjects – compared to the other groups. They were primarily caused by increased body weight. According to the literature, an increase in %FAT and changes in fat tissue distribution are often observed at this age (Ambikairajah, et al., 2019). The increased percentage of inactive tissues influenced the test results. According to the presented analyses, adipose tissue is an unfavorable predictor of distance for both sexes, which should be taken into account both when assessing the 6MWT and when using walking training for health purposes.

The results of comparisons, where the grouping variable was the declared level of physical activity, showed natural differences in women. The longer distance covered by women with a high level of activity resulted from a greater number of steps (higher intensity of effort). However, the lack of differences in 6MWT parameters in men seems interesting. It was probably due to motivational factors.

Currently, there is no valid, uniform data regarding the interpretation of 6MWT results. Some authors propose that a 6-MWT result below 82 % of the normative value should be considered abnormal (Troosters, et al., 1999). According to this suggestion, taking into account the results of the presented research, the lower limits of the proposed ranges

should be considered normative values. However, the limitation of this study must be taken into account. It concerns a limited number of people originating from one region (Silesian Voivodeship – southern Poland).

The proposed reference data is expressed in meters. The literature usually proposes quite complicated formulas for their calculation (Holliday, et al., 2000). This limits their practical use to a narrow group of specialists. In our opinion, clear expression of these data in meters enables self-control of exercise capacity to a large extent. In the population dimension, this may bring significant benefits in the process of taking care of one's fitness and health.

Conclusions

The proposed reference data applies to all men, regardless of age. For women, it is proposed to take age into account. Declared physical activity had an impact on the 6MWT results only in women. An important factor that has a negative impact on the results of 6MWT in both sexes is %FAT.

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NORDIC WALKING AS SUITABLE MOVEMENT ACTIVITY IN WOMEN WITH OSTEOPOROSIS

SEVERSKÁ CHÔDZA AKO POHYBOVÁ AKTIVITA VHODNÁ PRE ŽENY S OSTEOPORÓZOU

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Abstract

Introduction: Osteoporosis is a metabolic bone disease that causes bone loss and thinning, which can subsequently be associated with an increased risk of fractures. Part of the complex treatment is appropriate physical activity. Exercises that do not stress the skeleton (swimming) as well as exercises that stress the skeleton and thus increase the density of bone mass (Nordic walking) are recommended.

Focus: The goal was to find out whether patients with osteoporosis use Nordic walking as one of the options for exercise therapy.

Material and Methods: To find out our goals, we decided on quantitative research in the form of a questionnaire. The research group consisted of 100 respondents; the main criterion was the presence of osteoporosis.

Results: The results of this study show that Nordic walking is mentioned as one of the physical activities by 55 female respondents (55 %) and 45 female respondents (45 %) do not use it as one of the physical activity options.

Conclusion: In conclusion, we can say that Nordic walking should be included to a greater extent in the framework of prevention as well as subsequent treatment, it should become part of the daily regimen of women with osteoporosis.

Keywords: osteoporosis, movement therapy, Nordic walking

Abstrakt

Úvod: Osteoporóza je metabolické ochorenie kostí, ktoré spôsobuje úbytok kostnej hmoty a jej rednutie, čo následne môže súvisieť so zvýšeným rizikom vzniku zlomenín. Súčasťou komplexnej liečby je vhodná pohybová aktivita. Odporúčajú sa cvičenia, ktoré kostru nezaťažujú (plávanie) ako aj cvičenia, ktoré skelet zaťažujú a tým zvyšujú hustotu kostnej hmoty (severská chôdza).

Cieľ: Cieľom bolo zistiť, či pacientky s osteoporózou využívajú severskú chôdzu ako jednu z možností pohybovej terapie.

Materiál a metodika: Pre zistenie našich cieľov sme sa rozhodli pre kvantitatívny výskum formou dotazníka. Výskumný súbor pozostával zo 100 respondentiek, hlavným kritériom bola prítomnosť osteoporózy.

Výsledky: Výsledky tejto štúdie poukazujú na to, že severskú chôdzu ako jednu z pohybových aktivít uvádza 55 respondentiek (55 %) a 45 respondentiek (45 %) ju nevyužíva ako jednu z možností pohybovej aktivity.

Záver: Záverom možno konštatovať, že severskú chôdzu je potrebné vo väčšej miere zaradiť v rámci prevencie ako aj následnej liečby, mala by sa stať súčasťou denného režimu žien s osteoporózou.

Kľúčové slová: osteoporóza, pohybová terapia, severská chôdza

Introduction

Osteoporosis is a systemic progressive disease of the skeleton characterized by the loss of bone mass and damage to the microarchitecture of bone tissue, resulting in increased susceptibility of bone fractures. Osteoporosis is one of the most common metabolic bone diseases, predominantly affecting women after menopause. It is characterized by a long symptomless period during which pain is caused by the pathological curving of the spine, muscle imbalance and bone fractures which indicate the possible presence of osteoporosis (Vašičková, 2011). At the same time, however, the long-term treatment of menopausal women due to anticoagulant treatment for serious heart rhythm disorders in older age should also be seen as an increasingly frequent cause (Labudová, 2012 a). Indicative fractures of osteoporosis include fractures to the vertebrae, distal forearm, and proximal femur. Fractures to the of the femur are the most clinically serious (Palička, et al., 2011). People who exercise regularly are less likely to suffer from these fractures as compared to those that lead a sedentary lifestyle. Physical activity influences the maximum range of bone tissue as well as the metabolism of calcium within bone tissue (Kolář, 2009). Postmenopausal women that engage in physical activity have a 25 % greater intestinal absorption of calcium and higher levels of calcitriol in the blood as compared to those that are inactive. The most suitable activities include strength training, hiking, Nordic walking, gymnastics, aerobics, or dance (Stránský, 2015). Nordic walking is a relatively new sport that originated in Finland in the eighties as a summer training method for cross-country skiers. It is based on the use of specially designed poles that utilize upper body strength to assist you in walking forward. When walking with these poles, the action of 600 muscles is involved and thus, the upper body is able to relieve some of the load from the legs by up to 30 %. The positive effects on the locomotor system are realized in an improvement in posture, stability, balance, overall fitness and strengthening of bone density. The sticks used in Nordic walking provide immediate stability and position the body upright reducing the strain on the knees and spine (Vyskočil, 2009). Nordic walking reduces the risk of osteoporosis, because bone density improves during physical activity and targeted training contributes to higher bone strength and resistance, at the same time,

physical activity also leads to a reduction in the risk of developing cardiovascular diseases in menopausal women (Labudová, 2012b, 2015). One of the main causes of chronic osteoporotic pain is muscle imbalance arising on the basis of increased thoracic kyphosis due to a decrease in the static function of bone tissue. The increased tension on the postural muscles results in contracture and weakening. For women with osteoporosis, Nordic walking can reduce tension in the relevant muscles, release contractures, strengthen weakened muscles subsequently reducing or even eliminating pain. Nordic walking has a number of positive benefits in providing an overall increase in strength, flexibility, improving balance and increasing isometric strength of the back extensors (Sterling, Wuorio, 2019). By properly activating the diaphragm, deep back extensors, abdominal muscles and pelvic floor muscles, our deep stabilization system balances the interplay and movement between the upper and lower limbs and thus participates in the dynamic stabilization of the spine during walking. Nordic walking can be done at any age, regardless of the weather and in different terrain with an intensity that corresponds to the physical fitness of the woman with osteoporosis (Nottingham, Jurasin, 2011).

Materials and method

The research group consisted of 100 female respondents between the ages of 40 and 79, with the mean age being 63 years. Selection of the respondents was performed deliberately. The main criterion was the presence of osteoporosis and the woman had to be in good physical condition, relative to her age.

To find out our goals and evaluate the results, we decided to use quantitative data collection. We conducted quantitative research through a questionnaire. The questionnaire consisted of 18 self-constructed questions. The respondents were presented with the questionnaire, which they filled out and then handed in at specialist clinics (eg. gynaecological, orthopaedic, endocrinological and FRO). Out of the 140 distributed questionnaires, 106 were returned to us, of which 6 questionnaires were excluded due to being incomplete. We analysed the collected results from 100 questionnaires and processed them into tables and graphs.

Questionnaire for the Respondents

1. Have you been diagnosed with osteoporosis? If yes, what type of osteoporosis is it? (circle the correct type)
 - a) Yes Postmenopausal Senile Secondary
 - b) No
2. What age category are you in?
 - a) 40 – 50
 - b) 51 – 60
 - c) 61 – 70
 - d) 71 and above

- 3) At what age did you experience menopause?
 - a) 40 – 45
 - b) 45 – 50
 - c) 50 – 55
 - d) 55 and above
4. Are you being monitored and treated for osteoporosis at a specialist clinic (orthopaedic, gynaecological, endocrinological and other)?
 - a) Yes
 - b) No
5. Are you taking medication for osteoporosis?
 - a) Yes
 - b) No
6. Do you take any additional medication/supplements – minerals/vitamins/ phytohormones?
 - a) Yes
 - b) No
7. Have you suffered a bone fracture/breakage due to osteoporosis?
 - a) Yes
 - b) No
8. Has your height decreased by more than 3 cm?
 - a) Yes
 - b) No
9. Do you suffer from back pain?
 - a) Yes
 - b) No
10. In which part of the spine does the pain persist?
 - a) Cervical spine
 - b) Thoracic spine
 - c) Lumbar spine
 - d) Sacrum/Coccyx
11. Do you engage in regular physical activity?
 - a) Yes, I exercise regularly
 - b) Occasionally
 - c) No, I do not exercise
12. Do you know what Nordic walking is?
 - a) Yes
 - b) No

13. Do you think that Nordic walking is a beneficial physical activity for osteoporosis?
 - a) Yes
 - b) No
14. Do you partake in Nordic walking as one of your physical activities?
 - a) Yes
 - b) No
15. How would you assess the impact of Nordic walking on your health?
 - a) Very good
 - b) Good, I feel a slight improvement
 - c) It does not help me
16. How many times a week do you practice Nordic walking?
 - a) Never
 - b) Once a week
 - c) Twice a week
 - d) Three or more times a week
17. How much time do you dedicate to Nordic walking in a day?
 - a) None
 - b) 30 minutes
 - c) 60 minutes
 - d) More than 60 minutes
18. Who suggested Nordic walking to you as an exercise treatment option for osteoporosis?
 - a) Gynaecologist
 - b) Endocrinologist
 - c) Orthopaedist
 - d) Physiotherapist
 - e) Other

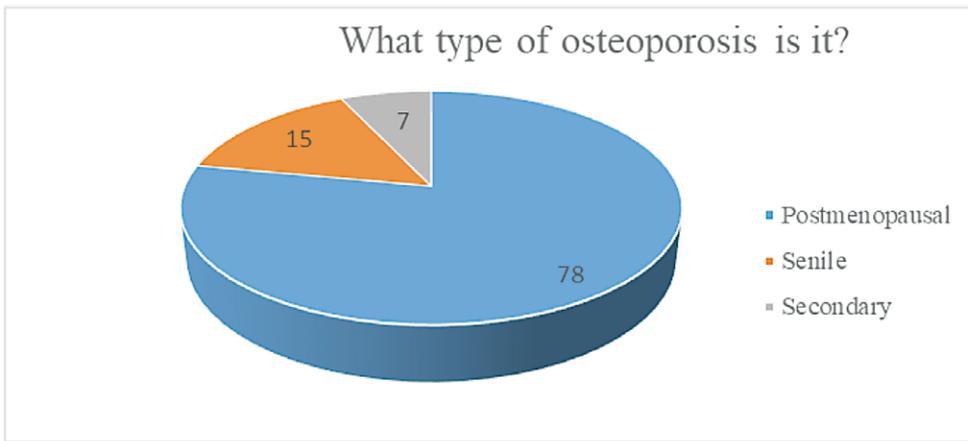
Results

Mathematical evaluation of the questionnaire

Question No. 1 Have you been diagnosed with osteoporosis? If yes, what type of osteoporosis is it? (circle the correct type)

Yes: 100 No: 0

Postmenopausal: 78 Senile: 15 Secondary: 7

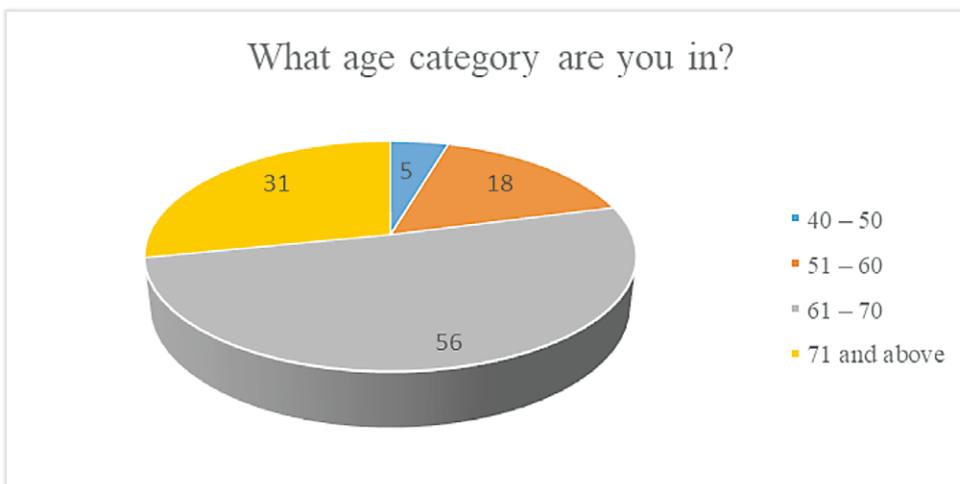


Graph 1. Representation of individual types of osteoporosis in the set of female respondents

Out of 100 respondents, 78 stated that they had been diagnosed with postmenopausal osteoporosis (78 %), 15 with senile (15 %) and 7 with secondary (7 %).

Question No. 2 What age category are you in?

40 – 50: 5 51 – 60: 18 61 – 70: 46 71 and above: 31

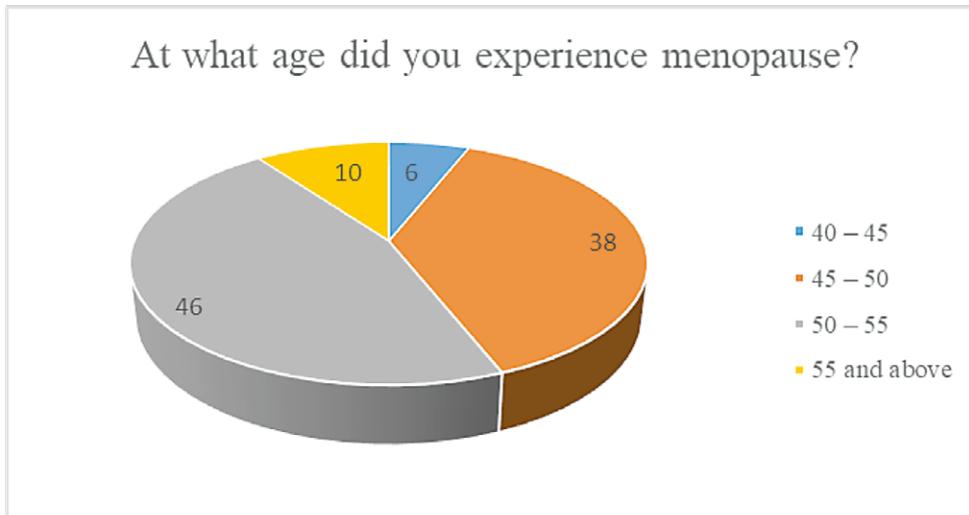


Graph 2. Female respondents represented in age categories

Of the 100 respondents, 5 (5 %) were aged between 40-50 years, 18 (18 %) aged between 51 – 60, 56 (56 %) aged between 61 – 70, and 31 (31 %) aged 71 and above.

Question No. 3 At what age did you experience menopause?

40 – 45: 6 45 – 50: 38 50 – 55: 46 55 and above: 10

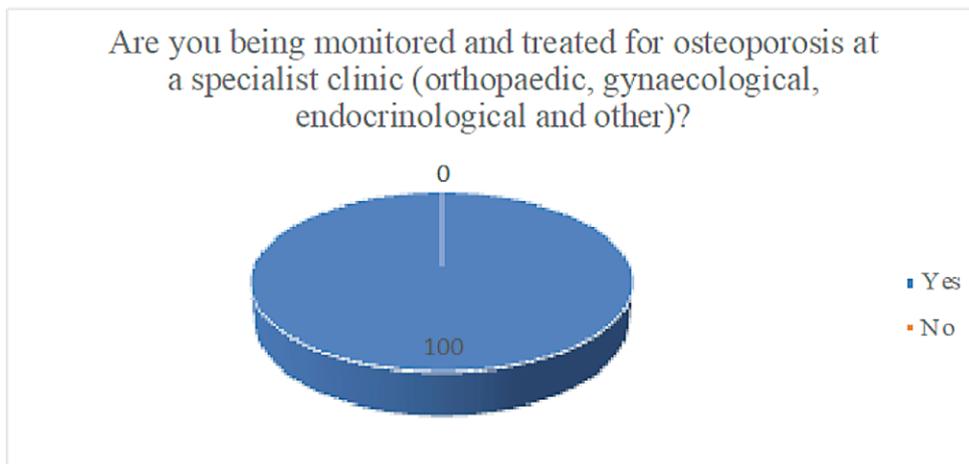


Graph 3. Onset of menopause according to respondent age

Menopause occurred in 6 respondents (6 %) aged between 40 – 45 years, 38 respondents (38 %) aged between 45 – 50 years, the largest representation was aged between 50 – 55 with 46 respondents (46 %), and 10 respondents (10 %) were aged 55 and above.

Question No. 4 Are you being monitored and treated for osteoporosis at a specialist clinic (orthopaedic, gynaecological, endocrinological and other)?

Yes: 100 No: 0

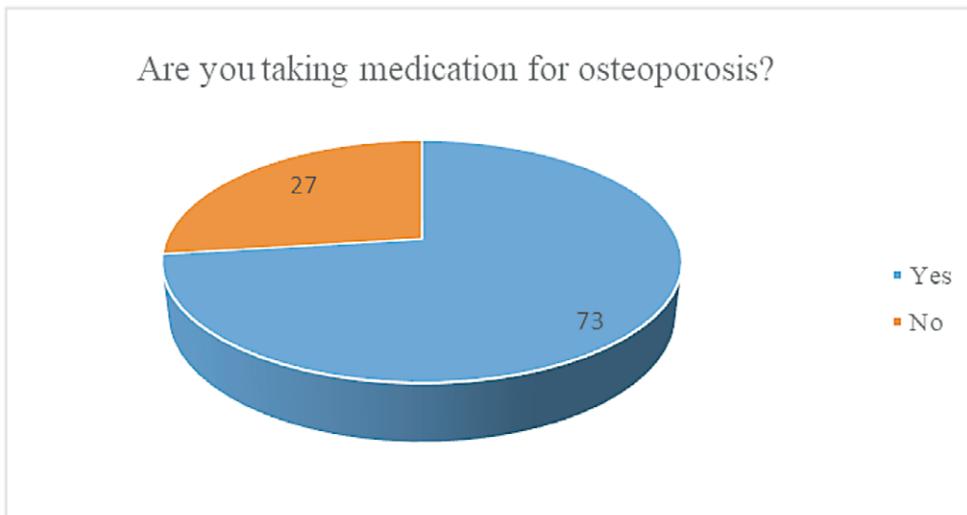


Graph 4. Representation of respondents treated for osteoporosis at a specialist clinic

All (100 %) respondents are monitored in specialist clinics, which means that the disease is sufficiently developed.

Question No.5 Are you taking medication for osteoporosis?

Yes: 73 No: 27

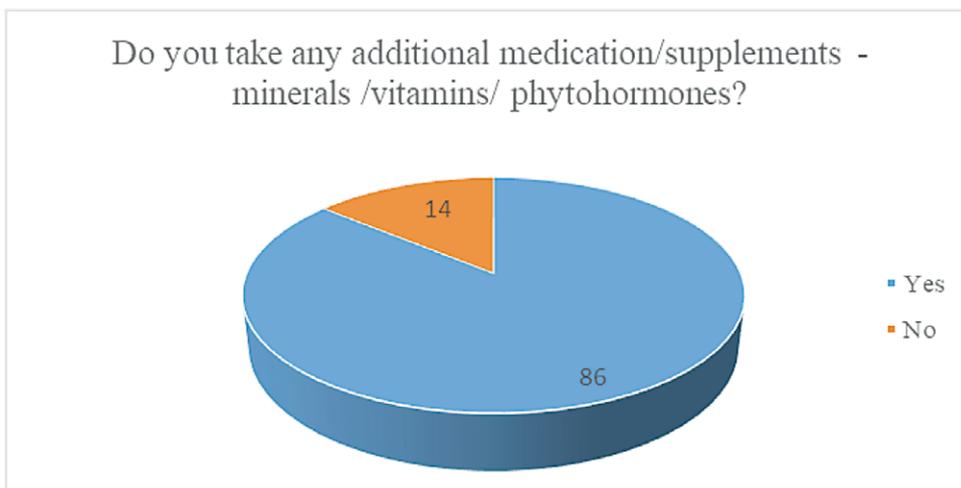


Graph 5. Representation of female respondents depending on the use of medical treatment

73 respondents (73 %) have indicated that they use medicine for osteoporosis and 27 respondents (27 %) indicate that they do not use medicines for osteoporosis.

Question No.6 Do you take any additional medication/supplements – minerals /vitamins/ phytohormones?

Yes: 86 No: 14

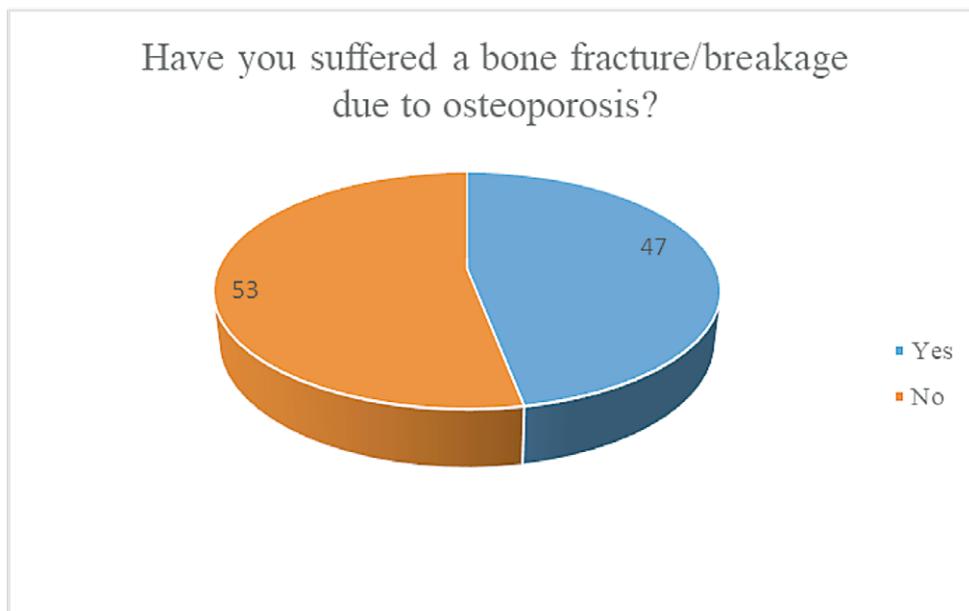


Graph 6. Representation of respondents depending on the use of supplementary treatment

86 female respondents (86 %) stated that they take supplementary medication/vitamins intended for the treatment of osteoporosis, and 14 respondents (14 %) do not take anything.

Question No. 7 Have you suffered a bone fracture/breakage due to osteoporosis?

Yes: 47 No: 53

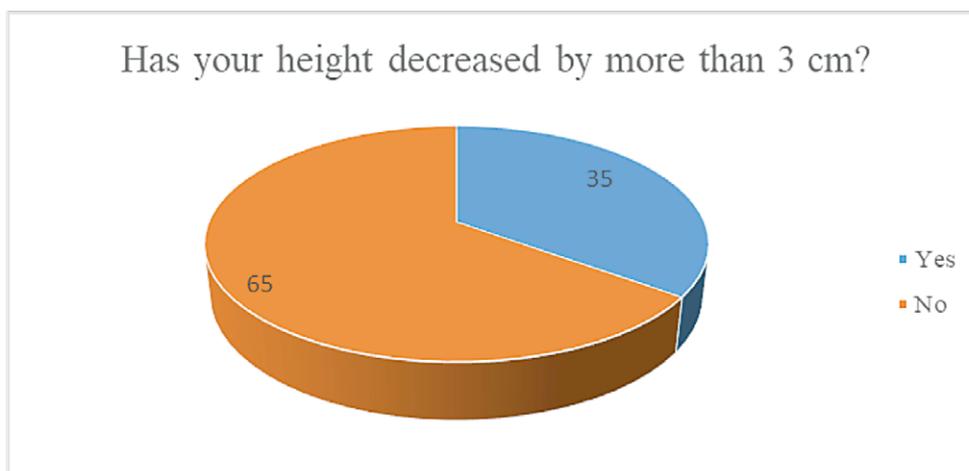


Graph 7. Incidences of fractures in the group of respondents due to osteoporosis

47 respondents (47 %) suffered a fracture due to osteoporosis and 53 female respondents (53 %) stated that they had no fracture due to osteoporosis.

Question No. 8 Has your height decreased by more than 3 cm?

Yes: 35 No: 65

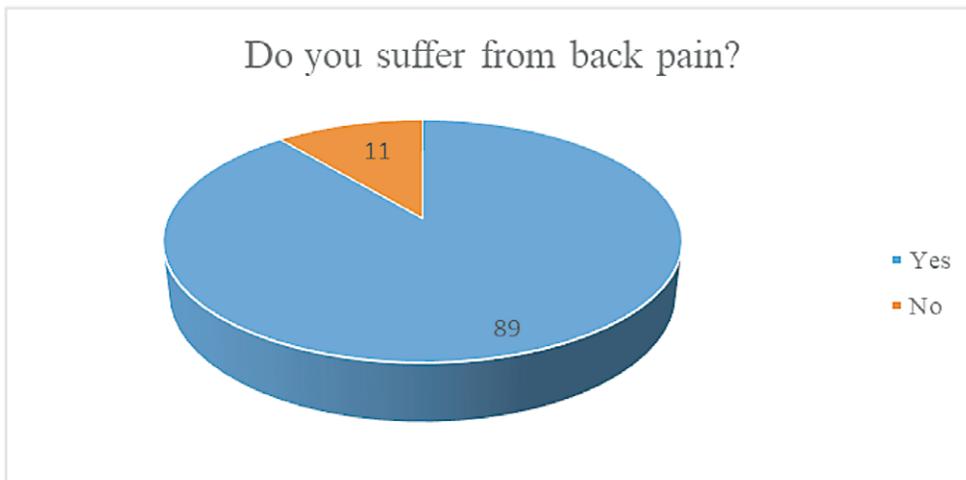


Graph 8. Reduction of body height in the group of respondents due to osteoporosis

For question No. 8, 35 respondents (35 %) told us that their body height decreased by more than 3 cm due to osteoporosis whereas 65 respondents (65 %) indicated that their height did not decrease by more than 3 cm.

Question No. 9 Do you suffer from back pain?

Yes: 89 No: 11

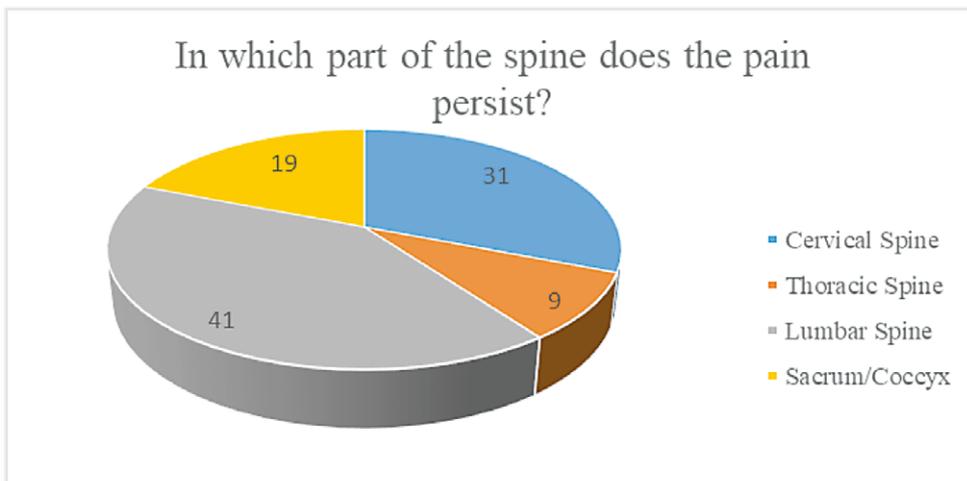


Graph 9. Incidence of back pain in the group of respondents

Back pain was reported by 89 respondents (89 %) whereas 11 respondents (11 %) do not suffer from back pain.

Question No. 10 In which part of the spine does the pain persist?

Cervical spine: 31 Thoracic spine: 8 Lumbar spine: 42 Sacrum: 19



Graph 10. Localization of spinal pain in the group of female respondents

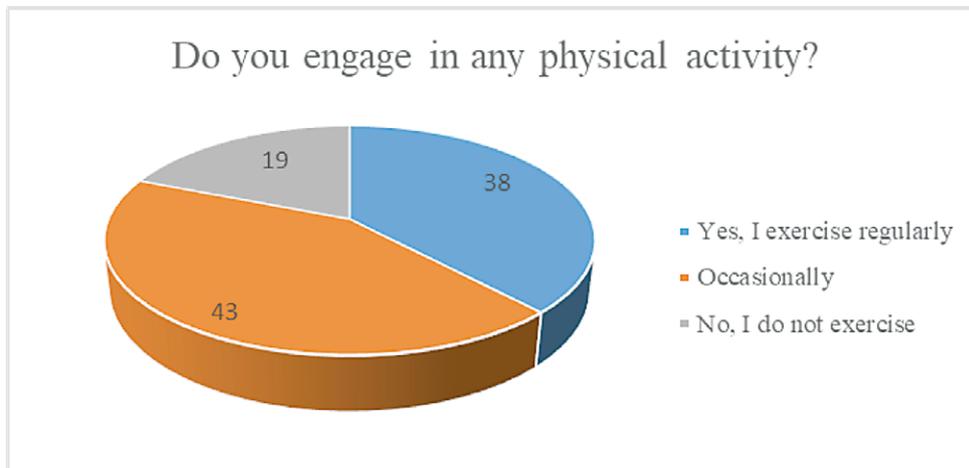
Pain in the cervical spine was reported by 31 respondents (31 %), pain in the thoracic spine was reported by 8 respondents (8 %), the largest number of respondents 41 (41 %) reported pain in the lumbar region and the remaining 11 respondents (11 %) in the lower back.

Question No. 11 Do you engage in regular physical activity?

Yes I exercise regularly: 38

Occasionally: 43

No, I do not exercise: 19



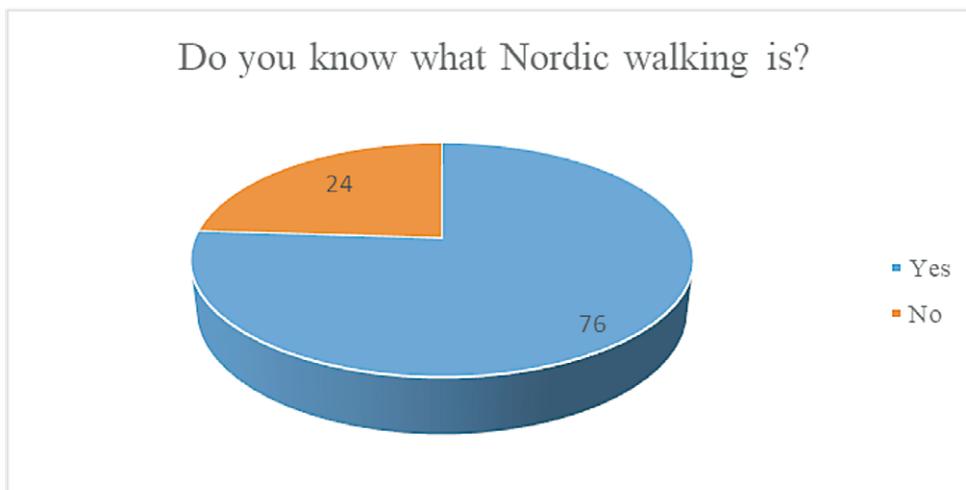
Graph 11. Regularity of physical activity in the group of respondents

38 female respondents (38 %) engage in regular physical activity, 43 respondents (43 %) occasionally engage in some physical activity and 19 respondents (19 %) do not exercise at all.

Question No. 12 Do you know what Nordic walking is?

Yes: 76

No: 24

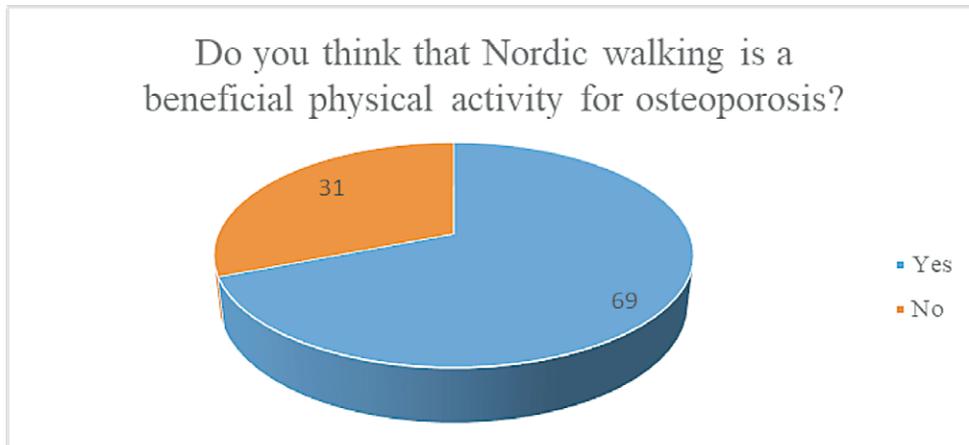


Graph 12. Awareness of Nordic walking in the group of respondents

76 female respondents (76 %) knew what Nordic walking is whereas 24 female respondents (24 %) stated that they did not know this type of physical activity.

Question No. 13 Do you think that Nordic walking is a beneficial physical activity for osteoporosis?

Yes: 69 No: 31



Graph 13. Rating of Nordic walking as a beneficial physical activity in the treatment of osteoporosis by the respondents.

In question no. 13, 63 respondents (63 %) assumed that Nordic walking is a suitable physical activity for osteoporosis, and 37 respondents (37 %) said that it is not.

Question No. 14 Do you partake in Nordic walking as one of your physical activities?

Yes: 55 No: 45



Graph 14. The use of Nordic walking in the respondents

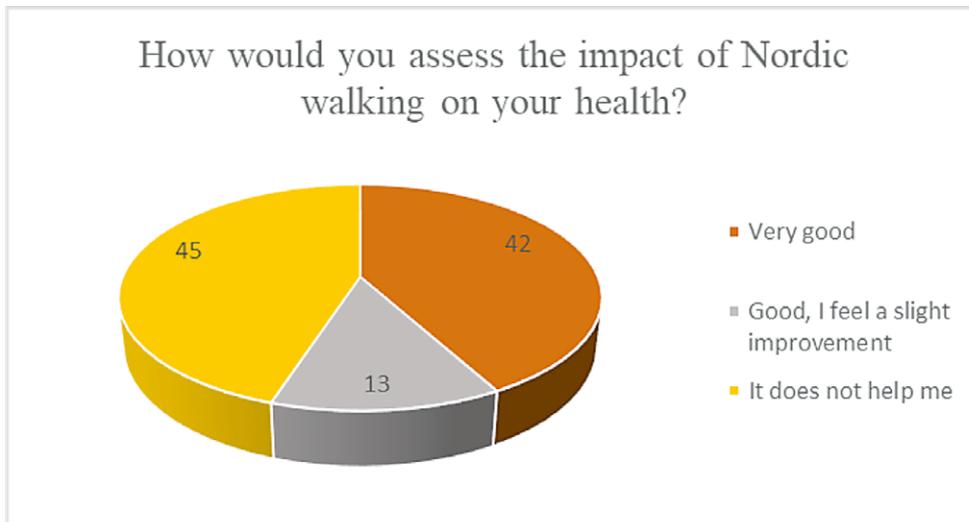
Nordic walking is utilized by 55 respondents (55 %) as one of their physical activities, and 45 respondents (45 %) do not use it as one of their physical activity options.

Question No. 15 How would you assess the impact of Nordic walking on your health?

Very good: 42

Good, I feel a slight improvement: 13

It does not help me: 45



Graph 15. Evaluation of the impact of Nordic walking on the group of respondents

42 respondents (42 %) rated the impact of Nordic walking on their own health as very good and 13 respondents (13 %) as good with a feeling of slight improvement. 45 respondents (45 %) said that Nordic walking does not help them.

Question No. 16 How many times a week do you practice Nordic walking?

Never: 45

Once a week: 25

Twice a week: 20

Three or more times a week: 10

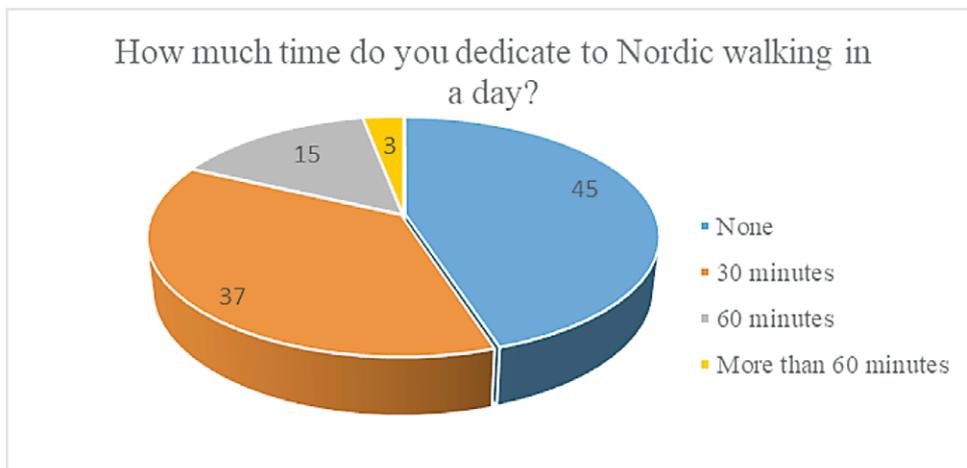


Graph 16. Number of Nordic walking training sessions in a week

In this question, 45 respondents (45 %) tell us that they do not practice Nordic walking at all, which was also confirmed by the evaluation of question no. 16. 25 respondents (25 %) practice Nordic walking once a week, 20 respondents (20 %) twice a week, and only 10 respondents (10 %) use Nordic walking 3 times a week or more.

Question No. 17 How much time do you dedicate to Nordic walking in a day?

None: 45 30 minutes: 37 60 minutes: 15 More than 60 minutes: 3



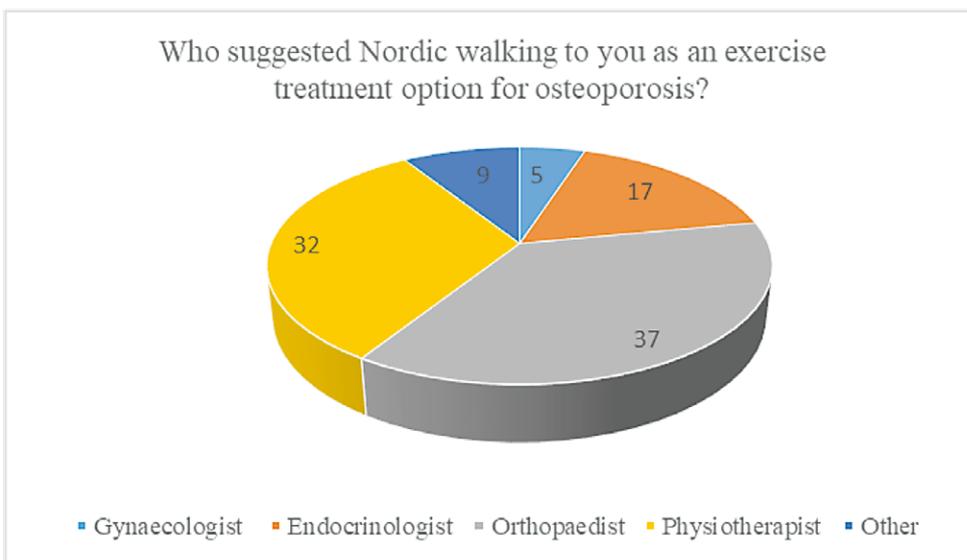
Graph 17. The length of a Nordic walking training session during the day

45 respondents (45 %) do not dedicate any time to Nordic walking, and this result is in accordance with the negative results from question No.16. These results are quite high, which may be indicative of the bad lifestyle led by many today and the inactivity of the respondents.

37 respondents (37 %) said that they do Nordic walking for 30 minutes, 15 respondents (15 %) do 60 minutes of Nordic walking and 3 respondents (3 %) partake in Nordic walking for more than 60 minutes a day.

Question No. 18 Who suggested Nordic walking to you as an exercise treatment option for osteoporosis?

Gynaecologist: 5 Endocrinologist: 17 Orthopaedist: 37 Physiotherapist: 32 Other: 9



Graph 18. Source of information about the use of Nordic walking as a possible movement therapy

5 respondents (5 %) were suggested Nordic walking as a movement therapy option by their gynaecologist, 17 respondents (17 %) were recommended Nordic walking by an endocrinologist, the largest group of 37 respondents (37 %) were directed by an orthopedist, 32 respondents (32 %) were recommended Nordic walking by a physiotherapist and 9 female respondents (9 %) learned about this option from other sources (social networks, acquaintances, general practitioner).

Discussion

Osteoporosis is often called the silent thief of bones and is one of most serious metabolic diseases. As mentioned by Pavelka, et al. (2018), osteoporosis is also beginning to be referred to as the epidemic of the third millennium. This period is characterized by a long symptomless phase, when the pain is caused by the pathological curvature of the spine, muscle imbalances and bone fractures, most commonly affecting the hip joint and lumbar spine. Based on her experience, Ďurišová (2013) notes that kinesiotherapy and regular movement therapy is an integral part of the complex treatment of osteoporosis. It ensures skeletal integrity, improves muscle strength, mobility, stability, posture, reduces the incidence and severity of falls, and thus minimizes the risk of a possible fracture. Physical activity and the influence of gravity (“weight-bearing exercises”) are the most important factors for bone growth and bone remodelling. Weight-bearing exercises have been proven to lead to a slight increase in bone mineral density (BMD) of approximately 1–2 % (<https://www.worldosteoporosisday.org>). The effect of movement on bone is complex and essentially involves 3 basic mechanisms: activation of osteoblasts, fixation of Ca^{2+} ions on negatively charged bone surfaces and an increased supply of material for ossification (Němcová, 2008). Antigravity exercises include regular walking, or Nordic walking. It is an ideal form of physical training, with an efficiency 40 – 50 % higher than normal walking (Wanderer, 2019).

Considering the issues associated with osteoporosis, in our survey we determined what percentage of the monitored set of 100 patients engaged in physical activity. 38 respondents (38 %) engage in physical activity regularly, 43 respondents (43 %) occasionally engage in physical activity, and 19 respondents (19 %) do not exercise at all. According to the survey, only 38 osteoporotic women exercise regularly, so we agree with Ďurišová (2013) that with insufficient physical activity in patients with osteoporosis, there is a constant loss of bone mass, and the degree of osteoporosis gradually worsens. Patients should be recommended a physically active lifestyle, maintaining a BMI above 19 kg/m^2 and have weight-bearing exercises adapted to their needs and abilities. In addition to physiotherapeutic care, motivation for consistent physical activity in a home environment is important (both indoor and outdoor).

Nordic walking is utilized as one of the outdoor exercises by 55 respondents (55 %) whereas 45 respondents (45 %) do not use it. Further evaluating the information from the questionnaire, 78 female respondents reported they had been diagnosed with postmenopausal osteoporosis, 89 % suffer from back pain, and almost half have suffered a fracture (47 %) due to the

disease. Kračmar, et al. (2011) states that Nordic walking is a beneficial activity for relieving back pain. By properly activating the diaphragm, deep back extensors, abdominal muscles and pelvic floor muscles, our deep stabilization system balances the interplay and movement between the upper and lower limbs and thus participates in the dynamic stabilization of the spine during walking. It's a shame that only half of the female respondents from our monitored group engage in Nordic walking. Due to the positive effects of Nordic walking training and the high incidence of back pain as well as the occurrence of fractures in the group, we would recommend using this method of physical activity as part of prevention and treatment to a larger percentage of patients.

25 respondents (25 %) do Nordic walking once a week, 20 respondents (20 %) twice a week, and only 10 respondents (10 %) use Nordic walking three times a week or more. 37 respondents (37 %) said that they do Nordic walking for 30 minutes, 15 respondents (15 %) do 60 minutes of Nordic walking and 3 respondents (3 %) do more than 60 minutes. According to Řehořková, et al. (2008), the minimum recommended frequency for this exercise is no less than 30 minutes at least 3 times a week.

We agree with the opinion of Němcová (2008), that physical activity and the influence of gravity are the most important factors for bone growth and bone remodelling. That's why we have to motivate the younger generation to exercise and be physically active. To direct them to movement and thus to a good path, so that they may actively influence their future. Good prevention and the popularization of physical activity leads to a reduction in the incidence of osteoporosis later in life.

Conclusion

Osteoporosis is a disease with an extraordinary medical, pharmacoeconomic and societal impact. Consistent diagnosis, correct differential diagnosis and targeted treatment enable the effective prevention and treatment of osteoporosis. The foundational treatment of osteoporosis remains to be calcium and vitamin D. However, the patient must realize that a significant factor of the success of the treatment of osteoporosis involves long-term and regular exercise therapy, which supports the incorporation of calcium into the bones. When choosing the type of movement (sport) activity for patients with osteoporosis, it is necessary to consider which movement activities (sports) the patient can handle right away and which ones they are a beginner in. In conclusion, it is important to note that it is very difficult to motivate people to exercise regularly, especially the elderly, because they have very unrealistic expectations and fears regarding physical exercise. For this reason, walking is becoming the number 1 trend not only in terms of recreational sports, but also among doctors and health organizations, to such an extent that the World Health Organization (WHO) recommends walking and Nordic walking as an effective method of helping treat various diseases. Through our evaluation, we see Nordic walking as one of the possible exercise therapies beneficial in the rehabilitation process and recommend its use in the prevention and subsequent treatment of osteoporosis.

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PREVENCIA A REHABILITÁCIA ÚRAZOV RAMENNÉHO KÍBU U AKTÍVNYCH ŠPORTOVCOV

PREVENTION AND REHABILITATION OF SHOULDER JOINT INJURIES IN ACTIVE ATHLETES

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Abstrakt

Úvod: Športový úraz je udalosť pôsobiaca na ľudský organizmus krátku dobu, spôsobuje poškodenie vyžadujúce dlhší čas k návratu do pôvodného stavu. Tvrdé kontaktné súboje alebo nepripravenosť organizmu na náročné výkony. Ramenný kĺb je kĺb s najväčším rozsahom pohybu. Práve pre tieto unikátne schopnosti je veľmi náchylný na poranenia.

Cieľ: Potrebná adekvátne tréningová pripravenosť, dostatočný svalový rozvoj, správna technika, vrátane optimálneho svalového zapojenia a vzájomná svalová synchronizácia. Pri kondičnom a výkonnostnom športe, je vhodné zaistiť inú pohybovú aktivitu pre vyrovnanie jednostranného zaťaženia.

Materiál a metodika: Kompenzačné cvičenia a zapojenie práce fyzioterapeuta v športovej príprave má nezastupiteľnú úlohu, viditeľné výrazné zapojenie horných fixátorov, loptatiek. Stereotyp flexie, pravá lopatka začína pohyb skôr ako horné fixátory lopatiek najmä m. trapezius výrazne aktivovaný už v počiatkovej fáze pohybu. Vyšetrenie odporových pohybov: pohyb do abdukcie a pri odporovom teste na m. biceps brachii uvádzali pacienti bolestivosť.

Výsledky: Krátkodobý a dlhodobý rehabilitačný plán sa zameriaval na zníženie bolestivosti zväčšenie rozsahu pohybu zväčšenie svalovej sily u kazuistiky dvoch aktívnych športovcov. Obnovenie tonusu svalstva stabilizáciu ramenného pletenca správne zapájanie svalov do stereotypov odstránenie sv. dysbalancii – (diagonála lopatky) funkcia hlbokého stabilizačného systému

Záver: Včasná diagnostika a konzervatívna alebo operačná liečba. Znehybnenie kĺbu v nevyhnutných prípadoch na čo najkratšiu dobu. Špecializácia fyzioterapeutov, akcelerovaná rehabilitácia a zabránenie stuhnutia kĺbu a ochabnutiu svalstva, snímateľné ortézy. Snaha o čo najskorší návrat do pohybu a športového zaťaženia. Novodobá nanoartroskopia, návrat k bežným aktivitám do 72 hodín po výkone a ku športu 2 týždne po výkone.

Kľúčové slová: Športový úraz, včasná diagnostika, fyzioterapia.

Abstract

Introduction: A sports injury is an event affecting the human body for a short period of time, causing damage that requires a longer time to return to its original state. Hard contact fights or unpreparedness of the body for demanding performances. The shoulder joint is the joint with the greatest range of motion. It is because of these unique abilities that he is very prone to injuries.

Focus: Necessary adequate training readiness, sufficient muscle development, correct technique, including optimal muscle engagement and mutual muscle synchronization. In fitness and performance sports, it is advisable to ensure another physical activity to balance the unilateral load.

Material and Methods: Compensatory exercises and the involvement of the work of the physiotherapist in sports preparation have an irreplaceable role, visible significant involvement of the upper fixators, balls. Flexion stereotype, the right scapula begins movement earlier than the upper fixators of the scapula especially m. trapezius significantly activated already in the initial phase of the movement Examination of resistance movements: movement into abduction and during the resistance test on m. biceps brachii patients reported soreness.

Results: The short-term and long-term rehabilitation plan focused on reducing pain, increasing range of motion, and increasing muscle strength in a case study of two active athletes. Restoration of muscle tone, stabilization of the shoulder girdle, correct involvement of muscles in stereotypes, removal of St. imbalance – (diagonal scapula) function of the deep stabilization system

Conclusion: Early diagnosis and conservative or operative treatment. Immobilization of the joint in necessary cases for the shortest possible time. Specialization of physiotherapists, accelerated rehabilitation and prevention of joint stiffness and muscle wasting, removable orthoses. Efforts to return to exercise and sports activities as soon as possible. Modern nanoarthroscopy, return to normal activities within 72 hours after the procedure and to sports 2 weeks after the procedure.

Keywords: Sports injury, early diagnosis, physiotherapy

Úvod

V súčasnej dobe je šport ako monumentálny fenomén, ktorý sa prelína s ďalšími spoločenskými oblasťami má mnoho pozitív ako napr. zdravý životný štýl. Predstavuje ale aj je fyzickú činnosť, pohybovú aktivitu, ktorá je motivovaná osobnou kondíciou alebo cieľným výkonom. Šport je špecifikovaný prívlastkami, ako kondiční, vrcholový, rekreační, mužský, ženský. Okrem týchto pozitív prináša aj negatívnu stránku a to úrazy, zranenia a svalové problémy. Športový úraz je udalosť pôsobiaca na ľudský organizmus pomerne krátku dobu, spôsobuje však poškodenie vyžadujúce dlhšiu dobu potrebnú k návratu do pôvodného stavu. Kontaktné súboje alebo nepripravenosť na náročné výkony, resp. s nezvládnutím techník športov.

Ramenný kĺb je kĺb s najväčším rozsahom pohybu v ľudskom tele. Umožňuje obrovský rozsah hybnosti a zároveň je schopný veľkej sily. Práve pre tieto unikátne schopnosti je veľmi náchylný na poranenia. Svojou štruktúrou je pripravený viac na mobilitu ako na stabilitu. Je náchylný na vznik nestability pri pohybe ramena nad 90° – „overhead“ aktivite. Okolité svalové štruktúry musia byť systematicky zaťažované s dodržaním biomechanických zákonitostí. Pri nedostatočnej alebo nevhodnej pohybovej aktivite dochádza k svalovej nerovnováhe (dysbalancii) a je zvýšené riziko úrazu (Wendsche, et.al., 2018).

Jadro práce

Komplexná príprava štruktúr pohybového aparátu, je predpokladom, že zaradenie vhodných fyzioterapeutických techník, ako je nap. segmentálna centrácia do tréningového plánu, pod odborným vedením fyzioterapeuta, povedie k prevencii vzniku svalových disbalancií a mikrotraumám. Pri pravidelnom používaní techník, s cieľom uvedomiť si zacentrované postavenie kĺbu pri pohybovej aktivite, vedie k zrýchleniu návratu aktívnej činnosti, po už vzniknutom úraze. Potrebná je adekvátne tréningová pripravenosť, dostatočný svalový rozvoj, správna technika, vrátane optimálneho svalového zapojenia a vzájomnej svalovej synchronizácie. Pri kondičnom a výkonnostnom športe, je vhodné zaistiť inú pohybovú aktivitu pre vyrovnanie jednostranného zaťaženia (Kolář, 2015). Kompenzačné cvičenia u aktívnych športovcoch majú – nezastupiteľnú úlohu. Najčastejšie úrazy ramenného pletenca sú hlavne, raketové športy ako je tenis, badminton, baseball, kriket, atletika, gymnastika „hody a vrhy, hokej, hádzaná, volejbal, golf, plávanie. Pri aktivácii svalstva ramenného pletenca je nutné vždy zaujať vhodnú polohu tela, spevniť trup a vytvoriť pevný bod (punctum fixum), pre pohyb hornej končatiny voči trupu. Centrovaný ramenný kĺb je v postavení, ktoré umožňuje jeho optimálnu statické zaťaženie. Konkrétne ide o funkčné postavenie, kedy je v kĺbe pri danej polohe rovnomerné rozloženie tlaku na kĺbových plochách. Kĺbové plochy sú nastavené do polohy, pri ktorej je kĺb v danom uhlovom postavení segmentov najlepšie schopný znášať zaťaženie, má maximálnu možnú stabilitu a najvýhodnejšiu statiku pre dané uhlové postavenie (Wendsche, et al., 2018). Pohyb v kĺbe je vykonávaný rôznymi spôsobmi podľa cieľa požadovaného pohybu. Každý pohyb v kĺbe je vykonávaný v otvorenom alebo v uzavretom pohybovom reťazci. Otvorený pohybový reťazec, je ten ktorý má jeden koniec označený ako distálny, voľný a druhý koniec, označený ako proximálny, pevne fixovaný. Uzavretý reťazec má fixované oba konce. Pri pohybe v otvorenom reťazci je potrebná väčšia koordinovaná stabilizácia systému. Pri pohybe v uzavretom reťazci je dosiahnuté optimálne zapojenie svalov vo fyziologickom poradí, čo sa využíva vo fyzioterapii. Z toho vyplýva, že pre vykonaný pohyb sa telo pohybuje v uzavretých pohybových reťazcoch, ktoré sú vývojovo staršie a pre fyziologický pohyb „prirodzené“ (Dvořák, 2013). Pohyb v otvorenom reťazci je pre organizmus náročnejší. Ramenný kĺb môže byť pri športe poškodený rôznymi spôsobmi. Najčastejšie je v overhead pozícii v otvorenom reťazci. Vyskytuje sa u rôznych športov ako sú hody, vrhy, smečovanie alebo raketové športy. Ďalšou skupinou sú plavci, v overhead polohe sa pohybuje končatina aj u gymnastov, tu ale dochádza k uzavretému reťazcu pri kontakte

s podložkou alebo náradím. U plavcov a gymnastov dochádza k poškodeniu ramenného kĺbu iným mechanizmom ako u hodových disciplín.

Fáza hodu:

1. Príprava – naťahovanie – produkcia potenciálnej energie zvýšením ťažiska čo najvyššie.
2. Skoré vztýčenie – pohyb paže do pozície hodu.
3. Neskoré vztýčenie – končatina je v maximálnej abdukcii a vonkajšej rotácii pripravená k hodu.
4. Akcelerácia – rýchly pohyb paže vpred, ktorá končí hodom so sprievodným úbytkom kinetickej energie.
5. Pokračovacia – následná – pokračovanie predchádzajúcej fázy, s úlohou rozptýliť zostávajúcu kinetickú energiu do svalov trupu a končatín.

Popísané fázy hodu sú zamerané na pohyb končatiny, pohyb začína nastavením pevného bodu a postúry. Celá pohybová slučka by nebola možná bez funkčného väzivového aparátu s dostatočnou odozvou na polohocit a pohybovit. Pohyb začína postavením protiľahlého chodidla, prechádza cez svalstvo kolenného zámku, cez bedrový kĺb na svalstvo trupu. Dochádza ku kontrakcii brušného lisu s paravertebrálnymi svalmi a m.quadratus lumborum, kontrakcie prechádza na svalstvo ramenného pletenca cez m.latissimus dorsi a spodné vlákna m.trapesius (Kolář, 2015).

Svaly sú rozhodujúce výkonný prostriedok je centrálny nervový systém. Realizujú pohybové zámery a slúži ako faktor, ktorý pohyb v určitom smere a v určitom čase nevyradí, ale daný pohyb vykonáva alebo brzdí. To je dôležité pri zaistení vhodného postavenia kĺbu. Reťazenie funkčných porúch vo funkčných reťazcoch je dané výberom inej stratégie s rovnakým alebo veľmi podobným cieľom. Subjektívne problémy vznikajú v okamihu, keď dôjde k nahromadeniu patologických riešení a náhradné pohyby a ich dôsledky presiahnu možnosti kompenzácie organizmu. Tento popísaný mechanizmus zhrňa vznik patologických pohybových stereotypov. K tomu dochádza pri kladení vysokých nárokov na početnosť vykonávaného pohybu a na vysokú záťaž. Pri fixovanom patologickom pohybovom reťazci stačí už len málo, aby došlo k traume. Stresová záťaž pri podaní vrcholného výkonu, únava, nedoliečenie predchádzajúcich drobných ťažkostí sú príčinou úrazu (Kabelíková, et al., 2011).

Patologický mechanizmus poškodenia ramenného kĺbu pri hode, môže nastať z dvoch dôvodov:

1. Nevhodná biomechanika hodu vyžaduje väčšiu svalovú silu ramena, než na ktorú je ramenný kĺb pripravený, čo vedie k únave.
2. Nevhodné rozptýlenie energie v mäkkých tkanivách ramena vedie následne k poškodeniu.

Pri nevhodnom biomechanickom zaťažení hrozí impingement (kompresia) a poškodenie prednej časti rotátorovej manžety a šľachy m.supraspinatus. Pri nahromadení energie vo fáze vlastného hodu hrozí poškodenie zadnej časti rotátorové manžety. Pri vnútornej rotácii a addukcii hlavice humeru a jeho posun translačným pohybom dozadu môže dôjsť aj k zadnej subluxácii (dôležitá je protrakcia scapule (Mašán, et al., 2022).

Prevenca

Základná a pravdepodobne najťažšia úloha prevencie je zabezpečenie primeranej záťaže z hľadiska kineziológie. Často hlavným problémom je čas ako dlho a v akej intenzite trénovať. Kedy u mládeže prejsť k vrcholovému športu – jednostrannému zaťažovaniu, aby športová aktivita nepoškodzovala, ale naopak napomáhala k získaniu a upevneniu zdravia. Dôležité je určiť zrelosť skeletu a svalstva v závislosti od biologického veku. Zohľadniť vek, pohlavie, zdravotný stav a trénovanosť športovcov. Tréner musí mať dostatočné znalosti o voľbe záťaže a jej dávkovaní, u mládeže je nutné dodržiavať komplexné zaťaženie s všestranným rozvojom. Inak je nebezpečenstvo spustenia patologického mechanizmu s fixáciou poruchy a vzniku svalovej disbalancie. Pravdepodobne aj vplyvom komercie športu dochádza k posúvaniu vekovej hranice vrcholových športovcov, ktorý sa stáva povoláním, na hranici fyziologického zaťaženia organizmu. Určujúcim faktorom sú vložené financie a ich návratnosť a nie zdravie športovcov (Mašán, et al., 2021).

Regenerácia je nevyhnutnou súčasťou športu, ale aj života po úraze. Slúži na obnovu síl. Delí sa na pasívnu, ktorá sa deje automaticky pri akomkoľvek výkone a aktívna, ktorá využíva vonkajšie vplyvy. Jednak je to pasívny odpočinok a ďalej potom aktívna regenerácia s využitím fyzioterapeutických procedúr ako je elektroliečba, vodoliečba, pohybová liečba, mechanoterapia a mnohé iné. Vhodnú formu fyzioterapeutických procedúr určuje lekár so špecializáciou fyziatria, balneológia a liečebná rehabilitácia v spolupráci s fyzioterapeutom.

Kompenzačné cvičenie patrí k aktívnym formám pohybovej regenerácie. Je neoddeliteľnou súčasťou tréningového plánu, zaraďuje sa jednak do záverečnej časti tréningovej jednotky a má svoje miesto v období prípravy. Slúži na vyrovnanie svalovej nerovnováhy, vznikajúcej vysokou záťažou a jednostranným preťažovaním. Pri kompenzačnom cvičení sa používajú pomôcky pôvodne využívané vo fyzioterapii ako sú overbally, veľké lopty, pružné terabandy, reebok core training alebo trampolíny. Tieto pomôcky sú labilné a pre udržanie stability je dôležité zapojiť do pohybu autochtónny pohybový systém, ktorý nie je pri bežnej činnosti tak aktivovaný. Strečing je odvodený z anglického slova stretch – natiehnutie alebo napínanie. Je to technika, ktorá slúži na predĺženie dĺžky svalu, väzov a zvýšenie kĺbovej pohyblivosti. Je dôležité ho vykonávať pomaly, presnou technikou a niekoľkokrát denne. Delí sa na statický strečing s cieľom natiehnutia svalu do krajnej polohy a udržaním tejto polohy. Dynamický strečing využíva pohybovú energiu na zvýšenie rozsahu pohybu. Pasívny strečing používa vonkajšie sily, umožňuje dosiahnuť maximálnych polôh. Aktívny strečing sa vykonáva zapojením agonických svalov bez vonkajšej sily. Cvičenie je synchronizované s dychovou gymnastikou.

Pri strečingu môžeme využiť techniku post izometrickej relaxácie. Kedy v maximálnej krajnej polohe po izometrickom sťahu, ktorý je 15 – 20 sekúnd nasleduje s výdychom uvoľnenia – uvoľnenie svalu a následne sa sval natiahne do ďalšej krajnej polohy. Opakuje sa 3 – 4x. Posilňovanie je technika, ktorá slúži na rozvoj svalovej sily a nárast svalovej hmoty. Pri

posilňovanie je potrebné pracovať s celým svalovým systémom. U mládeže do 15 rokov je vhodné využiť záťaž vlastného tela bez použitia vonkajšieho odporu. Ako odpor slúži pri posilňovaní činka, kladka alebo pružné ťahy. Záleží na celi, ktorý chceme dosiahnuť – zlepšenie sily statickej, dynamickej a vytrvalostnej. Posilňovanie začína s nízkou váhou, s dodržaním presnej techniky vykonania cviku. Pre zvládnutie techniky využívame na cvičenie stroje, ktoré zaisťujú správne vykonanie cviku. Po zvládnutí techniky kombinujeme záťaž jednoručných činiek s veľkou činkou a kladkami. Pri zvládnutí techniky zvyšujeme váhu a počty opakovaní. Na každú techniku volíme 2 – 3 cviky, ktoré po 2 mesiacoch obmieňame.

Odpočinok

Pre športovcov je veľmi dôležité usporiadanie denných činností, svoje miesto musí mať tréning, zamestnanie – štúdium, regenerácia, odpočinok poprípade voľný čas. Významný vplyv má striedanie záťaže a odpočinku a využitie kompenzácie. Každý organizmus má svoj biorytmus, ktorý treba vypozerovať a využiť v prospech športovcov. Biorytmus je jednak denný, pri ktorom je najvyššia aktivita medzi jedenástou a dvanástou hodinou a druhý vrchol je medzi treťou a piatou popoludní. Ďalší biorytmus je týždenný, kedy vrchol nastáva v utorok a v stredu. A potom ročné pri ktorom je prvé vyvrcholenie aktivity v júni a druhé od decembra do januára. Nedostatok času a odpočinku je jedným z negatívnych faktorov znižujúcich kvalitu výkonu a urýchľujúcich nástup únavy s nebezpečenstvom vzniku mikrotraum. Je dôležité od ranného veku učiť športovcov hospodáriť s časom, nedostávať ho do časovej tiesne prehnane vysokými nárokmi, deliť činnosti podľa dôležitosti a kvalitne využívať voľný čas.

Z analytického cvičenia, ktoré bolo zamerané izolovane na jeden sval, sa vplyvom skúmania vývoja motoriky človeka prechádza postupne ku komplexnému pohľadu na pohyb – fyzioterapia vychádza z lokomócie a reflexná terapia pracuje komplexne s celým pohybovým systémom. Techniky na podklade reflexnej lokomócie využívajú vzor reflexný plazenie a otáčanie ako východiskové polohy pre ďalšie cvičenia. V jednotlivých cvikoch sa svalový systém nastaví do polohy a využíva sa motoricky starších zavretých pohybových vzorov. V týchto vzoroch potom dochádza na biomechanicky vhodné zapojenie jednotlivých svalových skupín. pri už vzniknutom úraze je niekoľko spôsobov liečby (Dvořák, 2013). Vhodnú liečbu indikuje odborný lekár podľa stanovených štandardov s prihliadnutím na vlastné skúsenosti a individuálne k jednotlivým pacientom. Cieľom každej liečby je obnovenie fyziologickej funkcie s minimom následných komplikácií, v zmysle následného obmedzenia hybnosti, vzniku skorých artrotických zmien, nezvratné poškodenia kĺbových plôch a väzivovo svalového aparátu. Ku konzervatívnemu spôsobu liečby sa pristupuje pri ťažkostiach, keď je prítomná bolesť bez porušenia celistvosti štruktúr v zmysle natiiahnutia alebo natrhnutia. Tu je indikovaný vhodný pohybový režim, ktorý je zameraný na znovuobnovenie pohybových reťazcov s využitím práce v uzavretých reťazcoch. Ako pomocná technika sa využíva fyzikálnej terapie s analgetickými účinkami ako sú TENS (transkutálna elektrická neurostimulácia) prúdy, magnetoterapia a iné. Pri natiiahnutí väzivových štruktúr alebo primárnej luxácii ramenného kĺbu, bez porušenia celistvosti štruktúr je indikovaná fixácia na 3 týždne – šatkový záves alebo desaultova ortéza.

A potom sa pokračuje v pohybovom režime ako u predchádzajúceho s využitím analgetických procedúr. V tejto fáze je dôležité zaistiť vhodný pohybový režim vo fixácii. V Operačné riešenie, v dnešnej dobe viac artroskopicky, alebo u výnimočných prípadov otvorenou cestou, je indikované pri poškodení celistvosti mäkkých štruktúr ramenného kĺbu alebo pri poranení vnútorných štruktúr ramenného kĺbu (napr. defekty na chrupavke). Pri operačnom riešení sa vykoná kontrola postihnutých tkanív a ich zošitie, alebo čiastočné odstránenie, pri poškodení chrupavky sa vykoná zahľadenie poškodených štruktúr. Po operácii je indikovaná fixácia desaultovou ortézou na 5 – 6 týždňov. A pohybový režim vo fixácii a po sňatí fixácie je ako u predchádzajúcich.

Návrat k športovým aktivitám

Pri návrate k športu je dôležitá postupnosť. Nie je vhodné ukončiť fyzioterapiu a začať opäť s plnou tréningovou záťažou. Športovec by mal pokračovať v zavedenom režime a zvyšovať záťaž postupne a individuálne športovou technikou. Vhodné je vybrať si nekontaktnú časť tréningu a pri ňom si uvedomovať postavenie končatiny a celého organizmu. Dbať na presné a fyziologické vykonávanie pohybu. V tom postupne pokračovať až do plnej záťaže a plného tréningu.

Kompenzačné (fixačné) pomôcky

Pokiaľ je horná končatina športovým výkonom príliš zaťažená – preťažená – je vhodné využiť pri vrcholovom (maximálnom) výkone kompenzačné pomôcky. Rozhodne by nemali byť používané v príprave a v tréningu, v tejto fáze dochádza k posilňovaniu štruktúr a pri fixácii naopak hrozí ich úplné vyradenie z pohybových reťazcov a ďalšiemu oslabovaniu. Ako fixácia môže slúžiť kinesiotaping alebo rôzne športové ortézy. Kinesiotaping je špeciálna lepiaca páska, ktorá má väčšiu mechanickú pevnosť, neobmedzuje však výraznejším spôsobom fyziologickú hybnosť, ale je schopná zabrániť extrémnej hybnosti. Technika akú sa tape lepí spevňuje a súčasne aj odľahčuje postihnutú oblasť. Môže fungovať aj ako stimulácia – pri presnom a cielenom nalepení stimuluje svojim tlakom kožu a podkožie a tým reflexne ovplyvňuje okolité tkanivá. Stimuluje aj vrstvu svalstva pod ním uloženú a tá sa viac zapája do pohybových reťazcov. Kinesiotaping sa môže využiť na prevenciu vzniku úrazu u doposiaľ nepoškodeného aparátu alebo bráni zvýšenej hybnosti aparátu už skôr postihnutého, ďalej sa môže využiť liečebne ako imobilizácia poškodené oblasti.

Záver

Stavba ramenného kĺbu zaistuje zložitý pohyb vo všetkých smeroch, čo je umožnené kĺbom a svalovým pletencom. Pohyb sa vyvíja z uzavretých pohybových reťazcov (reflexné plazenie a otáčanie) a otvoreným (uchopenie predmetu a práca s nim). Pri kondičnom športe, je vhodné zaistiť inú pohybovú aktivitu pre komplexné vyrovnané zaťaženie organizmu. Pri vrcholovom, výkonnostnom športe, ktorý zaťažuje organizmus vo veľkej miere len jednostranne, je potrebná kompenzácia. Pri kombinácii s novými postupmi, ktoré môžu

pôsobiť aj preventívne a zaisťujú optimálne zretiazenie pohybu, je väčšia šanca minimalizáciu a poškodenie pohybového aparátu. Okrem analytického cvičenia na vyťahovaní skrátenejších a posilnenie ochabnutých svalov, je dôležité pracovať s celým organizmom a nezabúdať na psychiku športovcov. Pri vzniknutom úraze je dôležitá včasná diagnostika a včasná konzervatívna alebo operačná liečba, so stanovením ďalšieho liečebného plánu. Úplné doliečenie je závislé od fyzioterapie, pri ktorej záleží na konkrétnom poškodení, na odborných znalostiach, skúsenostiach, celého tímu. Snaha o čo najskorší návrat do pohybu a športového zaťaženia musí byť v súlade s liečebným plánom a postupný.

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COMPREHENSIVE REHABILITATION OF PEOPLE WITH LOWER LIMB DYSFUNCTION IN RELATION TO USE OF OUTDOOR FACILITIES IN URBAN INFRASTRUCTURE

KOMPLEKSOWA REHABILITACJA OSÓB Z DYSFUNKCJĄ KOŃCZYN DOLNYCH Z WYKORZYSTANIEM Z OBIEKTÓW ZEWNĘTRZNYCH INFRASTRUKTURY MIEJSKIEJ

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Abstract

Introduction: Difficulties in walking include all age groups, from the youngest, through professionally active people and an increasing number of elderly and old people. The reasons for the growing number of people with mobility difficulties are mainly the effects of neurological diseases, rheumatological and orthopedic ailments, as well as traffic and work accidents.

Focus: Enhancing the quality of life and reducing the necessity for individuals to engage in physical activities can also impact issues related to walking. The ongoing and comprehensive rehabilitation often extends into one's own residence, where the environment plays a crucial role in promoting enhanced mobility. Urban settings, green spaces, and facilities designed for physical activities can be categorized as either formal or informal infrastructure. This study aims to highlight the potential for individuals with lower limb impairments to continue their rehabilitation within their living environment, utilizing green spaces.

Methods and Material: Informal infrastructure consists of spaces not dedicated to qualified sport. Two categories of space can be distinguished here. Appropriately selected movement, of varying intensity, is conducive to the development of the body, multiplication and preservation of health. Scientific evidence of the effectiveness of physical activity, the good effects of a healthy and active lifestyle is widely known. At the same time, they are used in post-rehabilitation and convalescence periods.

Results: Functional restrictions in the lower limb stem from the absence of significant adaptive mechanisms. Rehabilitation teams are dedicated to delivering comprehensive rehabilitation and therapeutic protocols, which are merely tools to attain the ultimate objective: fostering a sense of happiness across multiple dimensions in daily life and achieving a high quality of life. This essence revolves around making informed choices and aligning actions with the patient's requirements. Formal infrastructure primarily encompasses spaces and amenities

intentionally designed for sporting purposes, from their inception, aimed at promoting physical activities

Conclusion. Maintaining overall health is of paramount significance for individuals with lower limb impairments, as many of them contend with what is referred to as multimorbidity. Throughout the rehabilitation process, the therapies administered are geared towards enhancing the patient's psychomotor capabilities, addressing not only the primary health concern.

Key words: rehabilitation, lower limb dysfunctions, relax, therapies

Streszczenie

Wstęp: Trudności w chodzeniu dotyczą wszystkich grup wiekowych, od najmłodszych, poprzez osoby aktywne zawodowo oraz coraz większą liczbę osób starszych i starych. Przyczyną rosnącej liczby osób z trudnościami w poruszaniu się są przede wszystkim skutki chorób neurologicznych, schorzeń reumatologicznych i ortopedycznych, a także wypadki komunikacyjne i w trakcie pracy.

Cele badawcze: Poprawa jakości życia i ograniczenie konieczności podejmowania przez jednostki aktywności fizycznej może również mieć wpływ na problemy związane z chodzeniem. Ciągła i kompleksowa rehabilitacja często obejmuje także własne miejsce zamieszkania, gdzie środowisko odgrywa kluczową rolę w promowaniu zwiększonej mobilności. Otoczenie miejskie, tereny zielone i obiekty przeznaczone do aktywności fizycznej można podzielić na infrastrukturę formalną lub nieformalną. Celem tego opracowania jest podkreślenie potencjału osób z niepełnosprawnością kończyn dolnych w zakresie kontynuowania rehabilitacji w swoim środowisku życia, z wykorzystaniem terenów zielonych.

Metody i materiał: Infrastruktura nieformalna składa się z przestrzeni nie przeznaczonych do uprawiania sportu kwalifikowanego. Można tu wyróżnić dwie kategorie przestrzeni. Odpowiednio dobrany ruch, o różnej intensywności, sprzyja rozwojowi organizmu, pomnażaniu i zachowaniu zdrowia. Powszechnie znane są naukowe dowody na skuteczność aktywności fizycznej, dobre skutki zdrowego i aktywnego trybu życia. Jednocześnie stosuje się je w okresach porehabilitacyjnych i rekonwalescencji.

Wyniki: Ograniczenia funkcjonalne kończyn dolnych wynikają z braku znaczących mechanizmów adaptacyjnych. Zespoły rehabilitacyjne zajmują się dostarczaniem kompleksowych protokołów rehabilitacyjnych i terapeutycznych, które są jedynie narzędziami do osiągnięcia ostatecznego celu: wspierania poczucia szczęścia w wielu wymiarach codziennego życia i osiągnięcia wysokiej jakości życia. Istota ta polega na dokonywaniu świadomych wyborów i dostosowywaniu działań do wymagań pacjenta. Infrastruktura formalna to przede wszystkim przestrzenie i udogodnienia przeznaczone od początku do celów sportowych, mające na celu promocję aktywności fizycznej, nie tylko osób pełnosprawnych.

Podsumowanie: Utrzymanie dobrego ogólnego stanu zdrowia ma ogromne znaczenie dla osób z niepełnosprawnością kończyn dolnych, ponieważ wiele z nich zmaga się z tzw. wielochorobowością. Przez cały proces rehabilitacji stosowane terapie mają na celu poprawę możliwości psychomotorycznych pacjenta, uwzględniając nie tylko podstawowe problemy zdrowotne.

Słowa kluczowe: rehabilitacja, dysfunkcje kończyn dolnych, relaks

Introduction

Diseases, injuries and accidents resulting in lower limb dysfunction are a serious health care problem around the world. Difficulties in walking affect all age groups, from the youngest, through professionally active people and a growing group of elderly and old people. The causes of the growing number of people with mobility difficulties should be seen primarily in neurological diseases of known etiology, e.g. strokes, others have an autoimmune basis, occur with periods of relapses and remissions, or are genetically determined or are classified as rare diseases. Another significant group of diseases are patients with rheumatological and orthopaedic ailments. In turn, the development of technology contributes to an increase in the number of road and work accidents, and the introduced facilities minimize the need for people to be physically active, both at work and at home. In the recent past, mobility problems were clearly identified with disability, but now it is known that even the most seriously ill patients can be helped. The dynamic progress of medical technology, diagnostic and therapeutic methods, including surgical ones, enable patients to enjoy the full quality of life on a much larger scale.

Importance of physical activity

Everyday physical activity, known from the beginning of human functioning, is essential in developing and maintaining physical capabilities, intellectual and emotional and social processes. Receiving various types of external stimuli is a means of learning and understanding the surrounding reality. Movement, in any form, became the foundation of his holistic and harmonized functioning in his personal and social life. Such a significant impact of physical activity on the quality of everyday life requires consideration of the understanding of the situation and spheres of experience and actions of people dealing with partial or complete dysfunction of the lower limbs. Motor disability is a very complex concept in terms of the types and degrees of changes, limitations and disorders in the musculoskeletal system, and consequently affects the level of functioning of patients in various areas of life. Physical activity is also important for those, who are at risk of social exclusion due age, disability or ageing, as it helps to increase physical and mental health. Transformation of social services is more focused on the rehabilitation, not only on senior caring (Ludvigh Cintulová, Buzalová, 2021). Due to pandemic measures, there were less possibilities to use the urban green infrastructure to do physical activities. Research study (Ludvigh Cintulová, et al., 2022) has shown that lack of outdoor activities and rehabilitation of disable people can make an negative

impact on the well-being. Rehabilitation programs can focus on improving independence and functional abilities, which can boost self-esteem and overall well-being. Learning or relearning activities of daily living can provide a sense of accomplishment and self-reliance. Participation in outdoor activities and group rehabilitation programs can foster a sense of belonging and social inclusion. This can be crucial for mental and emotional well-being, as it helps combat feelings of isolation and loneliness.

Additionally, the state of active functioning in the environment, especially of people with disabilities, was negatively affected by the Covid-19 pandemic (Giles-Corti, et al., 2023), the threat of climate change and the armed conflict in Ukraine. The report published in the Lancet magazine indicates other accompanying threats, including: growing resistance to antimicrobial agents and obesity in societies, inversion of the population pyramid and deteriorating food security (Published, 2022). The number of deaths and disabilities related to non-communicable diseases, such as cancer, cardiovascular diseases and diabetes, is constantly increasing (Nomura, et al., 2015). Regression in the field of health depends on the degree and number of these threats, and at the same time, preventive actions aimed at increasing health and life satisfaction are of decisive importance. Therefore, it is necessary to implement public health efforts to make residents more resilient to current and future health problems. In turn, governments and local authorities must take coordinated actions, including urban planning, to reduce the risk of deterioration of health. If the disabled person is connected to the nature, his ability to resist problems is lower. Being able to enjoy the outdoors, experience nature, and partake in recreational activities can have a positive impact on emotional well-being. Nature exposure has been associated with reduced stress and improved mood. Engaging in outdoor activities and rehabilitation can enhance the quality of life for disabled individuals. It allows them to experience the world, enjoy recreational pursuits, and gain a sense of achievement, contributing to an improved sense of well-being (Bundzelová, et al., 2023).

Life satisfaction, in all its decades, is mainly related to health and well-being. On every occasion, health wishes are always the first thing that comes first. In turn, well-being is related to, among others, with satisfaction in everyday social and professional functioning, personal development and development of loved ones, and spiritual experiences. This subjectively felt well-being of every person is the result of a number of conditions and elements and includes biological aspects, socioeconomic status, immediate environment, emotional and cognitive processes and the recognized hierarchy of values. Physical activity has become the link between health and well-being (Table 1).

Table 1. Life satisfaction (authors' own work)

Life satisfaction dimensions		
<i>Physical and mental well-being</i> physical health, fitness, activity, mood and life energy	<i>Retrospective factors</i> satisfaction with life and work, difficulties in life, past achievements	<i>Sense of security</i> material needs, relationships and support in the family and community

Research aim

The aim of the study is to indicate the possibility of continuing rehabilitation by people with lower limb dysfunction in their place of residence using green areas.

Results of rehabilitation programme

Due to their disability, people with lower limb dysfunctions have a difficult adaptation process in society. Kinalski draws attention to this, calls them barriers and lists the most common barriers resulting from society's attitudes, architectural, urban and communication barriers, and legislative barriers (Maciaszczyk, 2015). Another element, convenience, determines the limitation of everyday activity, especially in urban environments. Convenience in moving, using cars or public transport significantly contribute to reducing the necessary amount of exercise (Physical, 2018).

The term "motor disability" takes on a pejorative connotation, which indicates a reductionist concept of man, determined by organ damage as a result of diseases, accidents or lack of development opportunities. Functional limitations result from the lack of significant adaptive mechanisms. The intention of the rehabilitation teams is to provide comprehensive rehabilitation and therapeutic procedures. These are only means to achieve the goal, which is to experience a sense of happiness on many levels in everyday life and a good life, the essence of which is expressed in making the right choices and acting in accordance with the needs of the patient.

Therefore, it is necessary not only to change social attitudes towards disabled people towards recognizing and stimulating their personal potential, but also to strengthen their self-esteem. At the same time, it becomes essential to work on self-acceptance of individual limitations and the burdens that accompany them.

Ewelina J. Konieczna (2010) draws attention to five fundamental aspects in the life of a person with a physical disability that influence the acceptance of one's condition.

Table 2. Acceptance of one's own condition (according to Konieczna, 2010)

Acceptance of one's own physical disability				
the meaning of existence and the suffering experienced, self-acceptance	Akceptation of disability	Disability self-esteem	Life values and optimism	Personal zone

The author focuses on developing the ability of people with physical disabilities to critically perceive the current state and organize information about themselves and their surroundings. In the second part, it emphasizes the great importance of these people's work on negative emotions related to experiencing their own disability, and in the third one, it focuses on setting constructive goals by physically disabled people and adopting a creative attitude. In the fourth aspect, Konieczna points to the optimism of people with physical disabilities, focused on themselves and others, which favors building interpersonal contacts. In the last

one, it indicates the expansion of the range of values to include others, apart from health and family (Konieczna, 2010).

Urban infrastructure

Urban spaces, green areas and facilities intended for physical activity can be divided into formal and informal infrastructure (Kostrzewska, 2016).

Formal infrastructure includes primarily those areas and facilities that were designed and implemented with a sports function in mind, dedicated from the very beginning to physical activity. Formal infrastructure can serve both sport for all and qualified sport. These include entertainment and sports facilities, school gymnasiums, club, school and community sports fields, tennis courts, municipal and school swimming pools, playgrounds, bicycle paths, city parks with zones for physical recreation, and outdoor gyms (Figure 1).

Sports infrastructure used for professional sports, club sports and sports competitions is subject to strictly defined design standards, while the surroundings of sports facilities used for recreation or less formalized forms of sports may be designed more freely. At the same time, the areas complement the professional sports facility. Such multifunctional facilities, with both public zones that can be used by the local community, and zones with limited access (for clubs, players, for competitions), are used to a much greater extent and serve diverse users much better. The above-mentioned facilities and areas around them can be used by people with lower limb dysfunctions, especially those actively practicing various sports. Athletics, volleyball and football, tennis and table tennis, as well as sailing and skiing (cross-country and downhill) are very popular. Formal infrastructure is not always available and is not always located in the immediate place of residence, this applies primarily to sports facilities. However, publicly available and free formal sports facilities include outdoor facilities and sports areas, such as:

- playgrounds,
- outdoor gyms,
- bicycle paths,
- tourist routes,
- community sports fields and
- shared school fields.

Informal infrastructure is spaces not dedicated to qualified sports. Two categories of space can be distinguished here. The first ones take place in urban public spaces, in backyards, squares, on the streets to use of architectural elements, small architecture, building fragments (e.g. square floor, stair railings, stairs themselves, benches). In such spaces, the presence of any physical activities and exercises is not always accepted, although it is becoming more and more common, mainly among young people. The second one includes places for physical activity in spaces that have been informally and bottom-up adapted to the needs of particular activities.



Figure 1. Places intended for physical recreation (photo by authors, Ustroń 2023).

These are often recovered spaces, restored to the city from a state of degradation and wasteland, developed by people looking for their own identity and places enabling “active self-expression”. These places are given new meaning, and new users identify with them by introducing, for example, visual and graphic elements. Informal areas are most often located in parks, by reservoirs or rivers. These places come to life through action, and those who participate in the activities and use them consider them as their own. Numerous places to rest create additional opportunities for people with less endurance and physical fitness (Figure 2).



Figure 2. Places intended for relaxation (photos by the authors, Ustroń 2023).

Informal infrastructure is used and can be created by enthusiasts of various forms of activity. People with musculoskeletal dysfunctions use asphalt paths, which make it easier to move around with crutches, canes, a walker or a wheelchair (Figure 3).

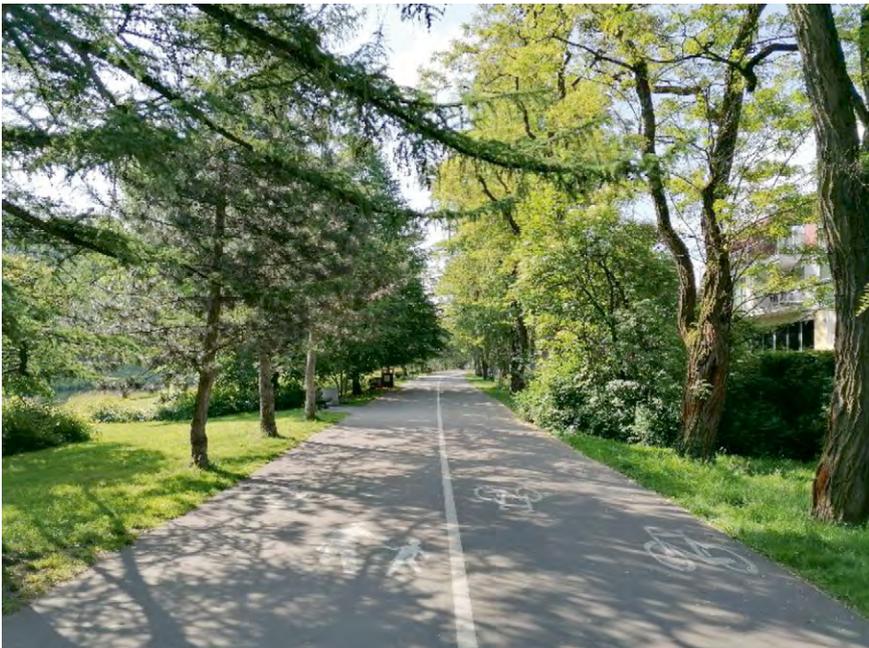


Figure 3. Asphalt path facilitating movement (authors' photos, Ustroń 2023).

In parks and green areas there is an opportunity for residents to meet, exchange views and interests. This facilitates the cultivation of old acquaintances and friendships as well as the creation of new ones. Moreover, enriching green spaces with educational boards or infrastructure, e.g. graduation towers, supports the therapeutic effect (Figure 4).



Figure 4. Educational board, graduation tower (authors' photo, Ustroń 2023).

Physical activities are an integral part of human life

At the same time, they result from the body's innate needs and are replicated thanks to already acquired skills and habits. Properly selected movement, of varying intensity, promotes the body's development, multiplication and maintaining health.

Scientific evidence of the effectiveness of physical activity and the good effects of a healthy and active lifestyle is very long. We will limit ourselves to pointing out the most important and important:

- reduces the risk of cardiovascular diseases, including hypertension,

- stimulates the functioning of the nervous system, reduces stress and depression,
- improves the musculoskeletal system and is an excellent osteoporotic prevention,
- maintains proper body weight and reduces the risk of obesity, helps in the prevention of type 2 diabetes,
- allows you to maintain metabolic functions,
- is a factor in cancer prevention,
- improves the quality of sleep and facilitates rest,
- is an essential element of rehabilitation and convalescence after virtually all injuries and diseases (Rottermund, 2012; Rottermund, Nowotny, 2020; Knapik, et. al., 2017; Rachele, et al., 2019).

It should be noted that such an effective health-promoting effect is demonstrated both by physical activity, in the form of systematic sports, rehabilitation or recreational exercises, as well as by any movement related to everyday activity, including professional work. Green areas are conducive to continuing rehabilitation or maintaining functional fitness at the highest possible level, where individually selected goals can be achieved. These spaces do not constitute architectural barriers, and the surrounding nature encourages spending time outdoors. It is worth using the guidelines proposed by WHO regarding physical activity doses (WHO Guidelines ..., 2021), taking into account individual performance capabilities, mobility and health contraindications.

Health concept

The concept of health areas was presented in 1974 by Marc Lalonde, the motto of the concept was the following definition of health: “Health is the result of factors related to genetic inheritance, environment, lifestyle and medical care. Promoting a healthy lifestyle can improve health and reduce the need for medical care” (Lalonde, 1974) (Table 3). Lalonde points to two factors in particular: lifestyle and the physical environment in which a person functions. These are factors that can be modified through changes in behavior and habits, as well as efforts to build and restore the natural environment, not degrade it.

Table 3. Determinants of health according to Lalonde (own study)

Determinants of health by M. A. Lalonde			
Lifestyle (approx. 53 %) – a set of decisions (actions) of an individual, that affect his health and which the individual can control to a greater or lesser extent	Physical area (approx. 21 %) – all its elements, external to the human body, on which the individual has no direct influence or whose influence is very limited	Human biology (genetic factors) (approx. 16 %) – all features related to the biology of the body human, including genetic factors, age and gender	Organization of medical care (approx. 10 %) – quality, availability, organization, type, resources of medical care

Nowadays, there are many models and factors that influence health and life satisfaction. One of them is the “Rainbow of health (policy) factors” proposed by Dahlgren and Whitehead (Dahlgren, Whitehead, 2007). The central part contains biological factors (age, gender, genetic factors). Concentrically to them – on the arcs of the rainbow – lifestyle, social

support networks and broadly understood socio-economic, cultural and environmental factors (living and working conditions) are placed. In total, there are 5 levels of the rainbow, each of which can be a place of action for different factors. The importance of political factors in creating individual levels (arches) of the rainbow increases towards the perimeter. Political and administrative factors are becoming more and more important in creating these determinants, which, however, are increasingly distant from human health and lifestyle. The socio-economic, cultural and environmental components of our lives are mainly responsible for the creation of systemic decisions, the manner of operation of national institutions, the division of the national product and the sphere of legal activities.

Physical activity has a significant impact on health care and life expectancy; it can be indicated as a basic factor in rehabilitation and hygiene, as well as an excellent element of prevention. Regular physical activity is a very strong biological stimulator and is one of the main determinants of human physical and mental health.

Discussion linked to the participating in physical activity

A survey conducted among participants of exercise classes indicates that the main reason for participating in exercises is pleasure and fun, followed by taking care of one's health and improving physical condition, taking care of a nice appearance, improving mental well-being and the opportunity to meet people (Uczestnictwo..., 2012). At the same time, barriers were identified that prevent or discourage participation in physical activity. The above research clearly shows that the most frequently indicated barrier is lack of time. Other barriers include: lack of willingness and interest, too high costs of participation and equipment, health condition, age, lack of appropriate infrastructure and company. Analyzing the results of the above study in the context of sports and recreational infrastructure, it seems that the most important are facilities and areas located near the place of residence (so as not to waste time commuting), publicly available (free of charge), providing the opportunity to engage in activities in the company of family or friends, no competition. Moreover, exercise, in any form, should take place in a pleasant atmosphere, enabling relaxation and relaxation. In cities, the issue of appropriate design of roads, bicycle paths and recreational pedestrian routes that enable trouble-free movement seems to be particularly important.

One more problem faced by those willing to participate in physical activity should be mentioned here. The biggest problem is not the lack of infrastructure, but the lack of making it available to local communities, closed school playgrounds that are not accessible after school hours or their degradation, which makes these spaces unattractive. The main influence on such behavior of owners of recreational and sports facilities is the applicable safety regulations, in which the owner of the area bears legal responsibility for any possible injuries.

The problem of physical passivity is becoming very important and affects many people in all age groups. What is disturbing is the fact that only 46 % of Polish residents declare

participation in any physical or recreational activity, among people over 60 years of age this percentage drops to 25 % (GUS, 2017). Due to the increasing difficulties in moving among older people, the proposal to actively use green areas for this age group seems to be most appropriate. Equally unfavorable data for the physical activity of the entire population in Poland are provided by other researchers, based on a literature review from 2015 – 2020 (Jędrzejczyk, 2021).

Physical activity can be carried out in many places, depending on the individual needs of the class participant and spatial possibilities. Each age group, due to the mobility and efficiency of the body, taking into account past or current diseases and injuries, has a slightly different approach to active forms of spending free time. Regardless of the type of classes and training (aerobic, strength, neuromotor), it is necessary to maintain safety during exercises and physical games. This issue particularly concerns adults and the elderly, who should contact a doctor and/or a personal trainer before undertaking physical activity to determine workload doses and rest breaks that are beneficial for the body. At the same time, participants themselves should be cautious, not overestimate their capabilities and learn, for example, how to measure their heart rate in order to remain fully safe.

Discussion: Green areas intended for physical activity

The use of public space for outdoor physical activity is considered necessary, especially in cities, as best evidenced by forced behavior during the COVID-19 pandemic (Venter, et al., 2020). That's when stay-at-home orders were issued and governments allowed residents to go outside their homes to engage in behaviors and exercises that promote health and well-being. Modern agglomerations, both large and smaller towns, are characterized by a lack of sufficient space available, safe and conducive to exercise for all its inhabitants.

Therefore, there is an urgent need to identify the needs of residents, not only those with mobility problems, to provide information about available green spaces and facilities and forms of proposed traffic (Hunter, et al., 2019).

Green areas have a positive impact on human health in several ways; one of the first places is taken by the possibility of practicing sports and physical recreation. Especially in cities, the natural environment seems to be of decisive importance. The observations conducted indicate that recreational activity takes place in parks with attractive paths (Zhang, et al., 2019) and with a large amount of old trees (Mertens, et al., 2017). Being in green areas has a positive impact on health, but we cannot forget about several negative impacts. The positives include better air quality, biological strengthening of organisms, better living conditions, greater aesthetics of the surroundings, lower temperatures in summer and, most importantly, they provide the opportunity to continue rehabilitation activities. The negative ones include an increase in the value of real estate in attractive green urban areas (development of attractive areas), the threat of physical violence, and the risk of allergic reactions. We should also mention the prudent use of parks and lawns, because excessive

exposure to sunlight, especially in summer, requires caution, and paths and routes should not cause unwanted injuries and infections (Lyme disease). Activity monitors are becoming widely used and appear to be effective in increasing physical activity and mobilizing people in various age groups and clinical and non-clinical populations. The display, depending on the quality of the device, indicates, among others: on the number of steps, number of calories consumed, pulse, blood pressure or displays an ECG graph. At the same time, the activity monitor increases the safety of active people. The benefits of increasing exercise are clinically important and durable over time (Ferguson, et al., 2022).

Researchers have noted evidence that the length of time spent in nature is related to its effects. At the beginning of outdoor activity, there was an immediate positive effect on the psyche, a change in mood, and subsequent minutes resulted in an increase in self-esteem. According to researchers, in the initial phase the psyche is particularly sensitive to movement and being surrounded by nature. Moreover, the strongest positive impact on self-esteem was recorded among young people and people with mental problems. Particularly worth recommending are parks and gardens with a river flowing, lakes or located by the sea. Scientists from the University of East Anglia conducted a meta-analysis of over 140 studies on the impact of spending time in green areas on health and well-being. They showed that this form of spending time is associated with lowering cortisol levels and reducing the risk of hypertension, stroke, heart disease and asthma. In Japan, a popular practice is Shinrin-yoku, or “forest bathing”, recommended to accelerate healing or strengthen the body and include various forms of physical activity or simply spending time in nature as an excellent element of regeneration. Other studies have shown that frequent spending time in green areas was associated with improvements in parameters such as cortisol concentration in saliva, blood pressure, heart rate and variability, and cholesterol levels. A beneficial effect was also observed in the case of type II diabetes, as well as a reduction in mortality, especially due to cardiovascular diseases. There was a reduction in the incidence of hypertension, stroke, asthma, dyslipidemia and ischemic heart disease. Volunteers participating in the research who used green areas more often were also much more likely to describe their health as good (Song, et al., 2022). The above-mentioned arguments clearly indicate that the use of green areas during convalescence by people with lower limb dysfunction is intentional. Regardless of whether it is active or passive contact with nature, it has an undeniable beneficial effect on the health and well-being of residents.

Discussion: Enabling local life in 15-minute cities places

Healthy and sustainable cities are based on compact agglomerations that enable residents to undertake everyday activities close to their place of residence using active forms of transportation. However, over the last few decades, planning has become car-centric, dominating city design around the world. In this way, the residents were “robbed” of natural health benefits, such as daily (somewhat forced) physical activity. Hence the need to introduce new solutions so that residents can meet their basic needs: health care, recreation,

entertainment, work, education and trade locally, using micromobility (Majewska, et al., 2022). Organizing 15-minute cities will require a new typology in the way buildings are built, focusing on “proximity-based” planning, in which all basic services necessary for everyday life are available within 15 minutes. For patients with mobility difficulties, towns organized in this way can guarantee greater activity and involvement in community life.

Summary

It seems that one of the key problems, not only in Polish urban space, is the inability to fully use the recreational and sports structures. At the same time, it becomes necessary to restore the existing “green areas” to functioning, ensuring the appropriate quality and condition of the equipment. It is also important to implement activation programs for patients with limitations of the musculoskeletal system. However, the construction of new sports areas and facilities is necessary especially in new development housing estates. You cannot stop at infrastructure intended for children (playgrounds) or small squares equipped with small architectural elements that enable only passive, not active, recreation.

The proposal is the perspective of ecosystem services in urban nature, addressed to everyone, from parents with children with strollers to the elderly. Not having the opportunity to spend their free time actively in an attractive space adapted to the mobility of potential participants, groups remain inactive or are forced to travel longer distances to places conducive to physical activity.

Scientific evidence shows that physical activity is associated with many health benefits. Therefore, simple opportunities to engage in routine, daily physical activity should be promoted and used. It has also been shown that the time spent passively in a sitting position, compared to the time with active physical activity, increases mortality, and the causes are mainly attributed to the pandemic of lifestyle diseases. Therefore, it can be concluded that not only increasing the time devoted to one’s own physical activity, but also reducing the time spent sitting may bring health benefits (Piercy, et al., 2018).

Studies of American populations found that walkability was positively associated with neighborhood interactions and a sense of community, especially in places with “easy access.” Destinations, but also public spaces in the form of nice landscapes, green areas and social events are likely to increase environmental interactions. They can be considered fundamental features of the environment that contribute to the development of social cohesion. It is important to understand that not only physical health, but also the mental and social implications of life that support social interactions and a sense of community become very important (Carson, et al., 2023).

Conclusion

Urban green spaces have the potential to improve the health and well-being of society, as well as additional benefits for the environment, economy and society. To achieve

these ambitious goals, there should be cooperation between society, practitioners and decision-makers. There must be active environmental citizenship using the principles of co-design, co-implementation, co-evaluation of projects (Hunter, et al., 2023).

Issues of general health seem to be very important for people with lower limb dysfunction, many of them suffer from the so-called multi-morbidity. During rehabilitation, the therapies are aimed at improving the patient's psychomotor skills, and not only at improving the basic health problem.

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PORANENIA KOXY A PROBLEMATIKA MIKROINSTABILITY BEDROVÝCH KÍBOV U PROFESIONÁLNYCH TANEČNÍKOV KLASICKÉHO BALETU A MOŽNOSTI JEJ OVPLYVNENIA PROSTREDNÍCTVOM FYZIOTERAPIE

COX INJURIES AND THE PROBLEM OF MICROINSTABILITY HIP JOINTS IN PROFESSIONAL CLASSICAL BALLET DANCERS AND POSSIBILITIES OF ITS INFLUENCE THROUGH PHYSIOTHERAPY

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Abstrakt

Poranenia v oblasti bedrového kĺbu a slabín považujeme u baletných tanečníkov za veľmi časté, podľa najnovších celosvetových štúdií predstavujú až 17,7 % spomedzi všetkých druhov zranení, pričom miera výskytu (poranenie/záťaž) je 0,09 poranení bedrového kĺbu a slabín na 1000 tanečných hodín. Medzi špecifiká biomechaniky pohybu v balete patria predovšetkým extrafyziologické rozsahy, pričom dôraz je kladený najmä na extrarotáciu a abdukciu bedrového kĺbu. Tieto abnormálne pohyby v konečnom dôsledku zapríčiňujú osobitnú škálu symptómov a patológií. Práve instabilita patrí medzi tri najčastejšie etiológie pôvodu bolesti v oblasti bedrového kĺbu u baletných tanečníkov. Jej prvotná liečba pozostáva predovšetkým z presne a špecificky cielenej kinezioterapie, ktorá sa zameriava najmä na posilnenie jadra tela tanečníkov a periartikulárneho svalstva v oblasti bedrového kĺbu. Fyzioterapia zohráva dôležitú úlohu pri prevencii a v manažmente týchto zranení. Jej primárnym cieľom je zabezpečiť optimálnu funkciu pohybového aparátu tanečníka, minimalizovanie rizika zranení, taktiež prispieva k dlhodobej udržateľnosti ich kariéry. Cieľom výskumu je overiť, či a do akej miery je možné, pomocou cielenej kinezioterapie ovplyvniť stabilizačnú funkciu bedrových kĺbov u profesionálnych tanečníkov klasického baletu. Mikroinstabilita bedrových kĺbov je vyhodnotená prostredníctvom využitia troch nových, v súčasnosti dostatočne vedecky podložených, klinických testov (AB-HEER test, HEER test, Prone instability test). Hodnotenie rozvoja svalovej sily periartikulárneho svalstva bedrového kĺbu a hodnotenie rozsahu pohyblivosti bedrových kĺbov pred a po skončení programu cielenej kinezioterapie je merané prostredníctvom hand-held dynamometra – HDD. Tento výskum by mal byť zdrojom relevantných dát, ktoré budú mať výrazný vplyv na lepšie pochopenie tejto problematiky a v podstatnom rade bude prispievať k zlepšeniu zdravotného stavu tanečníkov klasického baletu.

Kľúčové slová: Instabilita bedrového kĺbu, klasický balet, kinezioterapia

Abstract

Hip and groin injuries are considered to be very common in ballet dancers, accounting for up to 17.7 % of all types of injuries according to recent worldwide studies, with an incidence rate (injury/injury) of 0.09 hip and groin injuries per 1,000 dance hours. The specifics of movement biomechanics in ballet include primarily extraphysiological ranges, with particular emphasis on hip extrarotation and abduction. These abnormal movements ultimately cause a specific range of symptoms and pathologies. It is instability that is among the three most common etiologies for the origin of hip pain in ballet dancers. Its initial treatment consists primarily of precisely and specifically targeted kinesiotherapy, which focuses mainly on strengthening the dancers' core and periarticular musculature in the hip region. Physiotherapy plays an important role in the prevention and management of these injuries. Its primary goal is to ensure optimal musculoskeletal function of the dancer, minimizing the risk of injury, it also contributes to the long-term sustainability of their career. The aim of this research is to verify whether and to what extent, using targeted kinesiotherapy, it is possible to influence the stabilizing function of the hip joints in professional classical ballet dancers. The microinstability of the hip joints is evaluated through the use of three new, currently sufficiently scientifically based, clinical tests (AB-HEER test, HEER test, Prone instability test). The development of periarticular muscle strength of the hip joint and the assessment of the range of motion of the hip joints before and after the targeted kinesiotherapy programme is measured by means of a hand-held dynamometer – HHD. This research should be a rich source of relevant data that will have a significant impact on a better understanding of this issue and will substantially contribute to improving the health status of classical ballet dancers.

Keywords: Hip instability, classical ballet, kinesiotherapy

Úvod

Svet profesionálnych tanečníkov klasického baletu je fascinujúci, zároveň ho považujeme za veľmi náročný. Táto profesia kladie vysoké nároky na fyzickú kondíciu, ako aj na pohybový aparát tanečníkov. Profesionálni tanečníci klasického baletu dosahujú vysoký štandard fyzického výkonu, zároveň musia dbať na dokonalú estetiku a ladnosť pohybu. To vyžaduje dlhodobý a náročný tréning začínajúci už vo veľmi skorom veku. Táto náročná profesia so sebou často prináša vysoké riziko vzniku poranení. Práve poranenia v oblasti bedrového kĺbu a slabín u baletných tanečníkov považujeme za veľmi časté. Podľa najnovších štúdií predstavujú až 17,7 % spomedzi všetkých druhov zranení, pričom miera výskytu (poranenie /záťaž) je 0,09 poranení bedrového kĺbu a slabín na 1000 tanečných hodín (Trentacosta, et al., 2017).

Zameranie

Špecifikami biomechaniky pohybu v balete sú predovšetkým extrafyziologické rozsahy pohybu, pričom dôraz je kladený najmä na extrarotáciu a abdukciu bedrového kĺbu. Tieto

abnormálne pohyby v konečnom dôsledku zapríčiňujú osobitnú škálu symptómov a patológií. Medzi tri najčastejšie etiológie pôvodu bolesti v oblasti bedrového kĺbu u baletných tanečníkov patrí instabilita bedrového kĺbu, syndróm femoroacetabulárneho impingementu (FAIS) a syndróm extra-artikulárneho praskania bedrového kĺbu (tzv. snapping hip syndrome). Prvotná liečba instability bedrového kĺbu pozostáva predovšetkým z presne a špecificky cielenej kinezioterapie, ktorá sa zameriava najmä na posilnenie jadra tela tanečníkov a periartikulárneho svalstva v oblasti bedrového kĺbu (Curley, et al., 2022). Fyzioterapia zohráva dôležitú úlohu pri prevencii a v manažmente týchto zranení. Jej primárnym cieľom je zabezpečiť optimálnu funkciu pohybového aparátu tanečníka, minimalizovanie rizika zranení, taktiež prispieva k dlhodobej udržateľnosti ich kariéry.

Jadro práce

Profesionálnych baletných tanečníkov z hľadiska náročnosti ich fyzickej aktivity možno prirovnáť k elitným športovcom (Gamboa, et al., 2008; Smith, et al., 2016). Každá fyzická aktivita, ktorá je vykonávaná na vrcholovej úrovni, vždy nejakým spôsobom pohybový aparát ovplyvňuje (Russell, 2010; Smith, et al., 2016; Stretanski, Weber, 2002). Vykonávanie špecifických baletných pohybov nie je výnimkou, na pohybový aparát baletných tanečníkov sú kladené vysoké nároky, predovšetkým pre nadmerné rozsahy počas prevádzania jednotlivých tanečných pozícií. Časté skoky a špecifické pozície, vedú k veľkému zaťaženiu kĺbov dolných končatín, panvy a driekovej oblasti chrbta. Práve v týchto oblastiach môžeme pozorovať u tanečníkov najčastejšie zranenia a prítomnosť patológií (Jarvis, Kulig, 2016; Yau, et al., 2017). Dôsledkom nadmerného zaťaženia je taktiež prítomný vysoký výskyt zranení, ktoré sú prevažne menšieho charakteru, ale často recidivujú (Smith, et al., 2016; Yau, et al., 2017). Opakované úrazy majú neskôr za následok prechod do chronického štádia, prípadne môžu prispieť ku vzniku závažného akútneho úrazu, čo môže v konečnom dôsledku viesť k invalidite a v extrémnych prípadoch i k ukončeniu kariéry profesionálneho baletného tanečníka. Baletní tanečníci disponujú veľkými rozsahmi pohybu vo všetkých kĺboch, no extrafyziologické rozsahy pohybu sú prítomné predovšetkým v bedrových kĺboch (Mitchell, et al., 2016; DiTullio, et al., 1989; Gannon, Bird, 1999). Táto zvýšená pohyblivosť sa môže vyskytovať v bedrových kĺboch vďaka výhodnému osovému postaveniu (femur, acetabulum, drieková chrbtica a panva), alebo permisivite mäkkých tkanív (svaly, šľachy, ligamentá, nervy). Nadmerná pohyblivosť môže byť spôsobená vrodenu, alebo získanou etiológiou. Vo viacerých publikáciách sa ukázalo, že medzi tanečníkmi sa častejšie vyskytuje generalizovaná hypermobilita kĺbov a syndróm hypermobility kĺbov (Sanches, et al., 2015). Atraumatická instabilita bedrového kĺbu, alebo mikroinstabilita je relatívne novým klinickým subjektom, ktorý je čoraz viac považovaný za príčinu bolesti a zhoršenie výkonnosti u mladých pacientov a športovcov (Kalisvaart, Safran 2015). Možno ju definovať ako extrafyziologický pohyb bedrového kĺbu, alebo patologickú laxitu, ktorá vedie k symptomatickej abnormálnej biomechanike bedrového kĺbu (Shu, Safran, 2011). Príčina instability môže byť traumatická, alebo atraumatická; patofyziologický mechanizmus však súvisí s opakovaným axiálnym, alebo

rotačným zaťažením bedrového kĺbu v podmienkach jemných anatomických abnormalít štruktúr, ktoré zvyčajne zabezpečujú stabilitu kĺbu, čo vedie k poškodeniu labra a kĺbovej chrupavky (Boykin, et al., 2011; Shu, Safran, 2011). Medzi prispievajúce faktory patrí väzivová, alebo kapsulárna laxita, svalová slabosť bedrového kĺbu a panvového pletenca a opakované zaťažovanie bedrového kĺbu pri športovej činnosti (Boykin, et al., 2011; Shu, Safran, 2011).

Záver

Vzdelávanie tanečníka, tréningového a umeleckého personálu je jednou z najdôležitejších zložiek úspešného fyzioterapeutického programu. U tanečníkov by sa mali vyhodnotiť chyby baletnej techniky so zameraním na zníženie zaťaženia kapsulolabrálnych, muskulotendinózných a kinetických reťazcov spinopelvikických mechanosenzorických bolestivých štruktúr bedrového kĺbu (Khoo-Summers, Bloom, 2015). Terapia by mala zahŕňať cvičenia na zvýšenie stability kĺbov s posilnením periartikulárnych svalov. Cviky by mali byť zamerané na flexory bedrového kĺbu, abduktory bedrového kĺbu, krátke vonkajšie a vnútorné rotátory, jadro (core) a lumbálnu chrbticu (Kalisvaart, Safran, 2015). Prevencia zranení a možného poškodenia bedrového kĺbu prostredníctvom adekvátnej fyzioterapeutickej intervencie v Slovenskej Republike je v súčasnosti nedostačujúca, prípadne absentuje úplne. Hoci aktívna kariéra baletného tanečníka trvá relatívne krátko, vplyv tohto povolania na zdravie zostáva celoživotný. Preto považujeme za potrebné zvýšiť množstvo a kvalitu výskumov a štúdií z danej problematiky.

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ŚWIADOMOŚĆ PRACOWNIKÓW SŁUŻBY ZDROWIA W ZAKRESIE ZESPOŁU BOLESNEGO BARKU U PACJENTÓW PO UDARZE MÓZGU

AWARENESS OF HEALTH CARE PROFESSIONALS REGARDING PAINFUL SHOULDER SYNDROME IN POST-STROKE PATIENTS

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Streszczenie

Wstęp: Zespół bolesnego barku towarzyszy ponad 70 % pacjentów po udarze mózgu. Nieprawidłowa opieka i źle prowadzone usprawnianie mogą obniżać możliwości funkcjonalnego wykorzystania niedowładnej kończyny górnej, co jeszcze bardziej ogranicza codzienne funkcjonowanie chorych.

Cel pracy: Celem pracy było zbadanie poziomu wiedzy pracowników służby zdrowia na temat zespołu bolesnego barku, występującego u pacjentów po udarze mózgu.

Materiał i metody: W badaniu wzięło udział 96 respondentów: 10 lekarzy, 47 fizjoterapeutów oraz 39 pielęgniarek. Najliczniejszą grupę badaną stanowiły osoby deklarujące ponad 10-letni staż pracy $n = 43$ (44,8 %), tylko 19 badanych deklaroowało staż pracy poniżej 2 lat. Jako metodę wybrano autorski kwestionariusz udostępniony elektronicznie. Kwestionariusz składał się z pytań z zakresu poudarowego zespołu bolesnego barku, anatomii i patologii kompleksu barkowego, przyczyn, profilaktyki, możliwości diagnozowania i sposobu terapii bolesnego barku.

Wyniki: Najwyższy poziom wiedzy na temat zespołu bolesnego barku odnotowano w grupie fizjoterapeutów- średnia poprawność odpowiedzi wynosiła 59,8 %; najniższą odnotowano w grupie pielęgniarek 40 %. Najniższą średnią poprawność odpowiedzi (43,4 %) w poszczególnych pytaniach osiągnęła grupa osób pracujących w zawodzie krócej niż 2 lata. Wśród przyczyn bolesnego barku ankietowani najczęściej zaznaczali – nieprawidłowe podciąganie pacjenta (lekarze – 60 %; fizjoterapeuci – 63,8 %; pielęgniarki – 56,4 %). Jako profilaktykę 83 % ankietowanych uznało “edukację pacjenta i jego rodziny”. Nie wykazano istotnego statystycznie związku pomiędzy poziomem wiedzy ankietowanych, a płcią ($p = 0,150$), stażem ($p = 0,449$) oraz miejscem pracy ($p = 0,051$).

Wnioski Wiedza respondentów na temat zespołu bolesnego barku jest na niskim poziomie. Zauważono również, że wiek, płeć oraz staż pracy ankietowanych nie ma istotnego związku z poziomem ich wiedzy w zakresie poudarowego zespołu bolesnego barku.

Słowa kluczowe: udar mózgu, zespół bolesnego barku, wiedza personelu medycznego.

Abstract

Introduction: Painful shoulder syndrome accompanies more than 70 % of post-stroke patients. Improper care and poorly managed improvement can reduce the functional use of the paresed upper limb further limiting patients' daily functioning.

Purpose of the work: The purpose of this study was to investigate the level of knowledge of health care professionals about painful shoulder syndrome occurring in post-stroke patients.

Material and methods: The study included 96 respondents: 10 doctor, 47 physiotherapists, 39 nurses. The largest group of respondents were those declaring more than 10 years of work experience $n = 43$ (44.8 %), only 19 respondents declared work experience of less than 2 years. A proprietary questionnaire provided electronically was chosen as the method. Consisting of questions on post-stroke painful shoulder syndrome, anatomy and pathology of the shoulder complex, causes, prevention, diagnosis options and treatment of painful shoulder.

Results: The highest level of knowledge about painful shoulder syndrome was recorded in the group of physiotherapists-the average correctness of answers was 59.8 %; the lowest was recorded in the group of nurses – 40 %. Among the causes of painful shoulder, the respondents most often marked – incorrect pulling of the patient (doctors – 60 %; physiotherapists – 63.8 %; nurses – 56.4 %). As prevention, 83 % of respondents considered “education of the patient and his family“. There was no statistically significant relationship between the respondents' level of knowledge and gender ($p = 0.150$), seniority ($p = 0.449$) and place of work ($p = 0.051$).

Conclusions: Respondents' knowledge of painful shoulder syndrome is at a low level. It was also noted that the age, gender and seniority of the respondents have no significant relationship with their level of knowledge regarding post-stroke painful shoulder syndrome.

Key words: stroke, painful shoulder syndrome, knowledge of medical personnel

Wstęp

Udar mózgu, określa się jako jednostkę kliniczną, charakteryzującą się nagłym, niespodziewanym pojawieniem się miejscowego lub uogólnionego upośledzenia funkcjonowania ośrodkowego układu nerwowego, które ma miejsce dłużej niż 24 godziny pod warunkiem, że wcześniej nie doprowadzi do śmierci (Szczeklik, i in., 2017). Przyczyną jest zakłócenie przepływu krwi i dotyczy krążenia w obrębie mózgu (Kwolek, i in., 2012; Mazurek, i in., 2013). Ze względu na patomechanizm dzieli się udar na niedokrwienny i krwotoczny. Najczęściej, bo aż 80 % to udar niedokrwienny spowodowany częściowym lub całkowitym zamknięciem światła naczynia krwionośnego, co prowadzi do zawału mózgu. Natomiast podłoże udaru krwotocznego to przerwanie naczynia krwionośnego i wylew krwi do mózgu: śródmózgowia 10–15 % przypadków, a około 5 % to krwawienie podpajęczynówkowe (Piskorz, i in., 2014; Książkiewicz, i in., 2006).

Udary stanowią poważny problem zdrowotny; co roku na świecie udaru mózgu doznaje aż 15 milionów ludzi. W Polsce sytuacja wygląda podobnie. Spośród 40 tysięcy osób po udarze, 50 – 70 % potrzebuje stałego leczenia i systematycznej rehabilitacji. Około 25 – 50 % tych pacjentów doświadcza trwałej niepełnosprawności oraz częściowej lub całkowitej zależności od osób trzecich w czynnościach dnia codziennego (Starosta, i in., 2016; Rykała, i in., 2009).

Zaburzenia funkcjonalności kończyny górnej po udarze mózgu występują u ponad 70 % pacjentów, którzy muszą się zmierzyć w swojej codzienności z brakiem możliwości funkcjonalnego wykorzystania niedowładnej kończyny górnej. U znacznej większości rozwija się poudarowy zespół bolesnego barku (łac. *periarthritis humeroscapularis* – PHS (Lubkowska, i in., 2014; Szelest, i in., 2012)). Może pojawić się w wyniku zaburzenia jednej struktury funkcjonalnej stawu, ale także może być rezultatem kilku nawarstwiających się mikrourazów w kompleksie barkowym (Lisiński, i in., 2007; Wilk, 2014), istotnie zakłócając proces przywracania sprawności i samodzielności pacjenta.

W pierwszej fazie po udarze- etapie wiotkości, dochodzi do obniżenia napięcia mięśniowego po stronie bezpośrednio zajętej, a co za tym idzie, deficytu kompetencji motorycznych i upośledzenia czucia w obrębie porażonej kończyny górnej. Utracona w tym czasie kontrola mięśniowa powoduje zwiększoną ruchomość w stawach do niefizjologicznych zakresów oraz nasiloną skłonność do podwichnięć i zwichnięć stawu ramiennego. Kończyna górna sprawia wrażenie bezwładnie zwisającej, a głowa kości ramiennej ulega znacznemu obniżeniu względem panewki stawu. Dodatkowo pacjenci odczuwają ból głównie w bezruchu, który zmniejsza się gdy poprawione zostanie ułożenie łopatki. Wśród przyczyn podwichnięcia dolnego wymienia się głównie nieprawidłową pielęgnację pacjenta i błędy podczas rehabilitacji. Od samego początku należy zwracać szczególną uwagę na kończynę po stronie bezpośrednio zajętej. Podczas pielęgnacji i rehabilitacji należy zapewnić właściwą płaszczyznę podparcia, odpowiednią stabilizację stawu ramiennego i stymulację wzrostu napięcia mięśniowego. Należy pamiętać, aby podczas zmiany pozycji, podciągania, czy prowadzenia pacjenta nie ciągnąć za porażoną kończynę (Mikołajewska, 2012; Kornet, i in., 2017).

W drugim etapie, w fazie hipertonii, napięcie mięśniowe ulega znacznemu, nadmiernemu zwiększeniu. Kończyna górna spastyczna wykazuje tendencję do powstawania przykurczów, a co za tym idzie często ustawia się w niepożądanym ułożeniu. Przysparza to ogromny problem w czasie podstawowych czynności pielęgnacyjnych, a także znacząco redukuje możliwość wykonywania podstawowych czynności dnia codziennego. Choremu towarzyszą duże dolegliwości bólowe, co znacząco utrudnia proces rehabilitacji. Mocno napięty i sztywny kompleks barkowy trudno uruchomić, a ruch jest niezbędny do odzyskiwania utraconych możliwości funkcjonalnych (Mikołajewska, 2012; Kornet, i in., 2017).

W przypadku poudarowego zespołu bolesnego barku bardzo istotna jest jego profilaktyka, aby nie przysparzać pacjentowi kolejnych powikłań. Od pierwszych godzin po incydencie udarowym należy zapewnić jej prawidłowe ułożenie, bodźcowanie i pielęgnację oraz podjąć adekwatne profilaktyczne działanie, zapobiegające powstaniu niepożądanych zaburzeń w obrębie kompleksu barkowego. Jednak, aby wyeliminować jego powstawanie w możliwie

największym stopniu, konieczna jest odpowiednia edukacja i kompetentna wiedza osób, które sprawują opiekę nad chorym – rozpoczynając od lekarzy, fizjoterapeutów i pielęgniarek, a kończąc na opiekunach medycznych i członkach rodziny pacjenta. Jednak w sytuacji kiedy zespół bolesnego barku się pojawi, jak każde inne schorzenie, trzeba umieć zdiagnozować i odpowiednio szybko wprowadzić adekwatne leczenie.

Cel pracy

Celem pracy było zbadanie poziomu wiedzy pracowników służby zdrowia na temat zespołu bolesnego barku, występującego u pacjentów po udarze mózgu.

Materiał i metody

W badaniu wzięło udział 96 respondentów (K = 68; M = 28) : 10 lekarzy, 47 fizjoterapeutów, 39 pielęgniarek. Najliczniejszą grupę badaną stanowiły osoby deklarujące ponad 10-letni staż pracy n = 43 (44,8 %), tylko 19 badanych deklarowało staż pracy poniżej 2 lat. Średnia wieku badanych wyniosła 38,44 lat. Najliczniejszą grupę stanowili ankietowani, którzy nie ukończyli jeszcze 31 rż. (28,1 %); natomiast najmniej badanych było w przedziale wiekowym 36 a 40 lat – 12 osób (12,5 %).

Jako metodę wybrano autorski kwestionariusz udostępniony elektronicznie składający się z pytań z zakresu poudarowego zespołu bolesnego barku, anatomii i patologii kompleksu barkowego, przyczyn, profilaktyki, możliwości diagnozowania i sposobu terapii bolesnego barku.

Za kryterium włączenia do badań przyjęto posiadanie kierunkowego wykształcenia, potrzebnego do wykonywania pracy w jednym z wyżej wymienionych zawodów medycznych, zgoda ankietowanego i prawidłowo uzupełniony kwestionariusz ankiety. Kryterium wyłączenia stanowiła niewypełniona w 100 % ankieta, brak kierunkowego wykształcenia.

Wyniki

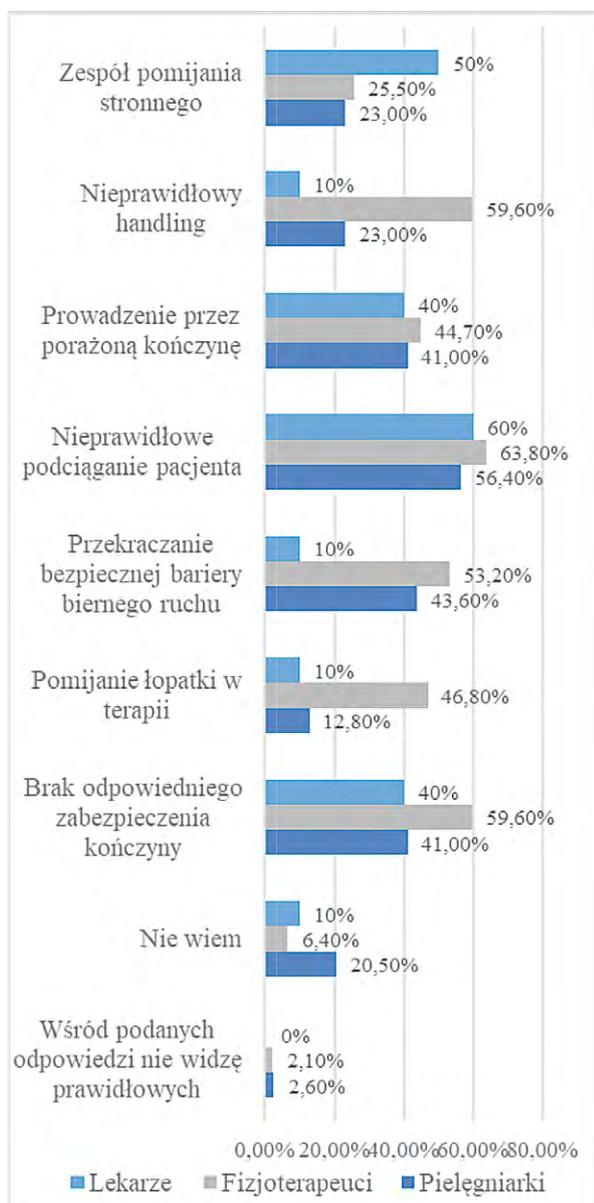
Najwyższy poziom wiedzy na temat zespołu bolesnego barku odnotowano w grupie fizjoterapeutów- średnia poprawność odpowiedzi wynosiła 59,8 %, najniższą odnotowano wśród pielęgniarek 40 %.

Najwyższą średnią poprawność prezentowała grupa ankietowanych, pracujących w zawodzie od 6 do 10 lat, która wynosiła 57,3 %; kolejno 56,9 % uzyskała grupa ankietowanych, pracujących od 3 do 5 lat. Respondenci pracujący powyżej 10 lat wykazali średnią poprawność na poziomie 46,8 %, najniższą wykazały osoby, pracujące mniej niż 2 lata – 43,4 %.

Większość respondentów za przyczynę powstawania zespołu bolesnego barku po udarze mózgu, podawało “nieprawidłowe podciąganie pacjenta” (lekarze – 60 %, fizjoterapeuci – 63,8 %, pielęgniarki – 56,4 %). Najrzadziej wskazywano “pomijanie łopatki w terapii” jako przyczynę bolesnego barku (lekarze: 10 %, pielęgniarki: 12,8 %). Spośród wszystkich pracowników służby medycznej, najwięcej pielęgniarek (20,5 %) odpowiedziało, że nie wie, która z podanych przyczyn jest poprawna.

Zdaniem respondentów, najważniejszym sposobem profilaktyki zespołu bolesnego barku w grupie fizjoterapeutów wskazywano: edukację pacjenta i jego rodziny (83 %) oraz zabezpieczenie bezwładnej kończyny przed zwisaniem (78,7 %). W grupie lekarzy dominowała odpowiedź “zabezpieczenie bezwładnej kończyny” 80 %; kolejno wskazywali “zapewnienie porażonej kończynie odpowiedniej płaszczyzny podparcia” (60 %). Odpowiedź ta pojawiała się najczęściej w grupie pielęgniarek 66,7 %; odpowiedzi “nie wiem” udzieliło 6 pielęgniarek (15,4 %) oraz 1 fizjoterapeuta (2,1 %).

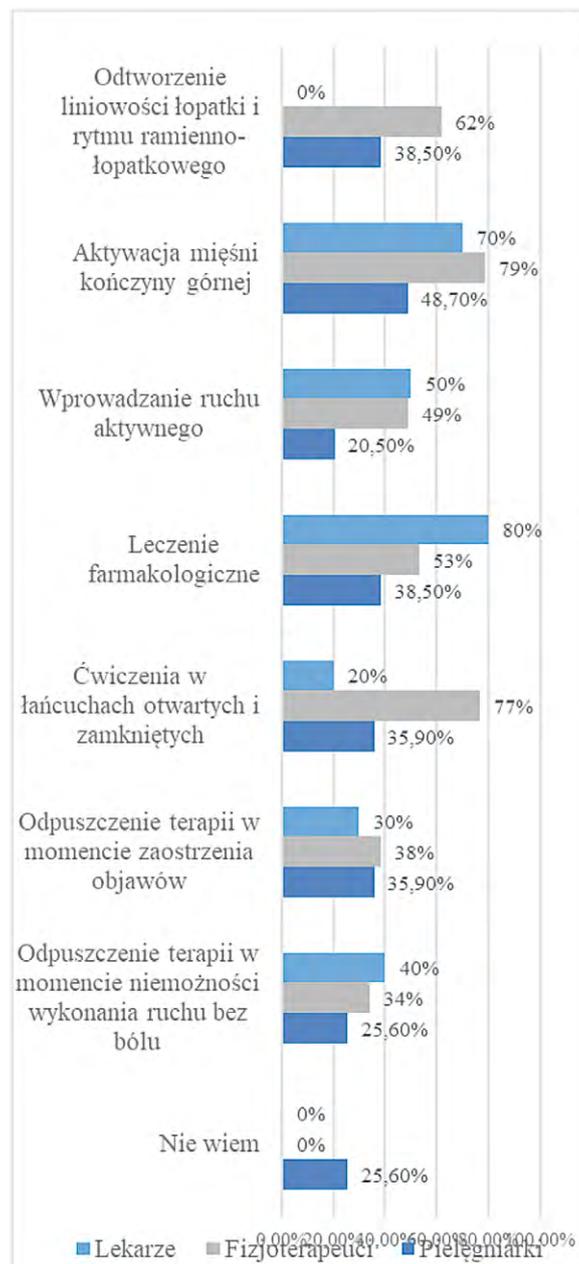
Większość lekarzy (80 %) uważa, że terapia poudarowa bolesnego barku polega na leczeniu farmakologicznym. Fizjoterapeuci (78,7 %) i pielęgniarki (48,7 %) najczęściej wskazywali aktywację mięśni kończyny górnej – głównie stożka rotatorów. Duży odsetek fizjoterapeutów (76,6 %) udzielił odpowiedzi, dotyczącej ćwiczeń w łańcuchach otwartych i zamkniętych. Jedynie pielęgniarki (25,6 %) zaznaczały odpowiedź ‘nie wiem’.



Rycina 1. Przyczyny powstania zespołu bolesnego barku po udarze mózgu- w zależności od wykonywanego zawodu.



Rycina 2. Profilaktyka zespołu bolesnego barku po udarze mózgu w zależności od wykonywanego zawodu.



Rycina 3. Terapia zespołu bolesnego barku po udarze mózgu w zależności od wykonywanego zawodu.

Nie wykazano istotnego statystycznie związku pomiędzy poziomem wiedzy, a płcią ($p = 0,150$); stażem pracy ($p = 0,449$); miejscem pracy ($p = 0,051$).

Analiza częstotliwości prawidłowej odpowiedzi o objawy podwichnięcia dolnego barku wykazała różnice istotną statystycznie z wykonywanym zawodem respondentów ($p = 0,037$), nie wykazano istotności ze stażem pracy ($p = 0,122$).

Nie wykazano związku pomiędzy wskazywaniem prawidłowej odpowiedzi na pytanie o objawy podwichnięcia górnego barku, a wykonywanym zawodem ($p = 0,327$) oraz stażem pracy ($p = 0,675$).

Dyskusja

Brak możliwości funkcjonalnego wykorzystania niedowładnej kończyny górnej ogranicza codzienne funkcjonowanie większości pacjentów po udarze mózgu. Dlatego bardzo ważne jest, aby personel medyczny sprawujący holistyczną opiekę nad pacjentami na oddziałach neurologii, posiadał rzetelną i kompetentną wiedzę w zakresie postępowania opiekuńczo-terapeutycznego i zapobiegania następstw udaru – szczególnie tych późnych (Nalepa, i in., 2015; Kiper, i in., 2017).

Uzyskane wyniki pozwoliły na określenie poziomu wiedzy pracowników służby zdrowia w zakresie zespołu bolesnego barku, będącego późnym powikłaniem udaru mózgu. Umożliwia to podjęcie adekwatnych działań, na przykład poprzez wprowadzenie odpowiednich kursów i szkoleń, podnoszących kompetencje w sprawowaniu opieki i leczenia pacjenta po przebytym incydencie mózgowym. Średni wynik, określający poziom wiedzy, uzyskany przez respondentów osiągnął mniej niż 50 %. Gazdowicz, Cipora oraz współautorzy przedstawili wyniki badań, w których 77,5 % studentów pielęgniarstwa wykazało przeciętny poziom (uzyskując od 54,5 do 82 % maksymalnej liczby punktów) wiedzy na temat udarów mózgu (Gazdowicz, i in., 2021).

Adamczyk oraz współautorzy przeprowadzili badania w grupie fizjoterapeutów, gdzie wykazali, że 87 % potrzebnej w pracy wiedzy stanowi doświadczenie zawodowe, a 57 % to kompetencje wynikające z odbytych dodatkowych kursów, niebędących w programie nauczania na studiach – czego świadomość rośnie wraz z wiekiem (Adamczyk, i in., 2012). Kołpa i współautorzy podają, że poziom wiedzy personelu szpitala w zakresie profilaktyki zakażeń wzrasta w zależności od długości stażu pracy oraz jest znacznie większy wśród respondentów, uczestniczących w dodatkowych szkoleniach w zakresie tej wiedzy (Kołpa, i in., 2015). Potwierdziło się to w naszych badaniach, gdzie grupa osób pracujących poniżej 2 lat osiągnęła najniższą średnią poprawność odpowiedzi (43,4 %).

Hoffman oraz współautorzy zwracają szczególną uwagę na ważność kompleksowego postępowania usprawniającego pacjenta po przebytym udarze mózgu, prowadzonego przez złożony zespół rehabilitacyjny, na który składają się głównie lekarze, fizjoterapeuci i pielęgniarki. Podkreślają, że wiedza personelu medycznego musi być na najwyższym poziomie kompetencji, gdyż źle prowadzone usprawnianie powoduje ogromną szkodę dla pacjenta i prowadzi do utrwalania patologii. Autorzy istotną rolę w terapii niedowładnej, porażonej kończyny przypisują łopatce – w badaniach własnych największą i jednocześnie znacznie większą wiedzę, od pozostałych grup zawodowych, w tym zakresie wykazali się fizjoterapeuci. Wśród czynności, mogących przyczynić się do powstania zespołu bolesnego barku autorzy zwracają uwagę na podciąganie pacjenta, na przykład podczas zmiany pozycji, za porażoną kończyną górną – na co w dużej mierze uwagę zwrócili badani – 60 % lekarzy, 63,8 % fizjoterapeutów oraz 56,4 % pielęgniarek. Autorzy przytaczanego badania zwracają też szczególne znaczenie na nastawienie rodziny chorego do procesu jego rehabilitacji oraz ich wiedzę w zakresie prawidłowej pielęgnacji pacjenta po udarze (Hoffman in., 2017) –

z czym, w znacznym stopniu, zgodzili się ankietowani w badaniu własnym (50 % lekarzy, 83 % fizjoterapeutów oraz 61,5 % pielęgniarek).

Podwichnięcie barku jest schorzeniem, które u pacjentów z poudarową hemiplegią występuje w 17 – 70 % przypadków. Najczęściej rozwija się w czasie od 1 do 3 tygodni od wystąpienia incydentu mózgowego – czyli w etapie wiotkości (Gyun Kim, i in., 2022; Fitterer, i in., 2021). W badaniach własnych najwięcej prawidłowych odpowiedzi, dotyczących etapu po udarze mózgu, w którym powstaje podwichnięcie dolne barku, udzielili fizjoterapeuci (83 %); lekarze w tej kwestii wykazali się poprawnością równą 70 %, pielęgniarki – 35,9 %. Ból barku po stronie niedowładnej jest złożonym, znacznie utrudniającym funkcjonowanie pacjenta, problemem, który dotyczy 12 – 58 % pacjentów po udarze mózgu. W większości przypadków daje dolegliwości między 8 a 10 tygodniem po udarze. Etiologia schorzenia jest bardzo zróżnicowana, a rehabilitacja takiego kompleksu barkowego przynosi wiele wyzwań dla zespołu terapeutycznego (Zheng, i in., 2015) – dlatego tak ważna jest wielopłaszczyznowa fachowość i obeznanie w tym zakresie wśród pracowników medycznych, szczególnie biorąc pod uwagę fakt, na jak dużą skalę szerzy się problem. W badaniach własnych wiedza, na temat objawów podwichnięcia dolnego barku, korelowała w sposób istotny statystycznie z zawodem ankietowanych – największy poziom wiedzy prezentowali fizjoterapeuci (80,9 %).

Nadler w swoich badaniach wykazał, że stosowanie odpowiednich ortez, zapobiegających bezwładnemu zwisaniu niedowładnej kończyny, spowodowało znaczące zmniejszenie bólu hemiplegicznego barku, a także zmniejszenie zakresu podwichnięcia, co widoczne było na zdjęciu rentgenowskim – dotyczyło to jednak już istniejącego u pacjenta podwichnięcia. Natomiast nie było badań, które sprawdzały, czy możliwe jest zapobieganie powstawaniu tego schorzenia, poprzez natychmiastowe, profilaktyczne stosowanie takich ortez u wszystkich pacjentów po udarze mózgu (Nadler, i in., 2017). W badaniach własnych respondenci byli zgodni i w zdecydowanej większości wskazywali zabezpieczenie bezwładnej kończyny, na przykład bandażem elastycznym lub ortezą, jako profilaktykę powstawania poudarowego zespołu bolesnego barku – 80 % lekarzy, 78,7 % fizjoterapeutów oraz 64,1 % pielęgniarek.

Hemiplegiczny ból barku jest najczęściej występującym, późnym następstwem udaru, który przysparza wiele trudności w procesie rehabilitacji, w dużej mierze go utrudniając i/lub uniemożliwiając. Porównując badanie ultrasonograficzne barku bolesnego oraz barku bez objawów bólowych (po stronie pośrednio zajętej), zaobserwowano znaczące pogrubienie ścięgna mięśnia nadgrzebieniowego po stronie hemiplegii. Podczas analizy odpowiedzi dotyczących pytania, które grupy mięśniowe w największym stopniu przyczyniają się do powstania PHS nasi respondenci udzielali odpowiedzi: 72,3 % fizjoterapeutów, 23 % pielęgniarek i 20 % lekarzy wskazywało mięśnie stożka rotatorów. Autorzy przytaczanego badania wskazali również we wnioskach, że pracownicy zawodów medycznych w swojej codziennej pracy klinicznej, powinni zwracać szczególną uwagę na problem hemiplegicznego bolesnego barku. Jedynie rzetelna i dobrze prowadzona fizjoterapia daje szansę na przywrócenie funkcjonalności kompleksu barkowego i całej niedowładnej kończyny górnej.

Zasadne jest zastosowanie niezbędnych leków przeciwbólowych, w momentach krytycznych, gdy ból uniemożliwia podjęcie rehabilitacji (Yaomei Li, i in., 2023). W badaniach własnych, najwięcej lekarzy (80 %) wskazało leczenie farmakologiczne jako element terapii PHS; 53,2 % fizjoterapeutów i 38,5 % pielęgniarek. Na odpuszczenie terapii w momencie niemożności wykonania ruchu bez bólu zwróciło uwagę 40 % lekarzy, 34 % fizjoterapeutów i 25,6 % pielęgniarek.

Kluczowym celem pracy było zbadanie poziomu wiedzy pracowników służby zdrowia w zakresie poudarowego bolesnego barku, a także zwrócenie uwagi na powagę tego problemu, wielkość skali na jaką się rozwija, utrudniając tym samym codzienne czynności nie tylko pacjentom, ale także pracę personelu medycznego. Dlatego tak istotna jest rzetelna wiedza pracowników służby zdrowia w zakresie profilaktyki późnych powikłań udaru mózgu, możliwie najwcześniejszego ich diagnozowania i metod terapii. Jedynie wtedy możliwe jest zmniejszenie ryzyka wystąpienia wśród pacjentów trwałej niepełnosprawności i zależności od osób trzecich w codziennym życiu.

Wnioski

Wiedza respondentów na temat zespołu bolesnego barku jest na niskim poziomie.

Zauważono również, że wiek, płeć oraz staż pracy Ankietowanych nie ma istotnego związku z poziomem ich wiedzy w zakresie poudarowego zespołu bolesnego barku.

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OZONE THERAPY AS ADJUVANT FOR CANCER TREATMENT

OZONOTERAPIA AKO ADJUVANS PRI LIEČBE ONKOLOGICKÝCH OCHORENÍ

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Abstract

Introduction: One of the effects of Ozonotherapy is that the reaction of ozone with the biological components of the body and precisely controlled doses, produced by mild oxidative stress, alleviates further oxidative stress and enables the therapeutic action of ozone because it has an excess of energy, so that oxidation processes do not run in oxidative stress.

Focus: This article provides an overview of the potential use of ozone as an adjuvant during cancer treatment. The mechanism of the effect of ozone has been recorded in many works. A living organism has the ability to learn and to create protective mechanisms upon repeated stimulation. Ozone acts on lymphocytes, induces the production of interleukin 2, gamma-interferon and tumor necrosis factor-TNF. It causes an increase in T4 and T8 lymphocytes. This proved an immunostimulating effect

The core of a job: Oxidative stress is a condition where the production of ROS exceeds the cellular antioxidant defense system, leading to cell damage. ROS are also major factors in cellular senescence in tissues. Cell senescence is an alternative way of responding to programmed cell death. It is important for suppressing the formation of cancer cells.

Findings: For several decades published in vitro studies on the ability of ozone to cause direct damage to tumor cells and also to enhance the effects of radiotherapy and chemotherapy. Indirect effects and a sensitizing effect of radiotherapy during the simultaneous administration of ozone have been demonstrated. Effects of ozone on the modification of the hemoglobin dissociation curve and other beneficial effects during cancer treatment. Finally, some works and our experience support the use of ozone therapy in treatment. In the work, we demonstrate several concrete case studies supporting the use of ozone therapy, which has shown excellent auxiliary effects in treatment.

Conclusion: By summarizing the relevant publications aimed at this goal and our clinical experience. Our demonstrated isolated clinical experiences as well as studies from the literature indicate a significant potential role of ozone as an adjuvant during radiotherapy and/or chemotherapy but also before its initiation. However, further research, randomized clinical trials, is needed to prove its usefulness.

Key words: Ozone therapy, senescence, oncology, cancer, radiotherapy, chemotherapy, adjuvant, treatment

Abstrakt

Úvod: Jedným z účinkov Ozonoterapie je, mierne oxidačným stresom produkovaná reakcia ozónu s biologickými zložkami organizmu a presne kontrolovaných dávkach, zmierní ďalší oxidatívny stres a umožní terapeutické pôsobenie ozónu preto, že má prebytok energie, aby procesy oxidácie neprebiehali v oxidačnom strese.

Zameranie: Tento článok poskytuje prehľad potenciálneho využitia ozónu ako adjuvans počas liečby rakoviny. Mechanizmus účinku ozónu bol zaznamenaný v mnohých prácach. Živý organizmus má schopnosť učiť sa a na opakovaný podnet si vytvorí ochranné mechanizmy. Ozón pôsobí na lymfocyty, indukuje produkciu interleukínu 2, gama-interferónu a Tumor nekrotizujúceho faktoru – TNF. Spôsobuje nárast lymfocytov T4 a T8. Tým bol preukázaný imunostimulačný efekt

Jadro práce: Oxidačný stres je stav, keď produkcia ROS presahuje bunkový antioxidačný obranný systém, čo vedie k poškodeniu buniek. ROS sú tiež hlavnými faktormi bunkovej senescencie v tkanivách. Bunková senescencia je alternatívnou cestou reakcie na naprogramované bunkové úmrtia. Je dôležitá pre potlačenie tvorby rakovinových buniek.

Zistenia: Niekoľko desaťročí publikované in vitro štúdie o schopnosti ozónu vyvolať priame poškodenie nádorových buniek a tiež zvýšiť účinky rádioterapie a chemoterapie. Boli preukázané nepriame účinky a senzibilizačný účinok rádioterapie pri súbežnom podávaní ozónu. Účinky ozónu na modifikáciu disociačnej krivky hemoglobínu a ďalšie priaznivé účinky počas liečby rakoviny. Nakoniec niektoré práce a aj naše skúsenosti podporujú využitie ozónovej terapie pri liečbe. Demonštrujeme v práci niekoľko konkrétnych kazuistík podporujúcich použitie ozonoterapie, ktoré preukázalo vynikajúce pomocné účinky v liečbe.

Záver: Zhrnutím relevantných publikácií zameraných na tento cieľ a našich klinických skúsenosti. Naše demonštrované izolované klinické skúsenosti ako aj štúdie z literatúry naznačujú významnú potenciálnu úlohu ozónu ako adjuvans počas rádioterapie a/alebo chemoterapie ale aj pred jej započatím. Je však potrebný ďalší výskum, randomizované klinické štúdie, aby sa preukázala jeho užitočnosť.

Kľúčové slová: Ozonoterapia, senescencia, onkologia, rakovina, rádioterapia, chemoterapia, adjuvans, liečba

Introduction

Cancer is a major public health problem worldwide. Antitumor treatment is based on chemotherapy, radiotherapy and targeted biological therapy. However, acquired resistance has become a serious challenge for anticancer therapies. Cancer cells acquire resistance through various mechanisms and signaling involving both intrinsic and extrinsic factors. In most patients with end-stage cancer, the primary cause of treatment failure is resistance to cancer

treatment. Therefore, the study of mechanisms of drug resistance is important in parallel with the development of the drug itself. Pharmacological factors, including inadequate drug concentration at the tumor site, as well as cellular factors may contribute to clinical resistance (Gottesman, 2002; Bocci, et al., 2011). The exact mechanisms of drug resistance in tumors are complex and multifactorial, but they can be divided into three categories: insufficient pharmacokinetic properties, intrinsic factors of tumor cells, and external conditions of tumor cells in the tumor microenvironment (Sun, 2016; Jing, et al., 2019).

Assembly studies confirmed that in the tumor microenvironment (Simonetti, Quagliariello, 2017). Promotes cancer progression in many aspects, especially therapeutic resistance. reduces drug penetration and provides a proliferation and anti-apoptosis advantage to surviving cells, thus facilitating resistance Soluble factors secreted by tumor or stromal cells contribute to abnormal proliferation, angiogenesis, metastasis and drug resistance (Wu, Dai, 2017).

Focus

Ince the rapid and uncontrolled proliferation of tumors limits the availability of oxygen, insufficient blood supply or hypoxia is a typical feature of the microenvironment of almost all solid tumors (Shao, Yang, 2018). Oxygen is essential for energy metabolism to drive cellular bioenergetics. The rapid proliferation of tumors outgrows their surrounding vasculature, leading to a drop in normal oxygen levels of 2–9 % to hypoxic levels of less than 2 %. Extensive reviews have been published on the clinical significance of hypoxia in cancer therapy (Harris, 2002; Jing, et al., 2019). Reduced oxygen availability (hypoxia), as a characteristic feature of the tumor microenvironment, occurs in most tumors, resulting from an imbalance between increased oxygen consumption and insufficient oxygen supply. Although rapid tumor proliferation can stimulate the growth of new vasculature, and tumor-induced angiogenesis leads to disorganized vasculature growth, the precisely distributed vasculature in normal tissues contributes to the delivery of oxygenated blood. Irregular distribution of the tumor vasculature caused by persistent hypoxic conditions can result in an increase in the distance between capillaries, exceeding the oxygen diffusion capacity (Wigerup, et al., 2016). Such chronic or diffusion-restricted hypoxia causes tumor cell necrosis. However, current anti-cancer strategies focus only on tumor cells in the vicinity of blood vessels (Loges, et al., 2009). The presence of hypoxic areas is one of the independent prognostic factors of cancer in humans. Tumor cells, while adapting to hypoxia, lead to more aggressive and therapeutically resistant tumor phenotypes. Hypoxia induces changes in gene expression and subsequent proteomic changes that have many important effects on various cellular and physiological functions, ultimately limiting patient prognosis (Roma-Rodrigues, et al., 2019). For example, slowly dividing cells in hypoxic areas can escape most cytotoxic drugs that target rapidly dividing cells, and cancer stem cells can also be present in weakly hypoxic areas providing epithelial-to-mesenchymal transition in the tumor microenvironment (Jing, et al., 2019).

Hypoxia creates intratumoral oxygen gradients, which contribute to tumor plasticity and heterogeneity and promote a more aggressive and metastatic phenotype.

The core of a job

Tumor cells develop new blood vessels to adapt to low levels of oxygen and nutrients, a process called *de novo* angiogenesis. However, such newly formed blood vessels are leaky due to their discontinuous endothelium together with obstruction of lymphatic drainage, causing vascular hyperpermeability and increased permeation. Thus, hypoxia causes vascular leakage and abnormal lymphatic drainage in the tumor, leading to an increase in interstitial fluid pressure. Cancer cells select normal host cells, such as fibroblasts, various immune cells, and blood and lymphatic cells, which are embedded in tightly packed extracellular matrices. The secondary formation of harsh metabolic and physical microenvironments results in an imbalance of positive and negative process regulators in the activation and deregulation of angiogenesis, desmoplasia and inflammation. Most tumors have hypoxic areas. The development of abnormal vasculature and a hypoxic microenvironment promotes abnormal angiogenesis, desmoplasia and inflammation, all of which contribute to tumor progression and therapeutic resistance and tumor metastasis (Whatcott, et al., 2015). In addition, an anoxic microenvironment is beneficial for glycolysis and lactic acid production leading to an acidic pH. A large number of studies have concluded that decreased intracellular pH of endosomes and lysosomes in tumor cells may promote metastasis by activating proteases. In fact, changes in extracellular pH induce drug resistance by inhibiting cellular and humoral immune functions, as acidic pH predominates in loci of inflammation and other immunologically active sites. Research has shown that reduced pH mainly inhibits chemotaxis, respiratory activity and bactericidal ability of polymorphonuclear leukocytes. In addition, impaired cytotoxicity and lymphocyte proliferation have been reported at acidic pH. Similarly, reduced lysis of various tumor cell lines by cytotoxic T lymphocytes at acidic extracellular pH has been demonstrated. Neutralizing T-cell effect or function and tumor acidity may improve response to immunotherapy. Hypoxic stress causes immunosuppression by controlling angiogenesis and favoring immune suppression and tumor resistance. Macrophages form a major component of the immune infiltrate in solid tumors by differentiating into tumor-associated macrophages. In recent years, the contribution of hypoxia to tumor therapy, especially drug resistance, has been observed in a wide range of neoplastic cells (Jing, et al., 2018).

Over several decades, prestigious journals have published articles on the ability of ozone to induce direct damage to tumor cells and also to enhance the effects of radiotherapy (RT) and chemotherapy (CT). Therefore, many clinicians advocate its use in the treatment of cancer. However, these studies were conducted *in vitro* in the laboratory and in some animal models. As such, the effects of ozone on tumor cells have been demonstrated under very different conditions than those used in clinical ozone therapy (O3T) sessions. In clinical practice, ozone usually does not come into direct contact with tumor cells, but its multiple effects are mediated by secondary messengers. In addition, the indirect mechanism of action of ozone stimulates adaptation mechanisms that can induce modulations in the body by affecting the immune system, blood flow and oxygenation, and oxidative stress. These indirect effects may be potentially beneficial in antitumor therapy, as some studies suggest (Jing, et al., 2018).

Oxidative stress is a condition where the production of ROS exceeds the cellular antioxidant defense system, leading to cell damage. ROS are also major factors in cellular senescence in tissues. Cell senescence is an alternative way of responding to programmed cell death. It is important for suppressing the formation of cancer cells. The antitumor effect of RT and many CT drugs is actually mediated by the production of ROS and free radicals in tumor cells. Its effects as such are “indirect”, i.e. they are mediated by the formation of secondary messengers and induce another adaptive response of the body in a hormetic dose-response relationship. Ozone concentration and effects do not follow a linear relationship: very low concentrations could have no effect, and very high concentrations can lead to opposite effects to those produced by lower/medium concentrations (Bocci, et al., 2011).

Chemotherapy drugs are still the cornerstone of cancer treatment. They have an oxygen-dependent effect on killing tumor cells, most of which kill cells by oxidizing free radicals and ROS in cells. Studies have shown that components in the tumor hypoxic microenvironment are associated with a poor prognosis in patients and can promote apoptosis and autophagy or inhibit DNA damage. and mitochondrial activity through a number of signaling pathways associated with failure of immunotherapy, chemotherapy, or radiotherapy. Especially in advanced metastatic cancer, a hypoxic environment is often created, which plays an important role in cancer development.

Improving oxygenation and metabolism, Upregulating the antioxidant enzyme system by continuing ozone therapy for several months (at least 6 months) can significantly modify the functional activities of red blood cells so that the oxygen supply increases and the tumor goes from a hypoxic to a normoxic state.

- Persistent oxidative stress is a factor that promotes the progression of invasion and metastasis.
- Ozone therapy is a procedure that involves a calculated, very transient oxidative stress capable of eliciting a cellular response without adverse effect.
- The ozone paradox consists in the fact that, despite being a strong oxidant, ozone is capable of inducing antioxidant enzymes and correcting chronic oxidative stress. This controls the progression of invasion and metastasis. Unlike normal healthy cells, cancer cells lack antioxidant enzymes. Protection of normal cells by stimulation of antioxidant enzymes, which causes a preconditioning effect.
- Oxidative stress in the form of free radicals, which is caused by radiation or chemotherapy, can be more effectively managed by these antioxidant enzymes.
- The side effects of these therapies are therefore largely prevented by ozone. Ozone improves general circulation.
- It reacts directly with endothelial cells and produces nitric oxide. which causes vasodilation.
- It improves the metabolism of red blood cells, makes the membrane of red blood cells more flexible and facilitates smooth circulation at the capillary level.
- In therapeutic doses, it prevents the aggregation of blood platelets.
- It leads to the formation of new blood vessels inside the tumor.
- All this translates into better oxygenation at the cellular level (Boci, 2009; Boci, 2011).

Effectively affects infections that commonly occur in cancer patients due to reduced immunity.

Stimulation of the immune system

- Ozone induces lymphocytes to produce lymphokines in a very controlled manner.
- Both helper and suppressor lymphocytes are activated.
- These activated lymphocytes are found in various lymphoid organs and put the entire immune system on alert.
- Ozone thus improves immunity and also participates in suppressing cancer cells.
- During ozone therapy, circulating neoplastic cells can undergo oxidation and become a potential autovaccine.
- It thus produces antibodies against its tumor cells and helps in their removal.
- Cancer cells have lost apoptosis.
- ROS are also major factors of cellular senescence in tissues. Cellular senescence is an alternative way of responding to programmed cell death. It is important for suppressing the formation of cancer cells, which have lost it and continue to multiply. Ozone induces apoptosis in cancer cells and causes them to die.

Activating the liver with ozone therapy helps induce liver enzymes that have a strong detoxifying effect. Reduces Cancer Fatigue

- The neuroimmunoendocrine system is so closely linked that activation of one leads to activation of the others. Ozone releases endorphins. This leads to better pain relief and an overall sense of well-being. And Cancer-Associated Fatigue
- There is a strong functional interaction between the nervous system, endocrine glands, and immune cells.
- The result of ozone therapy is an energetic feeling and euphoria. Improves the quality of life
- The overall improvement of metabolism after ozone therapy leads to an energetic feeling in patients. This makes the life of a cancer patient bearable.

Clinical experience with ozone in the treatment of cancer in our facility

Observations

- Ozone therapy has a wonderful effect on cancers of the digestive tract and cancers of the urinary system, e.g. CA Colon, CA Rectum and CA Cervix
- Habit related cancers take slightly longer to improve eg. CA: Cheeks, CA: Larynx, CA: Tongue. These are all related to tobacco chewing, smoking, pan eating and/or gutka. In these cases, the accumulation of toxins is very high and control takes longer.

Our observations

- Ozone therapy works best as an adjunctive therapy to ongoing conventional therapies, especially in cancer
- Reduces the side effects of chemotherapy and radiation therapy
- The goal is to prolong or maintain the effects of classical therapy and improve patients' well-being, lifestyle and quality of life.

Born: 10.08.2014 – 19.04.2016 preoperative magnetic resonance of the brain Conclusion: Infratentorial in the posterior fossa in location IV. the ventricles and vermis show a voluminous expansion of irregular contours. Expansion of the posterior fossa extending into the spinal canal to the level of the lower edge of C2. The expansion fills the entire 4th ventricle. 21/04/2016 – radical tumor resection Rectal during cytostatic treatment 3 – 5 times a week 20 ml 27ug O3+O2. and subsequently to the normalization of the condition. membrane lipids of neurons. Cell membranes are the main targets of ozone action. This results in an improvement in the processes of transferring, processing and storing information in the CNS. The resulting effect after a year: A child with a small latency of psychomotor development compared to peers. Based on the above-mentioned effects of ozonization, structural and functional properties improve.

J. K. 38 Years Dg.: Multiple CA mammae I.dx. Mr. Mastectomy I.dx., exenteratio axillae I.dx. 6.2022-biopsy, 10.2022-mastectomy, 11.2022-chemotherapy, 5.2023-hormonal therapy. Ozone therapy- applied since June 2022 – during CHT twice a week. Subj.: ability to work as a physiotherapist during stupa and initial polyneuropathy. Laboratory results of o-markers S-Ca15-3 ref. 0.0-26.4 kIU/L. 20.7.2022- S-Ca15-3 : 27.03 +kIU/L Ozone therapy started. 19.9.2022- S-Ca15-3: 28.03 +kIU/L. 6.10.2022- S-Ca15-3 : 25.21 – kIU/L before surgery, without any therapy, only ozone therapy was administered 2-3 times, the oncomarker normalized weekly! Ozone therapy applied at weekly intervals throughout the year. Pac. Without polyneuropathy and cardiopathy. During the entire chemotherapy, functional at work, with a wine at the end of the chemotherapy and the next day.

JM 59 Yers III.a št. Gr. 8, Rad. Prostatectomy, X-ray th, horm. Th. introductory PsA 18, Progn. life expectancy of 5 – 6 years., Started long-term Ozone therapy. T. no. 14 years after surgical treatment. PsA 0.14

A. O. 69 Yers, Dg.: Ca mammae (2016) pt. with MTS to lungs Ozone therapy started, after 4 doses he feels 60 % better, after 8 doses 80 %, Appetite improved. She improved especially mentally. She became happier and more cheerful. Her zest for life returned.

Conclusion

Ozone therapy for cancer patients is supported by scientific studies

Many scientific studies document the success of ozone therapy in many respected journals in the US and abroad. In 2004, a pilot study was conducted to inform about the effectiveness of oxygenating cancer tumors. The results indicated a reversal in the hypoxic conditions of the tumor and were measured using the polarographic probe technique.

Our center uses ozone therapy as a complementary type of treatment. It has been shown to work best in conjunction with other treatments such as immunotherapy. Ozone therapy is used to treat a wide variety of diseases and conditions, including late-stage and aggressive cancers.

Ozone therapy has gained the support of the medical community due to continued research. The scientific community has overwhelmingly supported its use in supportive care applications. The success of these applications has been carefully outlined in various widely recognized journals.

The most well-known interventions for tumors are surgery, which is highly invasive, and chemotherapy, which has intense side effects. In recent years, interventional therapy has become a treatment method due to its minimal invasiveness. Ozone treatment has shown excellent adjuvant effects in the treatment of cancer.

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ARTETERAPIA A JEJ PRÍNOS PRI LIEČBE NEUROLOGICKÝCH OCHORENÍ

ART THERAPY AND ITS BENEFIT IN THE TREATMENT OF NEUROLOGICAL DISEASES

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Abstrakt

Príspevok sa zameriava na tému využitia arteterapie ako podporného nástroja na zlepšenie kvality života klientov registrovaných v Súkromnom lekárskom centre Hippokrates v Bratislave, ktorí sa v centre liečia formou daily care prevažne na neurologické ochorenia.

Cieľom príspevku je poukázať na významný prínos arteterapie ako plnohodnotného liečebného prístupu a predstaviť ju ako súčasť modernej komplexnej starostlivosti nielen o ľudí s neurologickým ochorením, ale aj na celkový liečebný potenciál umeleckých techník pre dnešného moderného človeka trpiaceho na civilizačné ochorenia.

Kľúčové slová: arteterapia, neurologické ochorenia, liečebný proces, umelecké terapie, kvalita života

Abstract

The article focuses on the topic of using art therapy as a support tool to improve the quality of life of clients registered at the Hippokrates Private Medical Center in Bratislava, who are treated in the center in the form of daily care, mainly for neurological diseases.

The aim of the article is to point out the significant contribution of art therapy as a full-fledged treatment approach and to present it as part of modern complex care not only for people with neurological diseases, but also for the overall healing potential of artistic techniques for today's modern people suffering from civilization diseases.

Keywords: art therapy, neurological diseases, rehabilitation, quality of life

„Arteterapia je miesto, kde sa stretáva vonkajší svet s vnútorným svetom.“

Elionor Ulman

Úvod

Cieľom nasledujúceho príspevku je zameranie pozornosti na využitie arteterapie ako podporného nástroja na zlepšenie kvality života klientov registrovaných v Súkromnom lekárskom centre Hippokrates v Bratislave, ktorí sa v centre liečia formou daily care prevažne na neurologické ochorenia. Ide najmä o sprostredkovanie poznatkov a pozorovaní z praxe za

posledných 8 rokov, počas ktorých mohli klienti tohoto centra využívať okrem konvenčných medicínskych postupov, aj arteterapiu. V centre Hippokrates je však arteterapia k dispozícii nie len pacientom s neurologickými ochoreniami, ale aj širokej verejnosti, ktorá má možnosť chodiť na individuálne pravidelné arteterapeutické stretnutia, a tak si udržiavať svoje duševné zdravie v dobrej kondícii, nakoľko arteterapia môže byť plnohodnotným nástrojom na psychohygienu či zážitkové sebaspoznávanie.

Arteterapia

Ide o pomerne mladú disciplínu, po prvýkrát použil slovné spojenie **art's therapy** známy francúzsky neurológ J. M. Charcot v 2. pol. 19. storočia (Hartl, Hartlová, 2000). Arteterapiu považujeme za liečebno-pedagogickú metódou, ktorá má za cieľ rozšíriť alebo zmeniť pole pôsobenia vedomia, vrátane sebavedomia klienta, zmeniť zaužívané vzorce jeho správania, prípadne budovať chýbajúce schopnosti, a tým prispieť k jeho lepšej adaptácii a sociálnemu začleneniu (Šicková-Fabricsi, 2016).

Praktizuje sa napríklad v psychiatrických zariadeniach, v nemocniciach, v rehabilitačných strediskách, vo výchovných a vzdelávacích zariadeniach, v domovoch dôchodcov či vo forenzných inštitúciách. (Šicková-Fabricsi, 2006).

Súčasnú arteterapeutickú trendy sa orientujú na klienta a dôraz na to, že celý proces uzdravovania by si mal plne uvedomovať. Súčasťou arteterapeutických stretnutí by mal byť otvorený dialóg, ktorý pomáha spoluvytvárať terapeutický vzťah klienta a terapeuta a pomáha nachádzať riešenia akompenzačné mechanizmy klientovho problému.

Je však potrebné hovoriť aj o tom, že ani v roku 2023 na Slovensku ani v Čechách nemá arteterapia dodnes jednoznačne vymedzený profesijný štatút a legislatívne ukotvenie. V rolách arteterapeutov tak najčastejšie pôsobia prevažne ľudia z pomáhajúcich profesií ako sú pedagógovia, psychológovia, výtvarníci, lekári, liečební a špeciálni pedagógovia, zdravotné sestry, sociálni pracovníci a podobne.

Arteterapia a rehabilitácia

Arteterapia v centre Hippokrates je vykonávaná od roku 2017, počas uplynulých rokov sa ukázala ako jedna z efektívnych terapeutických prístupov pre klientov tohoto zariadenia, ktoré ponúka svoje služby formou daily care (denná ambulantná liečba). Jedinečným, citlivým a bezpečným spôsobom pomáha dávať klientom zúčastňujúcich sa arteterapeutických stretnutí podnetné impulzy pomocou tvorivých činností, ktoré sa pri terapeutickom procese menia na konkrétne ciele, odpovede či uvedomenia, ktoré sú neraz základom pre začatie vnútorného liečebného procesu. Pomáha riešiť osobné psychické konflikty pacientov, zlepšuje vývin interpersonálnych schopností, redukuje stres, zvyšuje sebadôveru a pomáha získať pacientom nadhľad. V spojení s konvenčnou medicínou, interdisciplinárnym prístupom a dodržiavaním liečebného plánu, tak môžeme hovoriť o cielenom zdvihnutí celkovej kvality života pacienta. Z niekoľkoročnej arteterapeutickej praxe v centre Hippokrates

vyplýva, že ide o efektívnu a tvorivú metódu terapeutickje práce, ktorá pomáha pri rôznych typoch neurologických ochorení pre prevažne dospelých ľudí rôzneho veku. Arteterapia je odporučená neuroológmi v centre Hippokrates ako doplnková terapia najmä pri diagnózach ako bolesti hlavy a chrbta, migréna, pri tetanickom syndróme, chronickej únave, syndróme vyhorenie, psychosomatických problémoch a mnohých iných.

Použitím nielen výtvarného média v arteterapii vstupuje klient a arteterapeut do priestoru reálneho aj imaginatívneho sveta, a to klientovi ponúka priestor pre jeho autentické vyjadrenie, sformulovanie jeho problému či jeho vnútorných pocitov a myšlienok. Môžeme povedať, že arteterapia ponúka priestor, kde každý dostáva možnosť prostredníctvom prevažne výtvarných médií, vyjadriť niečo konkrétne „zhmotnené“ formou originálneho diela a tvorby.

Šicková-Fabrics (2006) uvádza, že na hodnotenie nie len prvého arteterapeutického stretnutia je vhodné zaznamenávať si niektoré dôležité fakty a odpovedať si na nasledovné otázky:

- kedy sa problém objavil,
- kde sa problém objavil,
- ako sa problém manifestuje (gestami, slovami, sekvenciou činov),
- kto je prítomný vo chvíli, keď sa problém objaví – ako sa problém mení,

potom ako sa zmenilo chovanie klienta,

- ako vysvetľuje svoj problém klient,
- ako poznáme, keď problém zmizne.

V arteterapii je veľmi dôležité, aby boli problémy klientov **deperzonifikované**, pretože práve vtedy rastie aj šanca na ich vyriešenie a správnu kompenzáciu. Svoju „pravdu“ a videnie problému vyslovuje klient v arteterapii vizuálne. Nosičom tejto skutočnosti sa stáva výtvarné médium alebo výtvarný materiál. Ten, kto vytvoril výtvarnú expresiu nie je „nádobou patológie“ ale nádobou expresivity (Riley, 1999; Šicková-Fabrics, 2006).

Je dôležité, že problém sa vo výtvarnom produkte reálne prostredníctvom tvorby externalizuje. Tým, že sa na umelecký výtvar pacienta dívame z nadhľadu, ako na niečo, čo je už „vonku“ a je to zhmotnené, dostávame ho do pozície oslobodzujúceho aktu. Umelecký artefakt, ktorý takto vznikne, je konkrétny a môžeme sa k nemu vracaať, vziať ho do napríklad do vlastných rúk. Artefakt má tiež svoju váhu, tvar, farbu, symboliku a môžeme v ňom nachádzať nové a nové dimenzie, významé pre pochopenie klientovej situácie (Šicková-Fabrics, 2006).

Podľa Labátha (2019) majú terapeutický efekt nielen medicínske zákroky, čoho sme svedkom v celých dejinách ľudstva a pri téme arteterapie by sme voľne mohli hovoriť o intenzite liečebného zámeru. Zjednodušene by sme teda mohli odlišii ciele terapeutického vplyvu nasledovne:

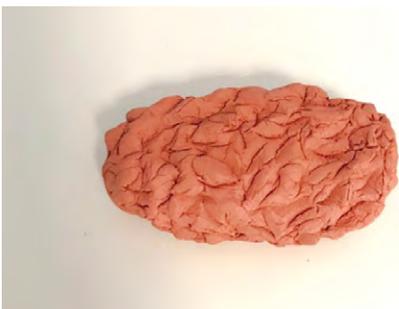
- počúvanie, chápanie prítomnosti a zdieľanie
- podpora, uvoľnenie, seba vyjadrenie
- stimulácia, rozvoj, posilňovanie a učenie, začleňovanie, sebaaktualizácia,
- korekcia správania, postojov, vzťahov

- symptomatická liečba
- kauzálna, rekonštrukčná liečba.

Vybrané arteterapeutické metódy pri práci s neurologickými pacientmi

Relaxácia a techniky, ktoré pomáhajú pacientovi uvoľniť prebytočné napätie a zablokované emócie sa pri rehabilitácii pacientov používa pomerne často, najmä preto, že neurologické ochorenia so sebou často prinášajú aj bolestivé stavy a fyzický a psychický diskomfort. V tejto súvislosti je viac ako vhodné pracovať s telesným prežívaním pacienta s čím sa viaže aj pojem „pocitovaný význam“. „Pocitovaný význam nie je zážitkom mentálnym, ale telesným. Ide o uvedomenie situácie, osoby alebo udalosti prostredníctvom tela. Je to vnútorná aura, ktorá sprevádza všetko, čo cítite a viete o danom subjekte v danej chvíli, sprevádza daný subjekt a komunikuje vám o ňom všetko naraz a nie postupne detail za detailom.“ (Gendlin, 1981; Levine, Fredericková, 2002).

Pri relaxačných aktivitách máme priestor využiť rôzne výtvarné médiá ako je modelovacie hmoty, hlina, plastelína, prstové farby a mnohé iné. Obľúbenými relaxačnými aktivitami bývajú aj techniky kombinované s relaxačnou hudbou ako je napr. voľné maľovanie rukami, či modelovanie so zavretými očami na vybrané skladby.



Obrázok 1. Relaxačná technika s modelovacou hmotou: Ako sa dnes cítim? Klientka s chronickou únavou vymodelovala podľa jej slov „vysušenú špongiu“ (Zdroj: vlastný archív)

Imagináciu by sme mohli opísať ako akési sprostredkovanie medzi svetom fyzickým a svetom duchovným. Riadená imaginácia je niekedy nazývaná aj vizualizáciou, pretože stratégie vizualizácie sú totožné s riadenou imagináciou.

Prvýkrát metódu aktívnej imaginácie navrhol pre psychoterapiu C. G. Jung. Pri aktívnej imaginácii pacient aktivizuje pomocou terapeuta hlbinné vrstvy svojej psychiky v bdelom stave, so zavretými očami. Podľa autarky Šickovej-Fabrici (2006) sa vnútorné pocity artikulujú do reči, v prípade aplikácie aktívnej alebo riadenej imaginácie v rámci arteterapie do výtvarnej podoby. Je výhodou, že sa môžu následne štruktúrovať podľa vedenia arteterapeuta do podoby, ktorá nesie korektívny potenciál. Imaginatívne metódy sa v arteterapii plnou mierou uplatňujú a sú vhodné na lepšie seba pochopenie, na uvoľnenie emócií, na vyjasnenie postojov k sebe aj k druhým ľuďom, na znovuprežitie niektorých udalostí v živote človeka. Vypovedá o tom, v akom bode sa práve pacient nachádza. Lepšie pochopenie seba samého nesie v sebe terapeutický potenciál.

Transformácia je metóda, kedy sa človek umelecky vyjadruje transformáciou pocitov z jednej sensorickej oblasti do druhej (Šicková-Fabricsi, 2002). Ide o prenesenie pocitov z vnímania jedného druhu umeleckého média do oblasti druhého, napr.: hudbu transformujeme do výtvarnej podoby. Táto arteterapeutická metóda sa v centre Hippokrates uplňuje s neurologickými pacientmi frekventovane, nakoľko prináša pozitívny efekt najmä v oblasti nahliadania pacientov na svoj zdravotný problém. Zväčša ho pacienti vnímajú ako prekážku, ktorú treba prekonať, zbaviť sa jej, no potláčanie či vymedzovanie sa voči vlastnému zdravotnému stavu prináša zväčša negatívne postoje pacienta ku svojmu ochoreniu/zdravotnému stavu. Pomocou transformácie dokáže arteterapeut pacientovi pomôcť pochopiť, že jeho postoje a prežívané pocity priamo ovplyvňujú schopnosť aktívne sa podieľať na liečebnom procese organizmu a pomocou tvorby ho podnietiť vytvárať a transformovať aj bolestivé či diskomfortné stavy do pozitívnych výtvarných obrazov a artefaktov.



Obrázok 2. Spontánne maľovanie klienta s tetanickým syndrómom na relaxačnú hudbu, názov maľby: Cesta
(Zdroj: vlastný archív)

Metóda **rekonštrukcie** spočíva v dotváraní rôznych fragmentov, napr.: koláž ľudskej postavy a pod. Podobné techniky sa dajú rôzne modifikovať do viacerých podôb a je zaujímavá pre všetky vekové kategórie a typy pacientov (Šicková-Fabricsi, 2002).

Sublimácia negatívnych pocitov prostredníctvom výtvarnej tvorby predstavuje efektívnu metódu arteterapeutickej práce pri rehabilitácii neurologických pacientov. **Sublimáciu vnímame ako súčasť obranných mechanizmov opísaných Sigmundom Freudom.** Obranný mechanizmus je spôsob, akým pacienti čelia úzkostným stavom, tieto mechanizmy vznikajú napríklad vtedy, keď sa v živote objavuje strach, dlhodobé bolesti, vyčerpanie a pacienti nevedia ako majú sa majú (so spomínanými stavmi) správať a bežne fungovať. Príklad techník slúžiacich na sublimáciu nepríjemných subjektívnych pocitov môžeme uviesť maľovanie s prstovými farbami na veľký formát, prostredníctvom ktorých môžeme pracovať s rôznym vrstvením, farbami, tlakom, otláčaním a pod. Tato technika nám pomôže „zhmotniť“ nepríjemné a negatívne vnemy a pracovať s pocitmi a emóciami na fyzickej úrovni.



Obrázok 3. Maľovanie prstovými farbami klientom s úzkostnými stavmi.
(Zdroj: vlastný archív)

Ciele arteterapie v procese rehabilitácie

Cieľom certifikovaného arteterapeuta v procese rehabilitácie neurologických pacientov v centre Hippokrates je predovšetkým pomáhať im dostupnými metódami, meniť ich prístup k ochoreniu, učiť ich prijímať svoj zdravotný stav a motivovať ich k pozitívnemu prístupu ku svojmu zdraviu. Nemenej dôležité je spoločne hľadať vnútorné sebaliečebné zdroje a poskytovať oporu pacientovi v celom procese liečby. Arteterapeut by mal byť členom interdisciplinárneho tímu a spolupracovať s ďalšími odborníkmi ako sú lekári, psychológovia, psychiatri, psychoterapeuti a pod., mal by konzultovať svoje interpretácie a zistenia.

Pozícia arteterapie nie je v jej izolovanom prístupe, ktorý všetko vyrieši, ale považuje sa za súčasť interdisciplinárneho konceptu pri riešení konkrétneho problému pacienta v rôznych oblastiach poskytovania liečby. Spôsob, akým využijeme arteterapiu sa líši v závislosti od toho kde, akou formou, u koho a prečo ju aplikujeme (v akej oblasti) a od toho, čo je jej konkrétnym cieľom.

Za výhody arteterapie v procese rehabilitácie pri neurologických pacientoch považujeme nasledovné:

- arteterapia nemá kontraindikácie,
- pomáha pacientom autenticky uvoľňovať, vnímať a poznávať vlastné pocity,
- pacienta učí prijímať a vyrovnávať sa s bolestnými stavmi a stavmi diskomfortu,
- zážitok z tvorby prináša tomu, kto tvorí, radosť a pôsobí upokojujúco,
- pomáha budovať rast osobnej slobody a motivácie.

Aj práca arteterapeuta pri rehabilitácii a terapeutickom procese má svoje špecifiká a limity, ktorých si je treba byť vedomý. Tento odbor je však nesmierne zaujímavý a pri rehabilitácii momentálne na Slovensku málo využívaný, z niekoľkoročnej praxe sa však ukazuje, že arteterapia je vhodnou súčasťou modernej komplexnej starostlivosti nielen o ľudí s neurologickým ochorením a celkový liečebný potenciál umeleckých techník pre dnešného moderného človeka trpiaceho na civilizačné ochorenia je nevyčerpatelný.

Liečba ľudskej patológie pomocou umeleckých techník nám ponúka alternatívu, jedinečnú a novú možnosť zapojenia mozgových sietí, ktoré zlepšujú spôsob, akým mozog spracováva informácie, zahŕňa externé a interné údaje a rozvíja nové efektívne mozgové spojenia.

V konečnom dôsledku by malo byť spoločným cieľom, aby sa ľudia lepšie prispôbili svojmu prostrediu, životným situáciám a rozmanitým okolnostiam. Bolo by veľmi podnetné, ak by sa vedci, lekári, umelci a terapeuti spojili, podelili sa o svoje skúsenosti a diskutovali o nich. Takáto interakcia by mohla viesť k novej spolupráci (Kashadan, Rottenberg, 2010).

Záver

Predpokladá sa, že ešte nejaký čas potrvá kým sa arteterapia plnohodnotne etabluje medzi ostatné druhy terapií, avšak už teraz sa dá konštatovať, že jej prínos v oblasti liečebných prístupov pre ľudí trpiacich (nie len) neurologickými ochoreniami, je významný. Faktom ostáva, že arteterapia má ešte mnoho neodkrytých potenciálov, ktoré majú schopnosť zvýšiť kvalitu života človeka (nie len v prípade neurologických pacientov), pomáhať mu prijímať aktuálnu životnú situáciu a podnecovať vlastné vnútorné sebaliečebné zdroje.

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ROBOTICKÁ TELEREHABILITÁCIA V INOVATÍVNYCH TERAPIÁCH

ROBOTIC TELEREHABILITATION IN INNOVATIVE THERAPIES

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Abstrakt

Úvod: V súčasnosti je prioritou vývoj nových inovatívnych terapeutických stratégií, ktoré integrujú nové poznatky o možnostiach neuroplasticity, o význame zlepšenia a nutnom zápise nových informácií, ktoré by umožnili reorganizáciu.

Zameranie: Telerehabilitácia je poskytovanie rehabilitačných služieb na diaľku pomocou telekomunikačnej techniky a týka sa služieb viacerých zdravotníckych disciplín vrátane fyzioterapie, logopédie, ergoterapie a biomedicínskeho inžinierstva. Ponúka aspekty starostlivosti o pacienta, vrátane, fyzické hodnotenia a diagnostiku, liečbu, konzultácie.

Jadro práce: Telerehabilitácia poskytuje služby, ktoré sú dostupné v domácnosti a môžu byť dodávané z akéhokoľvek miesta. Mnohé Výskumy preukázali, že obraz technológie môže byť úspešne použitý pre vzdialenú diagnostiku a je považovaný za účinný prostriedok pre terapeutov poskytovať služby na diaľku. Telerehabilitácia je poskytovanie rehabilitačných služieb prostredníctvom telekomunikačných sietí a internetu. Telerehabilitačné robotické systémy sa používajú buď v jednocestnom alebo dvojcestnom režime. V jednocestnom režime má možnosť usmerňovať prácu robota cez interfejs pacient. Pri dvojcestnom aj pacient aj terapeut, ktorý sa nenachádza pri pacientovi a robotovi.

Záver: Mali by sme si uvedomiť, že výskumné technológie pre rehabilitačnú liečbu sa veľmi rýchlo rozvíjajú a sú celosvetovo iba na začiatku. Robotická rehabilitácia a aj využívanie virtuálnej reality je dobrou investíciou, pretože rozvíja ľudské schopnosti a podporuje participáciu, je potreba väčšej investície do jej rozvoja.

Kľúčové slová: Telerehabilitácia. Robotická rehabilitácia. Neurorehabilitácia. Neuroplasticita. Virtuálna realita.

Abstract

Introduction: Currently, the priority is the development of new innovative therapeutic strategies that integrate insights into the neuroplasticity of the importance of improvement and require use of new information which would enable reorganization.

Focus: Telerehabilitation is a term describing the provision of remote rehabilitation services using telecommunications technology and refers to services providing a range of medical disciplines including physiotherapy, speech therapy, ergotherapy, biomedical engineering. It also offers all aspects of patient care, including patient interview, physical assessment and diagnosis, treatment, consultation, education and training. Telerehabilitation provides services that are available at home and can be delivered from anywhere. Research has shown that image technology can be successfully used for remote diagnostics and is considered to be the most effective means for physiotherapists to provide services remotely.

Core of Work: Telerehabilitation is the provision of rehabilitation services through telecommunications networks and the Internet. Telerehabilitation robotic systems are used in one-way or two-way mode. In one-way mode has the ability to guide the work of the robot via interface – patient only. In two-way, both the patient and the therapist, where therapist is not near the patient or the robot. We should realize that research for rehabilitation treatment technology is developing rapidly and globally they are just in the beginning.

Conclusion: Robotic rehabilitation and virtual reality is a good investment, because it develops human capacity and supports participation, hence the need for greater investment in its development.

Keywords: Telerehabilitation. Neurorehabilitation. Neuroplasticita, Robotic telerehabilitation. Virtual reality.

Úvod

V súčasnosti je prioritou vývoj nových inovatívnych terapeutických stratégií, ktoré integrujú nové poznatky o možnostiach neuroplasticity, o význame zlepšenia a potrebe nových informácií, ktoré by umožnili reorganizáciu. Telerehabilitácia je poskytovanie rehabilitačných služieb na diaľku pomocou telekomunikačnej techniky a týka sa služieb viacerých zdravotníckych disciplín vrátane fyzioterapie, logopédie, ergoterapie a biomedicínskeho inžinierstva. Ponúka aspekty starostlivosti o pacienta, vrátane, fyzického hodnotenia, diagnostiky, liečby a konzultácie.

Telerehabilitácia je termín opisujúci poskytovanie rehabilitačných služieb na diaľku pomocou telekomunikačnej techniky. Rehabilitácia motorickej zložky je veľmi variabilná, čím je poškodenie horšie, tým sú dlhodobé následky výraznejšie. Telerehabilitácia poskytuje služby, ktoré sú dostupné v domácnosti a môžu byť dodávané z akéhokoľvek miesta. Ponúka všetky aspekty starostlivosti o pacienta a to rozhovor s pacientom, vzdelávanie a odbornú prípravu. Fyzioterapeuti zadávajú a kontrolujú rehabilitačné koncepty ako sú úlohy a opakovanie, spätnú väzbu a motiváciu s cieľom učenia sa nových motorických zručností, ktoré sa premietajú do reálneho sveta. Využívanie virtuálnej reality je dobrou investíciou pre rozvoj schopností a podpory participácie.

Hlavnými indikáciami pre výkon telerehabilitácie sú poruchy nervového systému, poruchy svalovej a kostrovej sústavy, chronické ochorenia dolných dýchacích ciest.

Robotická telerehabilitácia je inovácia v medicíne, ktorá využíva technológie ako robotika, telekomunikácia a informačné technológie na poskytovanie rehabilitačnej starostlivosti pacientom na diaľku. Toto je osobitne užitočné pre pacientov, ktorí majú obmedzený prístup k rehabilitačným službám kvôli vzdialenosti, zdravotnému stavu alebo finančným obmedzeniam.

Robotická telerehabilitácia je využívaná v rôznych oblastiach medicíny vrátane neurorehabilitácie, kardiovaskulárnej rehabilitácie, pohybovej terapie a iných odvetviach. Robotické systémy môžu pomôcť pacientom pri cvičení a posilňovaním svalových skupín, zlepšením motorických schopností a tým zlepšovaním celkového zdravotného stavu.

Jadro práce

Telerehabilitácia poskytuje služby, ktoré sú dostupné v domácnosti a môžu byť aplikované z akéhokoľvek miesta. Viaceré výskumy preukázali, že obraz technológie môže byť úspešne použitý pre vzdialenú diagnostiku a je považovaný za účinný prostriedok pre terapeutov poskytovať služby na diaľku. Ide aj o poskytovanie rehabilitačných služieb prostredníctvom telekomunikačných sietí a internetu. Robotické systémy sa používajú buď v jednocestnom alebo dvojcestnom režime. V jednocestnom režime má možnosť usmerňovať prácu robota cez interfejs – iba pacient. Pri dvojcestnom sa zapája pacient aj terapeut, ktorý sa nenachádza pri pacientovi a robotovi. Jedným z hlavných prínosov robotické telerehabilitácie je schopnosť poskytnúť individualizovanú starostlivosť. Robotické systémy môžu byť programované tak, aby zodpovedali jedinečným potrebám každého pacienta, čo zvyšuje efektívnosť rehabilitácie. Tiež umožňujú lekárom sledovať pokrok pacienta na diaľku a prispôbiť plány liečby podľa potreby.

Ďalším významným prínosom je pohodlie a prístupnosť, pacienti môžu podstúpiť rehabilitačné cvičenia a terapie z pohodlia svojho domova, čo môže zvýšiť ich účasť a záväzok voči liečbe. Napriek mnohým prínosom, robotická telerehabilitácia neustále čelí niekoľkým výzvam. Tieto zahŕňajú vysoké náklady na robotické systémy, potrebu technických zručností na ich ovládanie a obavy z ochrany súkromia a bezpečnosti dát. Avšak, s pokračujúcim vývojom technológie sa očakáva, že tieto výzvy sa postupne prekonajú.

Príklady robotickej telerehabilitácie:

Tele-Wobble: Telerehabilitačný systém, ktorý obsahuje upravenú verziu kolísavej dosky so senzormi a ovládačmi, softvérovú tréningovú hru a architektúru webových služieb, ktorá umožňuje ovládať tréningový rozvoj jednotlivca na diaľku.

Hand Mentor, Foot Mentor a SCRIPT: Roboty, ktoré sa úspešne používajú v domácom prostredí na rehabilitáciu horných končatín.

Haptické rukavice, joysticky a haptické kolieska: Zariadenia, ktoré pomáhajú pri hodnotení tlaku vyvíjaného používateľom počas rehabilitačných cvičení. Domáce rehabilitačné zariadenia sú udržateľné riešenie pre pacientov, ktorí žijú vo vidieckych oblastiach, majú

obmedzenú mobilitu alebo sú vystavení vysokému riziku infekcie, získať rehabilitačné služby doma alebo vo svojej komunite.

Robotická telerehabilitácia môže poskytnúť terapeutom zvýšenú dostupnosť a pohodlie, zvýšenú motiváciu a angažovanosť, lepšie výsledky a kvalitu života a znížiť pracovnú záťaž a záťaž.

Záver

Mali by sme si začať uvedomovať, že výskumné technológie pre rehabilitačnú liečbu sa veľmi rýchlo vyvíjajú a sú celosvetovo v začiatkoch realizácie v rámci praxe. Robotická rehabilitácia a aj využívanie virtuálnej reality je dobrou investíciou, pretože rozvíja ľudské schopnosti a podporuje participáciu, je potreba väčšej investície do jej rozvoja. Ponúka mnoho prínosov, ktoré značne zlepšia kvalitu starostlivosti o pacientov v celosvetovom meradle. S pokračujúcim technologickým pokrokom a výskumom v tejto oblasti je pravdepodobné, že tieto výhody sa v budúcnosti zvýšia.

Robotická telerehabilitácia umožňuje pacientom, ktorí žijú vo vidieckych oblastiach a majú obmedzenú pohyblivosť alebo sú vystavení riziku infekcie, získať rehabilitačné služby doma alebo vo svojej komunite bez toho, aby museli cestovať na kliniku. To ovplyvní cestovné náklady, čakacie doby a vystavenie potenciálnym patogénom. Zvýšená motivácia a angažovanosť, môže poskytnúť interaktívnu a personalizovanú spätnú väzbu, vedenie a podporu pacientom počas rehabilitačných cvičení. To môže zvýšiť motiváciu, angažovanosť a dodržiavanie predpísaného liečebného plánu. Niektoré robotické zariadenia môžu využívať aj herné prvky, virtuálnu realitu alebo sociálnu interakciu, aby bol rehabilitačný proces pre pacientov zábavnejší a príjemnejší. Zlepšené výsledky a kvalita života, môže poskytnúť vysoko intenzívnu úlohu a špecifický tréning, ktorý sa podieľa na zlepšení funkčného zotavenie a kvalitu života pacientov s rôznymi neurologickými alebo muskuloskeletálnymi ochoreniami. Robotická telerehabilitácia môže taktiež monitorovať a vyhodnocovať pokroky pacienta a podľa toho upraviť liečbu, čím sa zabezpečí optimálna a individualizovaná starostlivosť.

Zníženie pracovného zaťaženia a záťaže pre terapeutov, môže pomôcť terapeutom pri poskytovaní efektívnejších a konzistentnej ich rehabilitačných službách väčšiemu počtu pacientov v danom čase. Môže tiež znížiť manuálnu a fyzickú záťaž terapeutov, predchádzať únave a zraneniam. Okrem toho môže robotická telerehabilitácia uľahčiť komunikáciu a spoluprácu medzi terapeutmi a pacientmi, ako aj medzi rôznymi zdravotníckymi pracovníkmi zapojenými do starostlivosti o pacienta.

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MÁ MANUÁLNA TERAPIA FASCIÍ VÝZNAM, AKO NÁSTROJ FYZIOTERAPEUTA? DOES MANUAL FASCI THERAPY SIGNIFICANCE AS A PHYSICAL THERAPIST'S TOOL?

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Abstrakt

Úvod: Fasciám sa v dnešnej dobe medzi fyzioterapeutmi venuje zvýšená pozornosť. Všeobecne sa prijíma názor, že tieto štruktúry zohrávajú významnú rolu v zdravom ale aj v patologickom pohybovom stereotypu.

Zameranie: „Myofascia“ označuje neoddeliteľný zväzok svalového tkaniva („myo-“) a jeho priliehajúcu sieť spojivového tkaniva („fascia“). Myofasciálna terapia je terapeutický prístup, ktorý sa zameriava na riešenie myofasciálnych triggerových bodov a fasciálnych obmedzení s cieľom zmierniť bolesť a zlepšiť funkciu pohybového aparátu.

Jadro práce: Niekoľko významných osobností výrazne prispelo k rozvoju a pochopeniu myofasciálnej terapie. Za priekopníčku štrukturálnej integrácie myofasciálnej manipulácie sa pokladá Ida Rolf (1896 – 1979). Táto americká biochemička a fyzioterapeutická odborníčka, zakladateľka štrukturálnej integrácie Rolfing, zdôrazňovala potrebu obnovy usporiadania a zjednotenia biomechaniky a kineziológie ľudského tela. Jednotlivé fascie na seba nadväzujú a ovplyvňujú celkovú tensegritu (pokračujúce napätie ustálených štrukturálnych vzťahov) v organizme. Ďalšími priekopníkmi v oblasti manuálnej terapie fascií sú Robert Schleip, Tom Myers a Carla Stecco.

Dr. Carla Stecco, talianska lekárka a anatómka, zohrala kľúčovú úlohu pri odhaľovaní komplexnosti fasciálneho tkaniva a vytváraní systematického prístupu k jeho manipulácii. Fasciálna manipulácia, terapeutický prístup, ktorý Stecco vyvinula a dôkladne preskúmala, predstavuje významný pokrok v oblasti terapie pohybového aparátu. Jedným z kľúčových príspevkov jej práce je identifikácia a klasifikácia konkrétnych myofasciálnych sekvencií, čo sú reťazce prepojených svalov a fasciálnych vrstiev. Tieto sekvencie slúžia terapeutom ako mapy na riešenie nielen miesta bolesti, ale aj jej základných príčin, často lokalizovaných na inom mieste tela.

Tento holistický prístup, známy ako Steccova metóda, zdôrazňuje dôležitosť systematického riešenia fasciálnych obmedzení pre dosiahnutie trvacej úľavy od bolesti a zlepšenie funkcie. Fasciálna manipulácia si kladie za cieľ uvoľniť adhézie a napätie v systéme fascií, čím ponúka úľavu od chronických bolestí, zlepšuje pohyblivosť kĺbov a obnovuje správnu funkciu svalov.

Hoci dôkazy podporujúce túto terapeutickú metódu stále sa rozvíjajú, niekoľko štúdií zdôraznilo jej účinnosť v rôznych klinických situáciách. Výskum ukázal pozitívne výsledky pri riadení stavov ako myofasciálny syndróm bolesti, fibromyalgia a poruchy pohybového aparátu.

Záver: Fasciálna manipulácia predstavuje sľubný terapeutický postup v oblasti fyzioterapie, ktorý poskytuje pacientom holistický a evidenciou podložený prístup k pohybovému aparátu. Vzhľadom na jej potenciál poskytovať neinvazívnu úľavu od pohybových problémov bez použitia liekov sa fasciálna manipulácia stáva cenným doplnkom vo výbave zdravotných pracovníkov, vrátane fyzioterapeutov, osteopatov a manuálnych terapeutov.

Kľúčové slová: Carla Stecco, fascie, fasciálna manipulácia, myofasciálna sekvencia, fyzioterapia

Abstract

Introduction: Physiotherapists are paying more attention to fascia in the present. It is generally accepted that these structures support a significant role in healthy but also in pathological movement stereotype.

Focus: The word “myofascia” refers to an inseparable sequence of muscle tissue (“myo-”) and its adjacent network of connective tissue (“fascia”). Myofascial therapy is a therapeutic approach that focuses on addressing myofascial trigger points and fascial restrictions to alleviate pain and improve musculoskeletal function.

Core of Work: Several prominent figures have contributed significantly to the development and understanding of myofascial therapy. Ida Rolf (1896 – 1979), the founder of Structural Integration, developed the Rolfing method, which focuses on aligning and balancing the body’s myofascial structures through deep tissue manipulation and movement education. Individual fascias connect to each other and influence the overall tensegrity (continued tension of established structural relationships) in the organism. Other pioneers in the field of manual fascia therapy are Robert Schleip, Tom Myers and Carla Stecco.

Dr. Carla Stecco, an Italian physician and anatomist, has played a pivotal role in unraveling the complexities of fascial tissue and developing a systematic approach to its manipulation. One of the key contributions of Stecco’s work is the identification and classification of specific myofascial sequences, which are chains of interconnected muscles and fascial layers. These sequences serve as roadmaps for therapists to address not only the site of pain but also its underlying causes, often located elsewhere in the body.

This holistic approach, known as the Stecco Method, emphasizes the importance of treating fascial restrictions systemically to achieve lasting pain relief and improved function. Fascial manipulation aims to release adhesions and tensions within the fascial system, offering relief from chronic pain, improving joint mobility, and restoring proper muscle function. While the evidence base for this therapeutic approach continues to evolve, numerous studies have highlighted its effectiveness in various clinical settings. Research has demonstrated positive

outcomes in managing conditions such as myofascial pain syndrome, fibromyalgia, and musculoskeletal disorders.

Conclusion: Fascial manipulation holds promise as a valuable therapeutic modality in physiotherapy, providing patients with a holistic and evidence-based approach to musculoskeletal health. Considering its potential to provide non-invasive, drug-free relief from musculoskeletal issues, fascial manipulation stands as a valuable addition to the toolkit of healthcare practitioners, including physiotherapists, osteopaths, and manual therapists.

Keywords: Carla Stecco, fascial manipulation, myofascial sequence, physiotherapy

Úvod

Fascia, spojivová tkanina, ktorá preniká ľudským telom, je dlhodobo uznávaná ako dôležitý prvok na porozumenie štruktúry a funkcie ľudského tela. Vo fyzioterapii získava manipulácia fascií stále väčšie uznanie v nedávnych rokoch. Táto metóda zahŕňa manuálnu manipuláciu fascií na riešenie rôznych problémov s pohybovým aparátom a bolesťami.

Zameranie

V tomto krátkom príspevku vás oboznámime s priekopníkmi fasciálnej terapie a priblížime Vám význam manipulácie fascií vo fyzioterapii, jej anatomických a fyziologických základoch, jej aplikáciách v klinickej praxi a nových dôkazoch, ktoré podporujú jej účinnosť.

Jadro práce

Fascia je komplexná trojrozmerná sieť kolagénu a elastínu (extracellular matrix), ktorá obklopuje a spája svaly, orgány, nervy, krvné cievy a iné štruktúry v tele. Jej anatomický význam nemožno podceňovať, pretože poskytuje mechanickú podporu, propioceptívnu spätnú väzbu a prostredie pre komunikáciu medzi rôznymi telovými systémami(Stecco). Porozumenie štruktúry fascie je kľúčové pre fyzioterapeutov, pretože tvorí základ pre techniky manipulácie fascií. Fasciu možno rozdeliť do rôznych vrstiev, vrátane povrchovej – superficial, hlboko uloženej – deep fascia a vnútornej – viscerálnej fascie. Povrchová fascia sa nachádza pod kožou, reprezentuje membránóznu zložku subkutánu alebo hypodermu a spája ju s podloženými svalmi (Stecco). Hlboká fascia sa skladá z aponeurotickej fascii ako napríklad thorakolumbálna fascia a z epimisiálnej fascii ktorá obklopuje svalové skupiny a poskytuje základnú štruktúru pre svalovú funkciu (Stecco). Vnútrná fascia obklopuje orgány a vnútornosti, poskytuje štrukturálnu integritu a pohyblivosť.

Fascia tvorí neustále spojenia v celom tele, čo jej umožňuje prenášať mechanické sily a napätie v rôznych častiach tela. Táto kontinuita je známa ako myofasciálne reťazce a zohráva kľúčovú úlohu pri udržiavaní postoja a podpore pohybu (Myers). Nedávne výskumy upriamili pozornosť na rolu fascie ako senzorického orgánu. Obsahuje bohatý zásobník mechanoreceptorov, ktoré poskytujú propioceptívne informácie o polohe, napätí a pohybe (Schleip). Táto senzorická spätná väzba je kľúčová pre motorickú kontrolu a povedomie o tele.

Zakladateľka v oblasti *štruktúralnej integrácie* – Ida Pauline Rolf, bola prelomovou americkou biochemičkou a tvorkyňou unikátneho a významného systému práce s telom nazývaného „Štruktúralna Integrácia“. Jej práca revolucionizovala oblasť somatickej terapie a zanechala hlboký a trvalý vplyv na spôsob, akým rozumieme štruktúre a funkcii ľudského tela.

Cesta Idy Rolf do sveta práce s telom a somatickej terapie začala ako osobná skúsenosť. Celý svoj život sa potýkala s rôznymi zdravotnými problémami, vrátane chronických migrén a iných fyzických nepohodlí. Jej nespokojnosť s konvenčnými liečebnými metódami a túžba nájsť alternatívne riešenia ju viedla k objavovaniu a uzdravovaniu. Začala skúmať vzťah medzi držaním tela, postavením a celkovým zdravím. Jej prelomovým zistením bolo, že ľudské telo je možné významne zlepšiť vo svojej štruktúre a funkcii systematickým prístupom k manipulácii mäkkých tkanív. Toto zistenie dalo vzniknúť systému Štruktúralnej Integrácie, ktorý pôvodne nazývala „Posturálna Uvoľňujúca Terapia“ dnes známa ako Rolfing. Vyvinula komplexnú sériu desiatich sedení, z ktorých každé bolo navrhnuté na systematické riešenie konkrétnych oblastí fasciálnej siete tela, s konečným cieľom zlepšiť držanie tela, rovnováhu a celkové zdravie. (Rolf). Tento proces zahŕňal hlbokú manipuláciu tkanív, strečing a vzdelávanie o pohybe.

Robert Schleip je významnou postavou vo svete výskumu fascií, je nazývaný prvopredsedom výskumu fascií. Jeho prínosy významne posunuli naše pochopenie fascií, ich dôležitosť v rôznych aspektoch zdravia a ich potenciálne aplikácie v zdravotnej starostlivosti a fyzioterapii. Robert Schleip venoval celú svoju kariéru odhaľovaniu tajomstiev fascií. Jedným z kľúčových aspektov Schleipovej práce je preklad vedeckých zistení do praktických aplikácií. Preskúmal, ako manipulácia fascií prostredníctvom techník práce s telom môže pozitívne ovplyvniť rôzne stavy, vrátane chronických bolestí, svalovo-skeletálnych problémov a dokonca prispieva k celkovému fyzickému zdraviu. Toto viedlo k rozvoju terapeutických prístupov, ktoré zahŕňajú manipuláciu fascií

Schleipova práca podporuje spoluprácu medzi rôznymi oblasťami zdravotnej starostlivosti, a tým podporuje holistický prístup k starostlivosti o pacientov. Jeho výskum premostil medzeru medzi anatómiou, fyzioterapiou a manuálnou terapiou, spojil odborníkov z rôznych oblastí na preskúmanie potenciálu manipulácie fascií

Tom Myers je významnou postavou v oblasti anatómie, práce s telom a štruktúrnej integrácie. Jeho práca bola rozhodujúca pri formovaní nášho pochopenia vzájomných prepojení v ľudskom tele, najmä prostredníctvom jeho konceptu „Anatomy Trains“ – revolučného prístupu k tomu, ako vnímame a pracujeme so štruktúrou a funkciou tela. Namiesto toho, aby vnímal svaly a fascie tela ako izolované komponenty, zdôrazňuje vzájomné prepojenie myofasciálnych meridiánov alebo „trains“, ktoré prechádzajú telom. Tento holistický pohľad premenil spôsob, akým terapeuti a praktikanti pristupujú k práci s telom a manuálnou terapiou, povzbudzuje ich, aby zvažovali telo ako dynamický celok.

Výskum a výučba Toma Myersa zdôrazňujú klinickú relevantnosť myofasciálnych liniek a ich vplyv na biomechaniku, postoj a pohyb. Táto práca bola rozhodujúca pri rozvoji oblasti manuálnej terapie a rozšírila naše pochopenie toho, ako telo funguje ako jednotný systém.

Carla Stecco, talianska lekárka a anatómka, je uznávanou osobnosťou v oblasti výskumu a manipulácie fascií. Jej pionierska práca významne prispela k našemu pochopeniu fascií, komplexnej siete spojivového tkaniva, ktorá obklopuje a preniká ľudským telom. Práca doktorky Steccovej a jej príspevky mali hlboký vplyv na rôzne lekárske disciplíny, vrátane fyzioterapie, osteopatie a manuálnej terapie. Jej záujem o výskum a manipuláciu fascií bol prebudený počas jej akademickej cesty a klinickej praxe, čo ju následne priviedlo k hlbšiemu preskúmaniu fascinujúceho sveta fascií.

Jedným z najvýznamnejších príspevkov Carly Stecco do oblasti je vývoj „Manipulácie Fascií“. Tento prístup k manuálnej terapii sa zameriava na identifikáciu a liečbu myofasciálnych bodov a adhézii fascií. Zahŕňa systematické a dôkazmi podložené hodnotenie fasciálneho systému tela s cieľom riešiť rôzne stavové problémy s pohybovým aparátom a bolesťami. (Stecco) Práca Carly Stecco je hlboko zakorenená v jej rozsiahlom anatomickom výskume. Spolupracovala na viacerých štúdiách a výskumných projektoch s cieľom pochopiť štruktúru, funkciu a klinický význam fascií. Jej anatomicke disekcie a výskumy poskytli cenné poznatky o úlohe fascií v biomechanike ľudského tela. Toto poskytlo holistický a efektívny prístup k liečbe rôznych zdravotných problémov. Jej oddanosť anatomickému výskumu, vývoju techník manipulácie fascií a vzdelávacím iniciatívam rozšírila hranice poznania v tejto oblasti. Jej príspevky významne ovplyvnili klinickú prax a poskytli zdravotníckym pracovníkom cenné nástroje na zlepšenie výsledkov a pohody pacientov.

Manipulácia fascií sa vo fyzioterapii používa na riešenie širokej škály problémov vrátane bolestí v pohybovom aparáte, športových zranení, posturálnych problémov a dokonca aj chronických bolestivých syndrómov. V oblasti manipulácie fascií vznikli niektoré kľúčové techniky a prístupy. Myofasciálne uvoľnenie je metóda manuálnej aplikácie trvajúceho tlaku na uvoľnenie myofasciálnych obmedzení a zmierňovanie bolesti a napätia. Cieľom je zlepšiť funkciu pohybového aparátu a zvýšiť rozsah pohybu. Manipulácia mäkkých tkanív ktorú používajú fyzioterapeuti na manipuláciu povrchových vrstiev fascií a podložených tkanív. Techniky ako trenie, hnetenie a natiahnutie sa používajú na rozpustenie adhézii a jaziev, čo podporuje hojenie tkanív a flexibilitu. Terapia triggerpoints čo sú hyperiritabilné miesta v svaloch alebo fasciách, môžu spôsobiť lokálnu alebo prenesenú bolesť. Manipulácia fascií môže zahŕňať terapiu bodov spúšťača na riešenie týchto špecifických generátorov bolesti. Manipulácia fascií sa nevyužíva len na liečbu existujúcich stavov, ale aj na prevenciu zranení a optimalizáciu športového výkonu.

Význam manipulácie fascií vo fyzioterapii je podporený rastúcim množstvom klinických dôkazov a prípadových štúdií, ktoré demonštrujú jej účinnosť v rôznych klinických situáciách. Význam manipulácie fascií vo fyzioterapii spočíva v jej potenciáli poskytovať účinné riešenia pre širokú škálu muskuloskeletálnych a bolestivých stavov. Anatomické a fyziologické základy fascií, spolu s klinickými dôkazmi podporujúcimi jej účinnosť, ju robia cenným nástrojom pre fyzioterapeutov. S priebežným výskumom a stále rastúcim uznaním v rámci oboru je manipulácia fascií pripravená zohrávať ešte významnejšiu úlohu v budúcnosti fyzioterapie, zlepšovať výsledky pacientov a prispievať k rozvoju metód manuálnej terapie.

Záver

Význam manipulácie fascií vo fyzioterapii nemožno podceňovať. Tento prístup uznáva telo ako prepojený systém a rozpoznáva, že obmedzenia fascií môžu mať hlboký vplyv na zdravie a funkciu. Príspevky prelomových osobností, ako sú Carla Stecco, Tom Myers, Robert Schleip a Ida Rolf, obohatili túto oblasť a poskytli fyzioterapeutom cenné nástroje na riešenie širokej škály svalovoskeletálnych problémov, chronických bolestí a obmedzení pohybu. Ako sa pochopenie fascií stále rozvíja, aj úloha manipulácie fascií vo fyzioterapii sa rozvíja, sľubujúc ešte efektívnejšie a holistické prístupy k starostlivosti o pacientov. Anatomické a fyziologické základy fascií, spolu s klinickými dôkazmi podporujúcimi jej účinnosť, ju robia cenným nástrojom pre fyzioterapeutov. S priebežným výskumom a stále rastúcim uznaním v rámci oboru je manipulácia fascií pripravená zohrávať ešte významnejšiu úlohu v budúcnosti fyzioterapie, zlepšovať výsledky pacientov a prispievať k rozvoju metód manuálnej terapie.

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PÔROD CISÁRSKYM REZOM A MOŽNOSTI OVPLYVNENIA BOLESTIVOSTI FYZIOTERAPIOU CHILDBIRTH BY CAESAREAN SECTION AND POSSIBILITIES TO INFLUENCE PAIN WITH PHYSIOTHERAPY

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Abstrakt

Úvod: Práca má za cieľ poukázať na pozitívny vplyv fyzioterapie pre ženy po pôrode sekciou, ktorou dokážeme znížiť najčastejšie následné komplikácie, ktoré pôrod sekciou prináša. Zamerali sme sa na vplyv na popôrodnú diastázu musculus rectus abdominis a zníženie bolestivosti v oblasti jazvy a lumbálnej časti chrbtice.

Ciele: Zosumarizovať informácie o doterajších liečebných postupoch, ktoré môžeme využiť po pôrode sekciou, metodiky zamerané na ovplyvnenie diastázy m. rectus abdominis a funkciu správnej aktivity hlbokého stabilizačného systému, starostlivosť o jazvu a predchádzanie následným algickým stavom.

Materiál a metodika: Skúmaný súbor tvoria dve skupiny žien po pôrode sekciou. Prvá skupina navštevovala fyzioterapeuta a cvičila pod jeho vedením, a druhá skupina pacientiek cvičila podľa edukácie len v domácom prostredí.

Výsledky: Skúmali sme vplyv fyzioterapie na zníženie bolesti po sekcii a zvýšenie pohybovej aktivity po pôrode sekciou, porovnávané v skupine pacientiek pod vedením fyzioterapeuta oproti skupine cvičiacej samostatne v domácom prostredí a vplyv na zmenšenie diastázy m. rect. abdominis.

Záver: V závere vyhodnocujeme naše zistenia a opisujeme možné fyzioterapeutické postupy a cvičenia.

Kľúčové slová: Cisársky rez. Popôrodná fyzioterapia. Diastáza musculus rectus abdominis. Hlboký stabilizačný systém. Jazva.

Abstrakt

Introduction: The aim of the work is to point out the positive impact of physiotherapy for women after cesarean delivery, which can reduce the most common subsequent complications that cesarean delivery brings. We focused on the effect on postpartum diastasis of the rectus abdominis muscle and the reduction of pain in the area of the scar and the lumbar part of the spine.

Objectives: Summarize information on current treatment procedures that can be used after cesarean delivery, methodologies aimed at influencing diastasis m. rectus abdominis and the function of proper activity of the deep stabilization system, scar care and prevention of subsequent painful conditions.

Material and methodology: The studied group consists of two groups of women after cesarean delivery. The first group visited a physiotherapist and exercised under his guidance, and the second group of female patients exercised according to education only at home.

Results: We investigated the effect of physiotherapy on reducing pain after cesarean section and increasing physical activity after cesarean delivery, compared in a group of patients under the guidance of a physiotherapist versus a group exercising independently at home, and the effect on reducing diastasis m.rect.abd..

Conclusion: In the end, we will evaluate our findings and summarize possible physiotherapy procedures and exercises.

Key words: Cesarean section. Postpartum physiotherapy. Diastasis of the rectus abdominis muscle. Deep stabilization system. A scar.

Úvod

Cisársky rez je pôrodná operácia, pri ktorej je dieťa vybrané z maternice matky brušnou cestou (Roztočil, 2001). Je dôležité porozumieť zložitému vzťahu medzi pôrodom cisárskym rezom a zdravotnými problémami, ktoré niekedy vedú ženy k vyhľadaniu lekárskej alebo fyzioterapeutickej pomoci s odstupom mesiacov a rokov. Zistiť, ako čo najlepšie postupovať v terapii a predovšetkým prevencii pred funkčnými problémami pohybového systému, a to už od začiatku šestonedelia.

Celosvetovo v posledných rokoch zaznamenávame rastúci počet pôrodov sekciou a mnohí odborníci hovoria o ich nadužívaní. Je však potrebné venovať pozornosť možným následkom po tejto operácii. Je významný jej vplyv na organizmus a žena je ním ovplyvnená mnohými spôsobmi (Thabet, et al., 2019).

Epidemiológia – V niektorých perinatologických centrách je prevalencia aj viac ako 30 %.

Indikácie k sekcii – Indikácií pre cisársky rez je veľa. Niektoré riešia matku, iné ľahký priebeh pôrodu plodu. Jednou z najčastejších príčin SC je diabetes mellitus, keď sa vykonáva medzi 37. – 38. týždňom tehotenstva (Hagovská, 2016).

Indikácie k sekcii:

1. Rozdiel medzi panvou matky a hlavičkou novorodenca
2. Stav po operácii malej panvy (prekonané 2 cisárske rezy, totálna panvová exenterácia)
3. Polohy a držanie plodu.
4. Vážne ochorenie matky (preeklampsia, vrodené kardiovaskulárne choroby)
5. Viacpočetné tehotenstvo
6. Novorodenecká váha menšia ako 2500 g (Hagovská, 2016)

7. Dlho odtekajúca či odtečená plodová voda (Kudela,2004)
8. Naliehanie a výrez pupočníka
9. Zvláštnou skupinou je cisársky rez na prianie rodičky. Podľa Hagovskej (2016) nemá byť prianie indikáciou na vykonanie SC. Avšak ženy s indikáciou „poloha koncom panvovým“, ktorá je v niektorých prípadoch poroditeľná vaginálnou cestou, si môžu samy vybrať spôsob pôrodu.

Rozdelenie podľa povahy – Cisársky rez možno rozdeliť dvoma spôsobmi, prvý spôsob je plánovaný na cisársky rez, teda primárny. Indikácia je známa už počas tehotenstva. S priebehom operácie je mamička oboznámená už počas tehotenstva. Druhou možnosťou je akútny, sekundárny cisársky rez.

Pooperačná starostlivosť – Po 24 hodinách na jednotke intenzívnej starostlivosti sa rodička presúva na izbu na popôrodnom oddelení. Po 5. – 6. dňoch odchádza matka domov (Pařízek, 2015).

Obdobie, kedy sa reprodukčné orgány vrátia do normálneho stavu ako pred tehotenstvom, sa nazýva šestonedelie. Trvá približne 6 až 8 týždňov.

Štúdia Gillearda a Browna (1996) uviedla, že štrukturálne zmeny, ktoré sa vyskytujú v brušných svaloch počas tehotenstva, môžu obmedziť funkciu brušných svalov a znížiť schopnosť brušných svalov poskytovať stabilitu panve proti rezistencii počas tehotenstva a až 8 týždňov po pôrode (Gilleard, et al., 1996)

Na podporu toho štúdia Liaw a kolegov naznačila, že veľkosť IRD bola negatívne spojená s funkciou brušného svalu (Liaw, et al., 2011)

- Štúdia Hillsa a spolupracovníkov (2018) zistila, že ženy s DRA mali nižšiu schopnosť generovať krútiaci moment otáčania trupu a vykonávať sedenie (podporené negatívnou koreláciou medzi IRD a rotáciou trupu, maximálnou kapacitou generovania krútiaceho momentu a skóre testu v sede) (Hills, et al., 2018).
- Niektoré štúdie sa podieľajú na výskume slabých brušných svalov, ktoré spôsobujú brušnú a lumbo-panvovú bolesť a dysfunkciu počas tehotenstva (Spitznagle, et al., 2007).

Taktiež sa predpokladá, že slabé brušné svaly môžu viesť k neúčinnnej kontrakcii svalov panvového dna (PFM) (Spitznagle, et al., 2007). Začatie cvičenia prenatálne môže pomôcť udržať tonus a kontrolu nad brušným svalstvom, aby sa znížil určitý stres na linea alba (Zappile, et al., 2009).

Staršia literatúra naznačuje, že funkčná kapacita brušného svalstva môže byť ohrozená v dôsledku zmeny línie pôsobenia svalu. Odvtedy Chiarello, et al. (2005), zistili, že výskyt a veľkosť DRA je väčšia u tehotných žien, ktoré necvičia, a keďže brušné svaly zohrávajú dôležitú funkčnú úlohu pri cvičení, ženy musia byť vyšetrené na prítomnosť DRA. Novšie dôkazy podporujú posilnenie hlbokkej stability jadra 3-krát týždenne počas 8 týždňov, okrem spevnenia, aby sa zlepšila separácia medzi rekti a kvalita života meraná stupnicou fyzického fungovania (PF10) (Thabet, et. al., 2019). Cvičenia zahŕňali bránicové dýchanie,

kontrakciu panvového dna, izometrické brušné kontrakcie a tradičné brušné cvičenia. Autori Lee a Hodges (2016) navrhli, že zúženie IRD nemusí byť optimálne a že predaktivácia TrA môže zvýšiť napätie a znížiť skreslenie linea alba, čo umožní prenos sily cez stredovú čiaru. Avšak v štúdií Gluppe, et al. (2018), sa zistilo, že cvičenie pod dohľadom raz týždenne počas 16 týždňov, okrem denného domáceho tréningu, neznížilo prevalenciu DRA po 6 mesiacoch po pôrode. Cvičenia boli zamerané na posilnenie panvového dna, ale aj relaxáciu a strečing, ako aj posilnenie brucha, chrbta, rúk a stehie.

Možné popôrodné komplikácie

Pôrodná bolesť panvového dna – bolesť v oblasti panvového dna, takzvaná popôrodná bolesť panvovej mriežky (PPGP) u väčšiny žien ustúpi do 4 mesiacov po pôrode, ale 20 percent žien, ktoré pociťovali bolesť počas tehotenstva a tesne po ňom, pokračovalo. Bolesť 2 až 3 roky po pôrode.

Dysfunkcia panvového dna

Dysfunkcia panvového dna (DPD) je široký pojem, ktorý popisuje funkčné zmeny panvového dna a jeho okolitých štruktúr. Tieto zmeny môžu postihnúť iba jednu časť alebo môžu postihnúť celé panvové dno. Symptómy dysfunkcie panvového dna sú inkontinencia moču alebo stolice, prolaps maternice alebo močového mechúra, pretrvávajúca alebo intermitentná panvová bolesť.

Jazva po cisárskom reze

Mechanizmus hojenia jaziev na maternici má oproti klasickému hojeniu jaziev svoje špecifiká, keďže sa tu uplatňujú určité mechanické faktory. Po začatí pôrodu, keď sa rana zašije, má hormón oxytocín vplyv na činnosť hladkého svalstva. Úplné vyliečenie teda môžeme očakávať až rok-dva po zákroku. Správne sa hojaca jazva je asymptomatická, ak sa patologicky zahojí, prejavuje sa svrbením, pálením, bolesťou a obmedzenou pohyblivosťou. Výsledkom môže byť aktívne zjazvenie (Bajerová, 2018; Raková, 2021; Žáková, 2020).

Diastáza m. Recti abdominis

Cisársky rez môže byť významným rizikovým faktorom pre vznik DRA vzhľadom na povahu operácie. Chirurgický rez a následný proces hojenia môžu potenciálne narušiť normálne zarovnanie a funkciu brušných svalov, a tým prispieť k rozvoju DRA.

Diastáza vzniká už v tehotenstve, kedy sa pravá a ľavá časť priameho brušného svalu od seba vzdiaľujú v dôsledku zväčšenia priestoru pre rastúcu maternicu. Diastáza sama o sebe nespôsobuje pacientovi žiadnu bolesť, ale ovplyvňuje stav a funkciu svalov, čo môže vyústiť až do rozvoja bolestivých stavov (Gruszczynska, Truszczynska-Baszak, 2018).

DMRA sa vyskytuje u 30 – 70 % tehotných žien a u 35 – 60 % žien po pôrode. U novorodencov a dojčiat sa DMRA vyskytuje v dôsledku neúplného uzáveru brušnej steny a nedostatočnej výživy väziva (Taylor, 2020).

Súčasn^é liečebné postupy

Chirurgické riešenie – abdominoplastika – sa používa u žien, ktoré sú rok a viac po pôrode a konzervatívna liečba neprinesla želaný efekt. Iné indikácie, ako je šírka medzery vhodná na začatie chirurgickej liečby, sa v literatúre neuvádzajú. Operáciu je možné vykonať dvoma spôsobmi. Prvým typom výkonu je sutúra (plikácia) oslabenej fascie m. rectus abdominis a vykonáva sa laparotómiou alebo laparoskopicky.

Konzervatívne postupy

Fyzioterapia môže hrať zásadnú úlohu pri liečbe DRA po pôrode cisárskym rezom. Fyzioterapeut môže pacientov viesť cieľným cvičebným programom na posilnenie brušných svalov a zlepšenie stability jadra. To môže pomôcť znížiť veľkosť diastázy a zlepšiť funkciu a vzhľad brucha.

Okrem toho môže fyzioterapeut poskytnúť techniky manuálnej terapie na riešenie akýchkoľvek myofasciálnych obmedzení alebo tkaniva jazvy, ktoré sa mohli vyvinúť po operácii. To môže ďalej pomôcť pri obnove funkcie brušných svalov a môže zlepšiť celkové výsledky u pacientov s DRA po pôrode cisárskym rezom.

Terapia diastázy, rovnako ako ovplyvňovanie iných svalových dysbalancií, si vyžaduje úplne individuálny prístup. Pri cielenej fyzioterapii DMRA je dôležitá konzultácia a vedenie terapie pod skúsenými rukami fyzioterapeuta.

Prvou líniou intervencie pre DRA je vzdelávanie. Pacienti by mali chápať anatómiu a funkciu brušných svalov, príčiny a dôsledky DRA a ako samostatne monitorovať DRA. Mali by tiež poznať pokyny pre bezpečné a efektívne cvičenie brucha a vedieť, ako aktivovať a trénovať hlboké brušné svaly.

Cvičenia na zotavenie po pôrode by sa mali zamerať na vnútornú jednotku, ktorá zahŕňa priečny brušný sval, multifidus, svaly panvového dna a bránicu. Zlepšenie mechaniky tela môže znížiť stres na linea alba. Pacienti by sa mali naučiť, ako správne zdvíhať, nosiť a polohovať svoje telo počas každodenných činností.

Posturálne uvedomenie. Oprava držania tela môže minimalizovať stres na linea alba. Pacienti by sa mali snažiť udržiavať neutrálnu chrbticu, vyhýbať sa nadmernému prednému nakláňaniu panvy a udržiavať hrudný kôš zarovnaný nad panvou.

Brušné podpery, ako sú pásy alebo viazače, môžu niektorým pacientom poskytnúť dočasnú úľavu. Tieto podpery môžu znížiť napätie na linea alba, poskytnúť stabilitu bruchu a dolnej časti chrbta a zlepšiť pohodlie pri každodenných aktivitách.

Zásady fyzioterapie po cisárskom reze

Rehabilitácia sa zameriava na posilňovanie panvového dna, bráničné dýchanie, starostlivosť o jazvu, cvičenia HSS a správnu aktiváciu brušných svalov, cvičenia na zmiernenie bolesti drierkovej chrbtice, korekciu držania tela a odporúčania pre manipuláciu s bábätkom

a ADL aktivity každodenného života. Začínáme v rámci predoperačnej prípravy najmä pri plánovaných cisárskych rezoch. Zameriavame sa predovšetkým na cvičenie vedúce k zvýšeniu fyzickej zdatnosti.

Terapeutické metódy

Techniky mäkkých tkanív – Ide o techniku zameranú na ovplyvnenie reflexných zmien kože, podkožia, fascií a svalov. Môžeme ho použiť samostatne, na ovplyvnenie nocicepcie, alebo na prípravu na niektorú z ďalších manuálnych techník, ako je mobilizácia (Kolář, 2009).

Respiračná fyzioterapia – Dýchanie patrí medzi automatické procesy, pri ktorých spolupracuje hrudná dutina s dutinou brušnou. Hrudná dutina by sa mala rozvíjať trojrozmerné a na tieto zmeny reaguje aj brušná dutina. Reťazové dýchacie pohyby sa prejavujú aj v držaní tela, pretože pohyby chrbtice a hrudníka sú súčasťou nádychových a výdychových pohybov (Čumpelík, 2017).

Mobilizácia – Mobilizácia sa uskutočňuje jemnými opakovanými pohybmi kĺbu všetkými smermi až do dosiahnutia predpätia, čo vedie k obnoveniu fyziologickej funkcie segmentu, preto najčastejšie mobilizujeme kĺbové blokády.

Postizometrická svalová relaxácia – Postizometrická relaxácia (PIR) je analytická metóda používaná na svalovú relaxáciu. Najčastejšie sa používa na terapiu spúšťacích bodov. Oddialením začiatku z miesta úponu predpneme sval, ktorý chceme ovplyvniť, následne vyzveme pacienta, aby nám kládol minimálny odpor a voľne dýchal. V tejto polohe zotrváme 10 sekúnd a potom pacienta vyzveme, aby sa s výdychom uvoľnil. Vďaka dekontrakcii sa sval samovoľne predĺži. Pri autoterapii používame antigravitačnú metódu podľa Zbojana (AGR)

Cvičenie panvového dna – Svaly panvového dna majú dôležitú posturálnu funkciu a udržiavajú panvové orgány v správnej polohe. Ženy s nefunkčným panvovým dnom pociťujú inkontinenciu, únavu po dlhodobej chôdzi, niekedy spojenú s bolesťami bedrových kĺbov a slabín. Medzi najznámejšie postupy patria cviky podľa Springera a Kegela na precvičenie kontrakcií a uvoľnenie panvového dna. Vhodná je korekcia držania tela a senzomotorické cvičenia napríklad na nestabilnej plošine (Suchomel, 2019).

Cvičenie podľa programu Tupler Technique® – metodika Tupler odporúča nosiť podporný sťahovací pás po celú dobu trvania programu.

Senzomotorická stimulácia

Akrálna koaktivačná terapia – Acral Coactivation Therapy (ACT) vyvinula PhDr. Ingrid Palaščáková Špringrová, PhD. na základe metódy Roswithy Brunkowovej. Autorka uvádza, že: Svalové reťazce začínajú a končia na akre.

Metóda Ľudmily Mojžišovej – Ide o metodiku pôvodne vyvinutú na liečbu skolióz a bolestí chrbta, časom sa osvedčila aj u pacientok s gynekologickými problémami a dnes sa pri liečbe spája najmä s ovplyvňovaním svalov panvového dna. funkčnej sterility u žien. Autorka Bezvodová (2017) popisuje princíp tejto metódy ako ovplyvňovanie nervovosvalového

aparátu panvového dna pohybovou a manuálnou terapiou panvy, krížovej kosti a kostrče, pričom súčasne využíva vegetatívny nerv na ovplyvnenie ženských pohlavných orgánov.

Proprioceptívna neuromuskulárna facilitácia – Proprioceptívna neuromuskulárna facilitácia (PNF) bola vyvinutá lekárom Hermanom Kabátom v polovici 20. storočia. Vo svojej štúdii dokázal, že vieme využiť aferentné impulzy zo svalových, šľachových a kĺbových receptorov na efektívne ovplyvnenie motorických neurónov predných miechových rohov. Pohybové vzorce podľa PNF smerujú diagonálne a ide o pohybové vzorce používané pri bežných denných aktivitách.

Dynamická neuromuskulárna facilitácia – Dynamická neuromuskulárna stabilizácia (DNS) od Pavla Koláča dokazuje, že pri rozvoji svalovej sily nie je optimálne sledovať len ich anatomický priebeh, ale aj ich integráciu do biomechanických reťazcov, ktoré odvodzujeme z centrálnych programov. Pri ovplyvňovaní svalov podieľajúcich sa na stabilizácii trupu sa najčastejšie využívajú pohybové vzorce z vývojovej kineziológie a jednotlivé svaly sa precvičujú vo vývojových sériách (Koláč, 2009).

Kinesiotaping – Ide o metódu, ktorú objavil japonský chiropraktik Kenzo Kasa, ktorý vyvinul pás s vlastnosťami podobnými ľudskej koži. Správne aplikovaný kinesiotape docieľi zvrásnenie a nadvihnutie pokožky (čo umožní obnovenie toku lymfy a krvi), zníži opuchy, zníži tlak a podráždenie receptorov bolesti.

Relaxačné metódy – Medzi relaxačné metódy patrí napríklad joga, masáže, relaxačné imaginatívne metódy, relaxácia založená na dychových cvičeniach alebo relaxačné metódy koncentrácie.

Edukácia – Ako už bolo spomenuté, prvé dni v pôrodnici sú pacientky poučené o vstávaní z postele na boku a kašľaní pri držaní rany.

Cieľ

Cieľom práce bolo zistiť vplyv cielenej fyzioterapeutickej intervencie u pacientok po cisárskom reze s rozvíjajúcou sa diastázou RA m. Ukázať metódy terapie, ktoré vedú k zníženiu bolesti v oblasti panvového dna, driekovej chrbtice a jazvy po cisárskom reze, overiť možnosti kinezioterapie pri redukcii diastázy priameho brušného svalu po cisárskom reze.. Monitorujte fyzickú aktivitu počas 8 týždňov. Bol stanovený kvalitatívny výskum na 20 pacientkach.

Čiastkové ciele

Cieľ č. 1 Zistiť zmenu šírky diastázy po 8 týždňoch fyzioterapie u pacientov cvičiacich s fyzioterapeutom a u pacientov cvičiacich doma na základe inštruktáže.

Cieľ č. 2 Zistiť rozdiel vo vnímaní bolesti po operácii v oblasti panvového pletenca, driekovej chrbtice a jazvy po operácii pomocou analógovej škály bolesti VAS u pacientov, ktorí podstúpili fyzioterapeutickú intervenciu a u pacientov edukovaných na cvičeniach. a režimové opatrenia v domácom prostredí.

Cieľ č. 3. Zistiť rozdiel v pohybovej aktivite meranej krokomerom po sekcii u pacientov cvičiacich s fyzioterapeutom a u pacientov cvičiacich doma.

Formulácia výskumných hypotéz

Pre dané ciele sme stanovili nasledujúce zodpovedajúce hypotézy:

- H1: Predpokladáme, že po 8 týždňoch cielenej fyzioterapie dôjde k výraznejšej redukcii šírky diastázy priameho brušného svalu v oblasti linea alba, ako u pacientov edukovaných a cvičiacich doma.
- H2: Predpokladáme, že u pacientov cvičiacich s fyzioterapeutom dôjde k výraznejšiemu zlepšeniu bolestí v oblasti panvového dna, drierkovej chrbtice a posečnej jazvy, merané na vizuálnej analógovej škále VAS, ako u pacientov cvičiacich samostatne doma.
- H3: Predpokladáme, že po 8 týždňoch fyzioterapie bude pohybová aktivita, sledovaná krokomerom, lepšia u pacientov cvičiacich s fyzioterapeutom ako u pacientov cvičiacich doma.
- H4a: Predpokladáme, že v skupine pacientok cvičiacich s fyzioterapeutom dôjde po absolvovaní fyzioterapie k štatisticky významnej zmene k lepšiemu vo všetkých sledovaných parametroch: šírka diastázy m. RA, bolesť v oblasti panvy poschodie, drierkovú chrbticu a jazvy po sekcii a fyzické aktivity.
- H4b0: Predpokladáme, že v skupine pacientok cvičiacich s fyzioterapeutom nedôjde k štatisticky významnej zmene k lepšiemu vo všetkých sledovaných parametroch: šírka diastázy svalu RA, bolesť v oblasti panvového dna, drierková chrbtica a jazvy po sekcii a pohybové aktivity.

Sledovaný súbor

Pacienti boli vo veku 20 až 40 rokov. Všetky pacientky podstúpili cisársky rez v období od 21. 11. do 13. 11. 2022.

Charakteristika súboru

Štúdiu sme realizovali na výskumnej vzorke pacientok, ktoré boli rozdelené do 2 skupín. V oboch skupinách boli ženy vo veku 20 až 40 rokov, ktoré rodili cisárskym rezom. Pacienti podpísali informovaný súhlas so zaradením do štúdie a boli ochotní spolupracovať.

Pomocou krátkeho dotazníka boli zisťované niektoré údaje súvisiace s touto prácou, ako výška, váha, BMI, počet tehotenstiev, pohybové aktivity pred, počas a po pôrode a ďalšie fakty užitočné pre túto štúdiu.

Prvá skupina 10 pacientok absolvovala fyzioterapiu zameranú na diastázu, HSS, na spevnenie svalstva panvového dna a tým zmiernenie stresovej inkontinencie, zmiernenie bolestí drierkovej chrbtice, správne dýchanie, poučenie o správnom zdvíhaní bremien a manipulácii s novorodencom. Fyzioterapia sa vykonávala dvakrát týždenne po dobu 40 minút. Boli použité

nasledovné metódy – mäkké a mobilizačné techniky, fyzikálna terapia na jazvu, Kegelove cviky na panvové dno, cvičenie diastázy Tupler Technique®, cvičenie na uvoľnenie driekovej chrbtice, nosenie sťahovacieho pásu, kinesiotaping na jazvu ako aj na diastáza a iné. Boli požiadaní, aby nosili inteligentné zariadenie – hodinky s krokomerom na detekciu fyzickej aktivity – čo najviac času.

Druhá skupina 10 pacientov neabsolvovala fyzioterapiu, ale bola vybavená príslušným informačným materiálom a ukážkou cvikov na zmenšenie šírky diastázy, cviky na HSS, panvové dno a cviky na uvoľnenie L chrbtice. Taktiež boli vyzvaní, aby maximálne dlho nosili hodinky s krokomerom, aby zaznamenávali dennú pohybovú aktivitu v sledovanom období.

Metóda výskumu

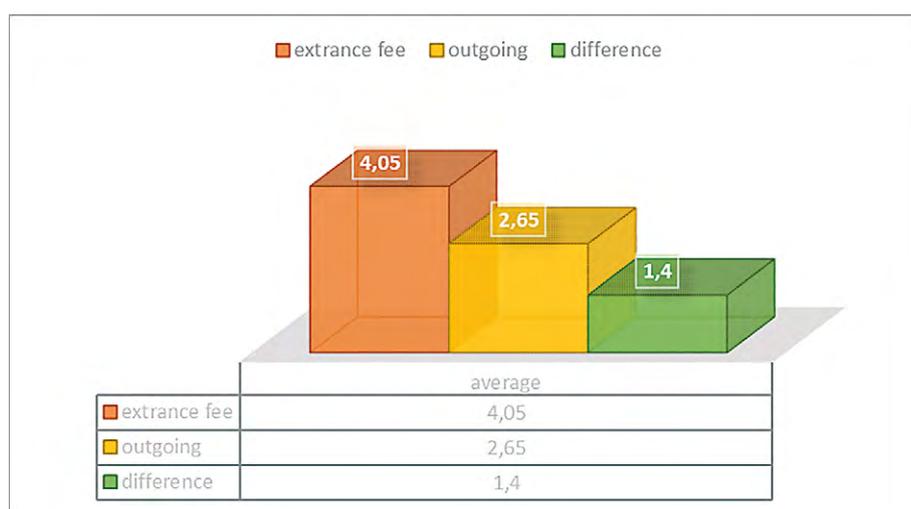
Prospektívna štúdia bola realizovaná v rehabilitačnom centre v termíne od 09. 11. 2021 do 13. 11. 2022 (Mašán, et al., 2023).

Použité vyšetrovacie metódy v rámci fyzioterapeutickej intervencie

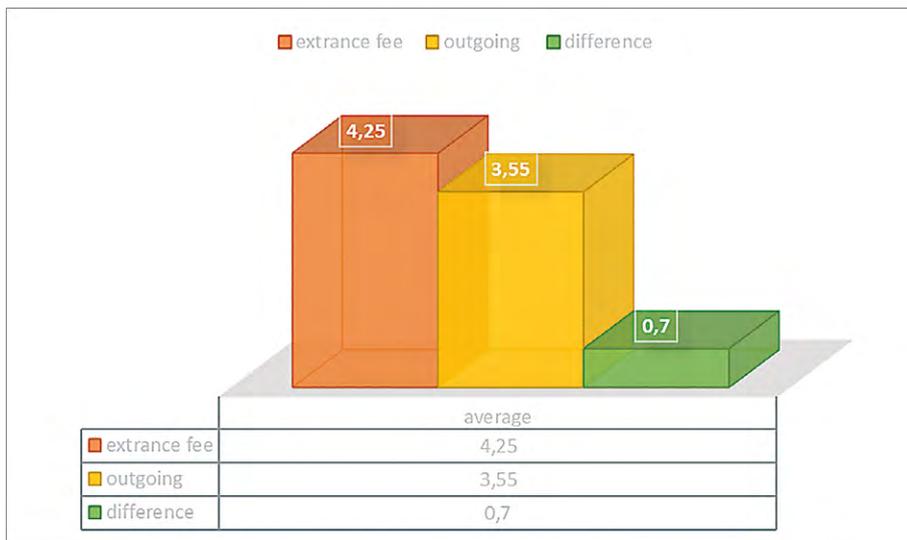
Našimi hlavnými vyšetrovacími metódami bola vizuálna analógová škála VAS od 1 – 10, slúžiaca na zisťovanie bolestí, ktoré pacientky pociťovali po sekcii, hlavne v oblasti cisárskeho rezu, panvového dna a driekovej chrbtice, pričom sa merala šírka diastázu v cm sme u pacientov v ľahu na chrbte použili digitálne posuvné meradlo a eleváciu hlavy do úrovne spodného uhla lopatky. Denná fyzická aktivita bola meraná pomocou krokometra v hodinkách. Boli to kľúčové vyšetrovacie metódy na získanie vstupných a výstupných hodnôt.

Výsledky práce

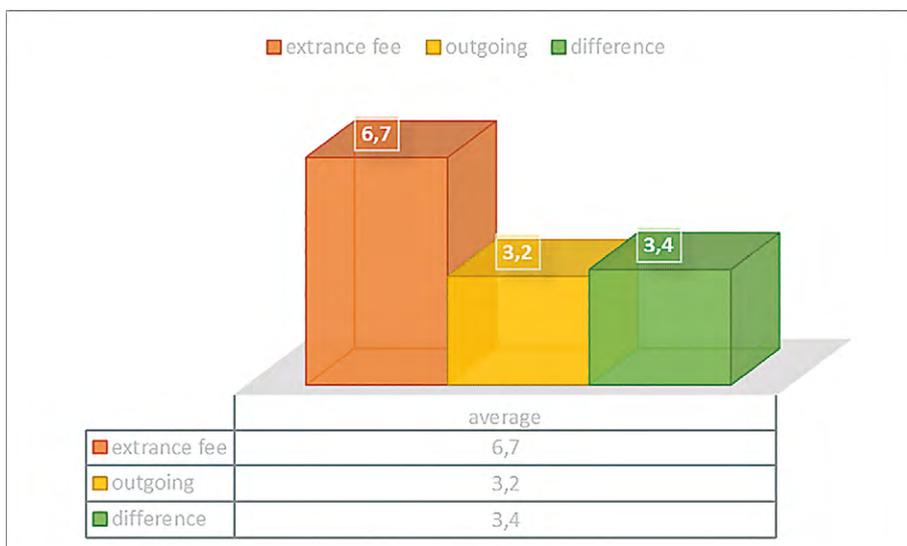
V nasledujúcej kapitole podrobne uvádzame výsledky výskumu. Z dôvodu prehľadnosti sme zvolili spracovanie do vhodných grafov a tabuliek.



Graf 1. Vstupné a výstupné hodnoty merania šírky diastázy u cvičiacich pacientov



Graf 2. Vstupné a výstupné hodnoty merania šírky diastázy u žien cvičiacich doma



Graf 3. Vstupné a výstupné hodnotenie bolesti po sekcii podľa škály bolesti VAS u cvičiacich pacientov s fyzioterapeutom

Overenie hypotéz

Na testovanie hypotéz sme použili neparametrický Wilcoxonov test.

Všetky tri hypotezy sa nám potvrdili.

Diskusia

Cisársky rez je jedným z najčastejšie vykonávaných pôrodných chirurgických zákrokov na svete a primárne počty v posledných rokoch celosvetovo narástli. Príčin tejto situácie je viacero. Najnovšie údaje ukazujú vplyv zvyšujúceho sa veku prvoroďčiek. Počet žien rodiacich po štyridiatke stúpa a na Slovensku rodia najviac matky vo veku 30 až 34 rokov. Svetoví odborníci kategorizovali dôvody stúpajúcej popularity elektívneho cisárskeho rezu. Ako hlavné dôvody uvádzajú ženy strach z pôrodu, obavy o bezpečnosť seba a dieťaťa súvisiace s vnímaním zdravotných rizík pri vaginálnom pôrode, negatívne skúsenosti z predchádzajúcich

pôrodov, spoliehanie sa ženy na vedu a chirurgiu a nie na „prírodu“ a obavy z negatívnych genitálnych zmien po vaginálnom pôrode.

Záverom možno povedať, že meranie dennej aktivity pomocou krokomera u žien po pôrode cisárskym rezom je možné a dobre tolerované. Aktivita sa zvýšila počas dvoch mesiacov po operácii a sklon tohto zotavenia úzko súvisel s klesajúcim sklonom bolesti.

Tieto údaje poskytujú nové modelovanie obnovy aktivity po operácii a jej vzťahu k bolesti a naznačujú užitočnosť hodnotenia dennej aktivity pre prognózu, čo tiež ukázalo zlepšenie funkčných aktivít žien cvičiacich pod dohľadom fyzioterapeuta v porovnaní s pacientkami ponechanými na starostlivosť podľa domácej výchovy.

Záver

Fyzioterapia je základnou zložkou popôrodnej starostlivosti. Fyzioterapia po cisárskom reze účinne znižuje bolesť spojenú s rezom, zmenšením diastázy priameho brušného svalu, znižuje výskyt stresovej inkontinencie a bolesti v oblasti panvového dna, ďalej umožňuje skorý nástup funkčných aktivít, uľahčuje chôdze a návratu k bežným aktivitám, čo potvrdili aj výsledky nášho výskumu. Ukázalo sa, že rozsah pohybových cvičení, dýchacie techniky, obnovenie posturálnej stability a starostlivosť o jazvu, znižujú bolesť a ťažkosti s funkčnými aktivitami. Ženy, ktoré podstúpili terapiu pod vedením skúseného fyzioterapeuta, mali výrazne lepšie výsledky v porovnaní so skupinou žien so štandardnou starostlivosťou a domácim cvičením, čo naznačuje, že fyzioterapia môže byť užitočná na zlepšenie zotavenia po CS. Bola hlásená znížená bolesť a skorý návrat k funkčným aktivitám po CS pomocou kombinácií terapie jaziev, kinesiotapingu, cvičení v postnatálnych vývojových polohách, ako aj hlbokého dýchania, techniky chráneného huffingu, cvičení s dôrazom na udržanie správneho držania tela.

Pacientom bolo odporučené pokračovať v cvičení a dodržiavať všetko uvedené v dlhodobom rehabilitačnom pláne. Uvedli, že sú s terapiou a výberom cvikov spokojní a plánujú v cvičení pokračovať, preto veríme, že sa im podarí diastázu ďalej ovplyvňovať, kým nedosiahnu požadovaný funkčný výsledok.

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ZADANIA FIZJOTERAPEUTY W ODDZIALE CHIRURGII CZASZKOWO-SZCZĘKOWO-TWARZOWEJ

TASKS OF A PHYSIOTHERAPIST IN THE DEPARTMENT OF CRANIO-MAXILLOFACIAL SURGERY

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Streszczenie

Wstęp: Pacjenci leczeni w oddziale chirurgii czaszkowo-szczękowo-twarzowej głównie z powodu przebytych urazów, zmian nowotworowych oraz innych patologicznych stanów, borykają się z wieloma następstwami zabiegów operacyjnych.

Celem pracy jest wskazanie potrzeb oraz omówienie możliwości prowadzenia procesu fizjoterapii wśród tej grupy pacjentów.

Część główna: Konsekwencją leczenia operacyjnego w rejonie twarzoczaszki są: obrzęk, ból, ograniczenie ruchomości biernej oraz czynnej w obrębie stawów skroniowo-żuchwowych, odcinka szyjnego oraz obręczy barkowej, blizny, niedowład lub porażenie mięśni m.in. mimicznych, języka, pod- i nadgnykowych, uszkodzenie nerwu trójdzielnego lub twarzowego. Szczególne wyzywanie stanowi rehabilitacja pacjentów onkologicznych. Opieka fizjoterapeuty w trakcie leczenia szpitalnego oraz w fazie poszpitalnej daje możliwość minimalizowania skutków zabiegów operacyjnych, szybszego powrotu pacjenta do pełnej sprawności funkcjonalnej, jak również poprawy estetyki twarzy (blizny pooperacyjne).

Wnioski: Na podstawie przeprowadzonego przeglądu literatury należy przyjąć, że rola działań fizjoterapeutycznych u pacjentów leczonych w oddziale chirurgii czaszkowo-szczękowo-twarzowej jest istotna oraz właściwie niezbędna. Wskazuje się na potrzebę prowadzenia dalszych badań potwierdzających skuteczność wybranych procedur oraz podjęcie działań zmierzających do opracowania algorytmów postępowania w oparciu o silne dowody naukowe.

Słowa kluczowe: fizjoterapia, chirurgia czaszkowo-szczękowo-twarzowa, zespół interdyscyplinarny.

Abstract

Introduction: Patients treated in the department of cranio-maxillofacial surgery, mainly due to past trauma, cancer and other pathological conditions, suffer from many consequences of surgical procedures. The purpose of this paper is to identify the needs and discuss the possibility of implementing the process of physiotherapy among this group of patients.

Core of work: Consequences of surgical treatment in the facial region include swelling, pain, restriction of passive and active mobility in the temporomandibular joints, cervical region and shoulder girdle, scarring, paresis or paralysis of muscles including facial, tongue, hypoglossal and supraglenoid, damage to the trigeminal or facial nerve. Rehabilitation of oncology patients is particularly challenging. The care of a physiotherapist during hospital treatment and in the post-hospital phase provides the opportunity to minimize the effects of surgical procedures, faster return of the patient to full functional capacity, as well as to improve facial aesthetics (post-operative scars).

Conclusions: Based on the literature review, it is concluded that the role of physiotherapeutic interventions in patients treated in the cranio-maxillofacial surgery unit is important and, in fact, essential. It is pointed out that there is a need for further research to confirm the effectiveness of selected procedures and to take steps to develop algorithms of post-treatment based on strong evidence-based.

Keywords: physiotherapy, cranio-maxillofacial surgery, interdisciplinary team

Wstęp

Nowoczesna fizjoterapia staje się coraz bardziej interdyscyplinarna, skierowana na indywidualne podejście do pacjenta oraz prowadzona w oparciu o *Evidence Based Medicine* – EBM. Obecnie fizjoterapeuci pracują z pacjentami z zakresu uroginekologii, laryngologii czy właśnie chirurgii szczękowo-twarzowej, gdzie jeszcze dziesięć lat temu w Polsce taka terapia praktycznie nie miała miejsca. Prowadzenie terapii w zespole interdyscyplinarnym zakłada wspólne ustalenie planu oraz celu terapii, natomiast każdy członek zespołu wykonuje zadania przypisane do swojej profesji. Zaznaczając, że między członkami następuje ciągła wymiana informacji. Należy podkreślić, że czynnym członkiem zespołu jest także sam pacjent. W procesie leczenia wymaga się także zaangażowania i współpracy z jego strony. Prowadzenie leczenia przez zespół interdyscyplinarny wpisuje się w model leczenia holistycznego ukierunkowanego na pacjenta jako całości w odniesieniu do sfery bio-psycho-społecznej (Mikolajewski, i wsp., 2018).

Przy Katedrze i Klinice Chirurgii Czaszkowo-Szczękowo-Twarzowej Śląskiego Uniwersytetu Medycznego w Katowicach powstał pierwszy w Polsce zespół rehabilitacyjny składający się z lekarzy stomatologów, lekarzy medycyny, fizjoterapeutów, psychologa, logopedy, studentów kierunku fizjoterapii oraz lekarsko-dentystycznego zrzeszonych w Studenckim Kole Naukowym przy Katedrze i Klinice Chirurgii Czaszkowo-Szczękowo-Twarzowej, a także we współpracy z poradnią żywieniową. Początki tych działań miały miejsce w 2017 roku. Przez

ten okres czasu w projekcie brało udział ponad czterdziestu wolontariuszy, który zajmowali się pacjentami operowanymi w oddziale. Działania zespołu rehabilitacyjnego są ogromnym wsparciem dla chorych, ponieważ ukierunkowują pacjenta na szybszy powrót do zdrowia, ale także wspierają proces trudnego i często długiego leczenia w przypadku pacjentów z zakresu onkologii już od momentu samej diagnozy. Opisany zespół rehabilitacyjny swoją misją, strukturą i założeniami przedstawia model interdyscyplinarnego leczenia pacjenta po operacji w rejonie głowy i szyi.



Rycina 1. Znak graficzny Katedry i Kliniki Chirurgii Czaszkowo – Szczękowo –Twarzowej Śląskiego Uniwersytetu Medycznego w Katowicach (źródło własne)

Rozwinięcie

W literaturze jest dostępne szeroko opisane postępowanie fizjoterapeutyczne w przypadku pacjentów ortopedycznych, neurologicznych, czy kardiologicznych. Wciąż niewiele jest rzetelnych doniesień naukowych dotyczących kompleksowego postępowania z pacjentami zakresu chirurgii szczękowo-twarzowej. Trudność ta może wynikać ze skomplikowanej budowy całego układu stomatognatycznego (US), który jest zespołem wzajemnie współdziałających elementów morfologicznych, które to z kolei tworzą funkcjonalną całość, sterowaną przez ośrodkowy układ nerwowy (Owczarek-Drabińska, Zielińska, 2022). Układ stomatognatyczny jest złożony z:

- Kości twarzoczaszki,
- Stawu skroniowo-żuchwowego (SSŻ), który działa w połączeniu ze stawami zębowo-zębowymi (zgryz) oraz zębowo-zębodołowymi (korzeń zęba a zębodół) oraz ich wzajemnej korelacji (Jancelewicz, 2010). Sam staw skroniowo-żuchwowy jest stawem parzystym, utworzonym przez powierzchnię stawową dołu żuchwowego oraz leżącego ku przodowi guzka stawowego i głowę żuchwy. Wewnątrz powierzchni stawowej znajduje się zrosnięty z nią krążek stawowy, który dzieli jamę stawową na dwa piętra: górne i dolne (Aleksandrowicz, Ciszek, 2013),
- Systemu mięśniowo-powięziowego, na który składają się przede wszystkim mięśnie żwacze, mięśnie skroniowe, jak również mięśnie skrzydłowe przyśrodkowe oraz boczne (tabela 1),
- Nerwu trójdzielonego (V nerw czaszkowy) oraz twarzowego (VII nerw czaszkowy),
- Naczyń krwionośnych i limfatycznych, błon śluzowych oraz ślinianek.

Tabela 1. Mięśnie odpowiadające za ruchy w stawach skroniowo–żuchwowych (Majewski, i wsp., 2010).

Ruch w stawie skroniowo-żuchwowym	Mięśnie biorące udział w wykonaniu ruchu
Ruch odwodzenia	<ul style="list-style-type: none"> • przednie brzuśce mięśnia dwubrzuścowego, • mięśnie skrzydłowe boczne dolne, • w niewielkim stopniu mięśnie żuchwowo–gnykowe.
Ruch przywiedzenia	<ul style="list-style-type: none"> • mięśnie żwacze, • mięśnie skroniowe, • mięśnie skrzydłowe przyśrodkowe.
Ruch boczny żuchwy	<p>Po stronie pracującej:</p> <ul style="list-style-type: none"> • tylne i środkowe włókna mięśnia skroniowego i głębokie włókna mięśnia żwacza. <p>Po stronie niepracującej</p> <ul style="list-style-type: none"> • przednie włókna mięśnia skroniowego oraz mięśnia skrzydłowego bocznego dolnego.
Ruch protruzji	<ul style="list-style-type: none"> • przednie i środkowe włókna mięśnia skroniowego, • mięśnie żwacze. • mięśnie skrzydłowe przyśrodkowe, • przednie brzuśce mięśni dwubrzuścowych i mięśni skrzydłowych bocznych dolnych.
Ruch retruzji	<ul style="list-style-type: none"> • tylne i środkowe włókna mięśnia skroniowego, • tylne brzuśce mięśni dwubrzuścowych, • w mniejszym stopniu mięśnie żuchwowo–gnykowe.

Układ stomatognatyczny jest pojęciem szerszym w stosunku do określenia “narząd żucia”, ponieważ jego funkcja nie jest ograniczona wyłącznie do samego żucia, fazy przygotowania pokarmu i fazy gardłowej aktu połykania. Do roli US należy także oddychanie, mowa werbalna i niewerbalna (wyrażanie emocji) oraz jak pokazują najnowsze doniesienia także udział w postawie ciała (Owczarek-Drabińska, Zielińska, 2022). Układ stomatognatyczny jest przede wszystkim mięśniowo i więzadłowo połączony z odcinkiem szyjnym kręgosłupa, co wskazuje, aby ten region traktować całościowo wraz całym kręgosłupem (Sofyanti, i wsp., 2020). Odnotowano także badania potwierdzające zależność między ustawieniem żuchwy a naciskiem środka ciężkości na podłoże (ang. *center of foot pressure*, COP) a nawet stabilnością chodu (Cuccia, Caradonna, 2009). Inni autorzy wskazują na poprawę parametrów stabilności u pacjentów po operacjach ortognatycznych lub po zakończonym leczeniu aparatem ortodontycznym (Ioniță, i wsp., 2013).

W oddziale chirurgii szczękowo-twarzowej operowani są pacjenci z powodu nowotworów łagodnych i złośliwych, urazu w obrębie twarzoczaszki, planowanych zabiegów ortognatycznych oraz innych stanów patologicznych (Wziątek-Kuczmik, i wsp., 2022).



Ryc. 2. Pacjentki leczone w oddziale chirurgii szczękowo–twarzowej: A stan po złamaniu oczodołu oraz kości jarzmowej w wyniku wypadku komunikacyjnego; B stan po endoprotezoplastyce stawu skroniowo–żuchwowego lewego (źródło własne).

U pacjentów przebywających jeszcze w oddziale (faza wczesna pooperacyjna) postępowanie fizjoterapeutyczne będzie miało na celu ich uruchomienie oraz wczesną pionizację poprzez wdrożenie ćwiczeń oddechowych i krążeniowych (Chiesa Estomba, i wsp., 2015). W przypadku pacjentów z obrzękami zaleca się wykonanie manualnego drenażu limfatycznego okolicy przyległej (nie w miejscu bezpośrednim) do miejsca operowanego oraz uruchomienie sąsiednich stawów poprzez ćwiczenia czynne wolne (obręcz barkowa, odcinek szyjny). Dodatkowo jako formę podtrzymującą efekt terapii zaleca się kinesiotaping w postaci aplikacji limfatycznej (baza plastra umiejscowiona w okolicy nadobojczykowej, cztery lub pięć ogonów klei się na nierozciągniętą skórę z napięciem do 15 %, tak by pokryły okolicę obrzęku) (Lietz-Kijak, i wsp., 2018). Celem usprawnienia gojenia się rany leczenie można wspomóc laseroterapią w postaci laserów biostymulacyjnych (*ang. low level laser therapy*, LLLT), których zadaniem będzie: zmniejszenie stanu zapalnego, regeneracja tkanek i zmniejszenie dolegliwości bólowych. Zaleca się stosować metodę punktową, bezkontaktową (przy niezagojonych ranach), później kontaktową. W stanie ostrym należy ustawić moc w przedziale 1–4 J/cm², w stanie przewlekłym w przedziale 6 – 12 J/cm². Z uwagi na pobudzenie procesów metabolicznych tkanki, zarówno zdrowej, jak i chorej dla bezpieczeństwa wyłącza się laseroterapię u chorych onkologicznych lub z podejrzeniem nowotworu. U pacjentów w obszarze głowy i szyi laser będzie stosowany przede wszystkim w celu poprawy gojenia się ran oraz na okolicę w późniejszym czasie na blizny, a także u pacjentów po operacjach ortognatycznych celem szybszego zdrowienia tkanki, czy wspomagająco podczas regeneracji nerwów (nerw twarzowy). Na rynku dostępne są także lasery wysokoenergetyczne (*ang. high intensity laser therapy*, HILT), gdzie dochodzi do stymulacji termicznej tkanek. Dostarczone ciepło pobudza przede wszystkim lokalne krążenie krwi, sprzyja dotlenieniu tkanki oraz resorpcji obrzęku (Urbaniak, Wiench, 2016; Kasprzak, Mańkowska, 2020).

Blizny powstające po operacjach w obrębie głowy i szyi są nie tylko defektem kosmetycznym, ale także „funkcjonalnym” z uwagi na połączenia mięśniowo-powięziowe. Według podziału Mustoe wyróżnia się: 1. bliznę prawidłową 2. bliznę nieprawidłową 3. bliznę przerostą liniową, 4. bliznę przerostą o dużej powierzchni 5. mały bliznowiec (keloid) 6. duży bliznowiec (Chochowska, i wsp., 2017). W przypadku blizn przerostowych i bliznowców najczęściej stosuje się ich chirurgiczne wycięcie. W sytuacji blizn nieprawidłowych zaleca się terapię zachowawczą w postaci fizjoterapii. Już we wczesnej fazie pooperacyjnej rekomenduje się stosowanie drenażu limfatycznego przyległej okolicy w celu odprowadzenia limfy na rzecz dostarczenia do tkanek krwi bogatej w składniki odżywcze. Po zagojeniu się rany oraz po ściągnięciu szwów stosuje się techniki w obszarze przyległym oraz bezpośrednio w miejscu samej blizny. Są to techniki delikatne, obejmujące głównie rozluźnianie mięśniowo-powięziowe (Chochowska, i wsp., 2017; Tomaszewski, i wsp., 2022). Celem wprowadzenia leku poprawiającego kondycję blizny można zastosować jonoforezę z następującymi substancjami: jodek potasu (najczęściej stosowany), chlorek sodu, hialuronidaza, heparyna, Contractubex. Należy zwrócić uwagę, że przeciwwskazaniem jest posiadanie elementów metalowych w miejscu zabiegowym. Innym zabiegiem z zakresu fizjoterapii jest fonoforeza, czyli połączenie ultradźwięków (UD) z lekiem – maść contractubex lub cepan (Galuszka, 2022). Przeciwwskazaniem do wykonania UD są m.in. okolice oczu oraz rdzenia kręgowego powyżej C3. W miejscach gdzie odległość między skórą a kością jest niewielka należy zachować szczególną ostrożność z uwagi na zjawisko odbicia fali (Kasprzak, Mańkowska, 2020).

Pacjenci po zabiegach ortognatycznych planowych lub w trybie pilnym z powodu urazu, leczeni są celem przywrócenia prawidłowych relacji w obszarze kości twarzoczaszki. W obrębie stawu skroniowo-żuchwowego są operowani głównie z powodu złamań wyrostka kłykciowego. Z trudniejszych zabiegów wykonuje się endoprotezoplastykę SSŻ w wyniku ankylozy i choroby zwyrodnieniowej. Zwyrodnienie związane z procesem starzenia głównie dotyka osoby po 50 roku życia. Drugą grupę pacjentów stanowią osoby młodsze, między 20 a 40 rokiem życia, u których zmiany zwyrodnieniowe powstały na skutek makrourazu lub sumujących się mikrourazów. Do elementów leczenia zachowawczego zalicza się fizjoterapię, farmakoterapię oraz terapię szyną zgryzową. Natomiast w momencie narastającej ankylozy oraz braku redukcji dolegliwości bólowych pacjent kierowany jest do leczenia operacyjnego (Kulesa-Mrowiecka, i wsp., 2022). W tej grupie pacjentów oprócz opisanego już wcześniej postępowania fizjoterapeutycznego w fazie szpitalnej istotne jest przywrócenie ruchomości w stawach skroniowo-żuchwowych wraz z symetrią toru żuchwy. Od 3 – 4 doby należy wdrożyć ćwiczenia izometryczne dla ruchu odwiedzenia żuchwy, a następnie dla ruchów bocznych. Opór może stanowić ręka pacjenta lub fizjoterapeuty. Następnie wdraża się ćwiczenia bierne, bierno-czynne oraz czynne wolne dla ruchu odwiedzenia, ruchów doboocznych oraz protruzji aż po ćwiczenia z oporem. Włączyć należy także procedury opracowania mięśni żucia celem przywrócenia ich prawidłowej długości a z czasem siły mięśniowej (Tyskiewicz, i wsp., 2019). Pacjenci po złamaniu w obrębie oczodołu mogą zmagać się z podwójnym widzeniem – diplopią. Zaleca się więc włączenie ćwiczeń ortoptycznych, których celem będzie pobudzenie części

mózgu odpowiedzialnej za odbiór bodźców wzrokowych oraz funkcję mięśni okoruchowych. Ćwiczenia są ordynowane od samego początku, tak by porażony lub niedowładny mięsień był stymulowany do pracy przy jednoczesowym wyciszeniu nadaktywności antagonisty (Tokarz-Sawińska, i wsp., 2015).

Pacjent onkologiczny leczony z powodu nowotworu w okolicy głowy i szyi wymaga leczenia w zespole interdyscyplinarnym już od chwili postawienia diagnozy. Podkreśla się rolę aktywności fizycznej jako formy przygotowującej do leczenia onkologicznego, która ma za zadanie utrzymać potencjał sprawnościowy pacjenta (Szpunar, Karczmarek_Borowska, 2018). Zabieg operacyjny może zostać poszerzony o resekcję węzłów chłonnych w obrębie szyi, co w postępowaniu fizjoterapeutycznym będzie wymagało wdrożenia kompleksowej terapii przeciwbrzękowej (Pyszora, 2010). W przypadku zabiegu operacyjnego z rekonstrukcją powstałych ubytków anatomicznych istotną będzie także rehabilitacja w miejscu biórczym (Walatek, i wsp., 2023). Z powodu powstałych ubytków resekcji tkanek w obrębie jamy ustnej część pacjentów będzie wymagać czasowej przezskórnej gastrostomii endoskopowej – PEG (Białas, Biedka, 2016). Ponadto pacjent może być poddany radioterapii lub chemioterapii, co rodzi pewne ograniczenia co do prowadzenia fizjoterapii.

Wnioski

W opinii autorów należy przyjąć, że rola działań fizjoterapeutycznych u pacjentów leczonych w oddziale chirurgii szczękowo-twarzowej jest istotna oraz właściwie niezbędna. Natomiast w Polsce zakres tej tematyki nie jest zawarty w standardzie kształcenia na kierunku fizjoterapia (Rozporządzenie Ministra Nauki i Szkolnictwa, 2019). Stąd stosunkowo niewielka liczba fizjoterapeutów zajmuje się usprawnianiem tej grupy pacjentów. Na podstawie doświadczeń zespołu rehabilitacyjnego pracującego przy Katedrze i Klinice Chirurgii Czaszkowo-Szczękowo-Twarzowej Śląskiego Uniwersytetu Medycznego w Katowicach został opracowany algorytm interdyscyplinarnego leczenia schorzeń części twarzowej czaszki w tym postępowania fizjoterapeutycznego, który w dalszym ciągu jest optymalizowany (Rymarczyk, i wsp., 2023). Wskazuje się na potrzebę prowadzenia dalszych badań potwierdzających skuteczność wybranych procedur oraz podjęcie działań zmierzających do opracowania wytycznych prowadzenia fizjoterapii w oparciu o silne dowody naukowe.

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Topics 3

Medicine

Laboratory medicine
and Telemedicine

NEUROENDOCRINE TUMOURS, CARCINOIDS AND LABORATORY DIAGNOSIS

NEUROENDOKRINNÉ TUMORY, KARCINOIDY A ICH LABORATÓRNA DIAGNOSTIKA

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Abstract

Introduction: Carcinoids belong to the group of neuroendocrine tumors (NETs) with broad biological and clinical characteristics.

Research objectives: The aim of this review is to give an overview of carcinoid tumours, their incidence, localization, distribution, clinical signs and mainly to point out the possibilities of laboratory diagnosis of these tumours.

Core of work: The incidence of these tumours has been rising significantly in recent years. In terms of their hormonal activity, they form a very diverse and heterogeneous group. They are based on neuroendocrine enterochromaffin cells (ECs), which are found in various anatomical parts of the body, but most frequently in the gastrointestinal tract, including the pancreas, in the lungs, and less frequently in the ovaries or thyroid gland. Clinical manifestations depend on the type of the spectrum of hormonally active substances. The diagnosis of carcinoids and NETs is based on the use of imaging methods according to the tumour location, also on histological and immunohistological findings and, among laboratory investigations, on the determination mainly of serotonin, neuron-specific enolase (NSE), gastrin, chromogranin A (CgA) in serum and 5-hydroxyindoleacetic acid (5-HIAA) in urine.

Conclusion: Carcinoid and neuroendocrine tumours need to be kept in mind in daily clinical practice, as their incidence in the last 5 years has exceeded even the combined incidence of patients with oesophageal, gastric and pancreatic cancer. Early and correctly diagnosed patients with carcinoid tumours have a real chance of complete cure. Since carcinoids are among the endocrinally active tumors and produce a diverse spectrum of hormonally active substances, laboratory diagnosis of the parameters involved plays a very important role.

Keywords: carcinoid, neuroendocrine tumors, serotonin, 5-HIAA

Abstrakt

Úvod: Karcinoidy patria do skupiny neuroendokrinných tumorov (NET) so širokou biologickou a klinickou charakteristikou.

Ciele práce: Cieľom tohto prehľadu je podať prehľad o karcinoidoch, ich incidencii, lokalizácii, rozdelení, klinických príznakoch a hlavne poukázať na možnosti laboratórnej diagnostiky daných nádorov.

Jadro práce: Incidencia týchto nádorov v posledných rokoch výrazne stúpa. Z hľadiska svojej hormonálnej aktivity tvoria veľmi pestrú a heterogénnu skupinu. Ich základom sú neuroendokrinné enterochromafinné bunky (EC), ktoré sa vyskytujú v rôznych anatomických častiach tela, najčastejšie však v tráviacom trakte, vrátane pankreasu, v pľúcach, menej často v ováriach či štítnej žľaze. Klinické prejavy sú závislé na typu spektra hormonálne aktívnych substancií. Diagnóza karcinoidov a NETov je založená na použití zobrazovacích metód podľa lokalizácie nádoru, tiež na histologickom a imunohistologickom náleze a, z laboratórnych vyšetrení, na stanovení hlavne serotonínu, neurón špecifickej enolázy (NSE), gastrínu, chromogranínu A (CgA) v sére a kyseliny 5-hydroxyindolactovej (5-HIAA) v moči.

Záver: Na karcinoidy a neuroendokrinné nádory treba myslieť pri každodennej klinickej praxi, nakoľko ich výskyt v ostatných 5 rokoch prekročil aj spoločný výskyt pacientov s karcinómom pažeráka, žalúdka a pankreasu. Včas a správne diagnostikovaní pacienti s karcinoidmi majú reálnu šancu na úplne vyliečenie. Vzhľadom na to, že karcinoidy patria medzi endokrinné aktívne nádory a produkujú rôzne spektrum hormonálne aktívnych substancií, hrá veľmi dôležitú úlohu laboratórna diagnostika daných parametrov.

Kľúčové slová: karcinoid, neuroendokrinné tumory, serotonín, 5-HIAA

Introduction

Carcinoid tumours represent a peculiar type of tumours that differ in structure, histology and biological behaviour from the common epithelial tumours of the gastrointestinal tract. They are among the most frequently occurring tumours of the neuroendocrine tumour (NET) group (Schnirer, et al., 2003).

History

The first mention of carcinoids comes from Langerhans in 1867, but carcinoids as neoplasias were first described by Lubarsch in 1888, who mentions them in Virchows Archives, where he describes the autopsy findings of a patient with a multiple tumour of the ileum. The term carcinoid was first given to them in 1907 by Oberndorfer. He did so to express their relative benignity compared with gastrointestinal adenocarcinomas. Carcinoids were initially regarded as benign tumours, but it was not until 1949 that Pearson and Fitzgerald reported a study involving 140 patients, including several with metastatic carcinoids, demonstrating the possible malignant behaviour of these tumours (Louthan, 2006).

Epidemiology

Carcinoid tumours occur at a rate of about 1 – 2 cases per 100 000 inhabitants per year. They account for 0.49 % of all malignancies. They predominantly occur in women, with

a peak incidence between 40 and 60 years of age. In children, carcinoids are rarely found, and mostly in the appendix (Barkmanová, 2009).

Since tumours grow from neuroendocrine cells, the frequency of their occurrence correlates with the density of these cells. Approximately 60 % of carcinoids are found in the largest endocrine organ in humans, the intestine. More than 25 % of carcinoid tumours grow in the bronchopulmonary tract (Cempírková, et al., 2005).

Most carcinoids are located in the small intestine. Small bowel tumours of any kind are rare and account for only 1 % of all tumours of the gastrointestinal tract. In this group, however, carcinoids have an important position with their 50 % representation among malignancies of the small intestine. The incidence of carcinoids by localization is most common in the small intestine, appendix, rectum and lung (Table 1). There are also very unusual and extremely rare localizations of the primary occurrence of carcinoids – gallbladder and bile ducts, ovaries, testicles, bladder, prostate, mammary gland, thymus (Petruželka, 2003).

Table 1. Incidence of carcinoids by location and percentage of occurrence.

localization of carcinoids	incidence (%)
stomach	2 – 4
pancreas	2 – 3
small intestine	39
colon	5 – 7
appendix	26
rectum	15
liver	> 1
lungs	10

(Source: Petruželka, 2003)

Distribution of carcinoids

Until recently, the classification scheme of carcinoid tumours according to the classification of Williams and Sandler in 1963 was used, which was based on the division of tumours according to different sections of the embryonic intestine and showed the relationship between the morphology and topography of their occurrence (Williams, et al., 1963). This division seems to be obsolete today with current knowledge, but it is simple, easy to understand and is therefore still used in the literature today with the knowledge of some inaccuracy. This classification divides carcinoids into three groups – carcinoids arising from the anterior segment of the embryonic bowel (foregut carcinoids), carcinoids arising from the middle segment (midgut carcinoids) and carcinoids arising from the posterior segment of the embryonic bowel (hindgut carcinoids) (Barkmanová, 2009) (Table 2).

Table 2. Localization of carcinoids (Source: Louthan, 2005)

	Localization	Percentage of representation
Foregut carcinoids	Respiratory tract, thymus, stomach, proximal duodenum, pancreas	10 – 15 %
Midgut carcinoids	Ileum, jejunum, appendix, proximal part of colon	50 – 70 %
Hindgut carcinoids	Distal part of the colon and rectum	15 – 20 %

Clinical manifestations of carcinoids

Clinical manifestations depend on the localization of the primary tumor, the extent of the disease and the spectrum of hormonal production by the tumor. Carcinoids are usually small in size, tend to be asymptomatic for a long time, may manifest with general oncological symptoms or manifest with carcinoid syndrome in endocrine functional tumours (Bax, et al., 1996). In lung tumors, the clinical manifestations are more likely to be cough, dyspnea, hemoptysis, or chest pain resulting from tumor localization. Carcinoids of the stomach and intestine may present with haemorrhage, either occult with progressive anaemia or manifest as haematemesis or melena. Tumours of the intestine may lead to obstruction or enterorrhagia. Tumours in the duodenum or pancreas may cause obstructive icterus (Barkmanová, 2009).

Carcinoid syndrome

Carcinoid syndrome may develop in 10 to 18 % of patients with carcinoid tumours. The most common manifestations are flush, diarrhea, cardiac damage, bronchial asthma, hypotension or hypertension. Clinical manifestations of the syndrome occur in the presence of liver metastases or when the tumour is located outside the gastrointestinal tract and the hormonal substances released are washed directly into the circulation – for example, in tumours located in the ovary, testes or lungs (Kiňová, et al., 2014). The main manifestations of the carcinoid syndrome include skin flush. It occurs in 25 – 73 % of cases of metastatic carcinoma. In its typical form, it is manifested by the sudden appearance of red or reddish-purple erythema of the upper part of the body, mainly on the face and neck. It is perceived by the patient as a sensation of heat and itching. Often accompanied by diarrhoea, palpitations, lacrimation, swelling of the face or conjunctivae (Robertson, et al., 2006).

Carcinoid heart disease

It occurs in 10–50 % of cases of carcinoid syndrome. The pathogenesis of cardiac involvement is not yet fully understood, but the secretion of serotonin by tumour cells leading to endocardial damage plays a role. An important factor is not only the absolute amount of serotonin but also the duration of exposure (Talafa, et al., 2012). Cardiac involvement is characterized by fibrosis of the endocardium, in the cavities of the right heart, and often causes retraction and fixation of the tips of the tricuspid and pulmonic valves. The three most common valvular lesions are formed by tricuspid insufficiency, pulmonic insufficiency

and tricuspid stenosis. Cardiac symptoms appear in advanced stages of the disease and the changes are irreversible. Up to half of patients with carcinoid syndrome die of right-sided heart failure (Kiňová, et al., 2014).

Diagnosis of Carcinoids

The speed and success of the diagnosis of carcinoid depends on the presence of local symptoms of the tumor or its hormonal production. This is also the reason why non-functioning tumours are diagnosed significantly later (Öberg, 1998).

Laboratory diagnostics

Carcinoid represents a difficult and complex problem in terms of diagnosis. This basically stems from its biological characteristics. In contrast to classically hormonally active tumours arising from the diffuse endocrine system, where the clinical predominance is due to hypersecretion of one particular hormone, according to which the tumour is designated (gastrinoma, insulinoma, somatostatinoma, glucagonoma, vipoma, etc.), the situation is different in carcinoid tumours. The classical carcinoid produces mainly serotonin, a number of so-called gastrointestinal hormones, e.g. gastrin, somatostatin, vasoactive intestinal peptide (VIP), and also peptide and protein substances such as ACTH (Petruželka, 2003).

The hormonally active substances that are most commonly determined in the diagnosis of carcinoid in our laboratory include: serotonin, NSE (neuron-specific enolase), gastrin, chromogranin A (CgA) in serum and 5-HIAA (5-hydroxyindoleacetic acid) in urine.

Serotonin

Serotonin (5-hydroxytryptamine, 5-HT) is a biologically active substance found in platelets, cells of the gastrointestinal tract and, to a lesser extent, in the CNS. It is formed by synthesis from the amino acid L-tryptophan (Ichiyama, et al., 1970) (Figure 1).

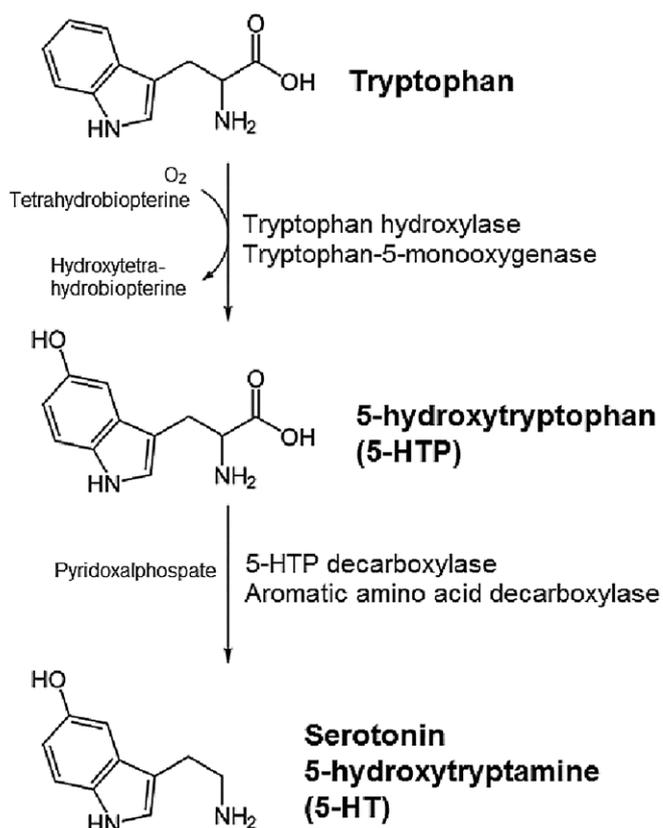


Figure 1. Biosynthesis of serotonin (5-HT). Tryptophan is converted into 5-hydroxytrypt-amine (5-HTP) by tryptophan hydroxylase (TPH) and 5-HTP is converted to 5-HT by 5-HTP decarboxylase (also called aromatic amino acid decarboxylase or AADC). (Source: Roberts, et al., 2013)

Serotonin in serum is determined in our department by HPLC method. HPLC (High Performance Liquid Chromatography) – one of the most commonly used separation methods. It is distinguished by high efficiency and good repeatability. This method is particularly suitable for the separation of organic less volatile liquid and solid substances that are soluble in water, organic solvents or dilute acids. HPLC is based on the separation of analytes based on their distribution between a stationary and a mobile phase, which is always liquid. The stationary phase is embedded in the chromatographic column. Many types of interactions occur during separation. Interactions of the analytes with the mobile phase, interactions of the mobile phase with the stationary phase, and absorption of the analytes onto the stationary phase are all applicable. The measured quantity is fluorescence, absorbance, refractive index or electrical conductivity (Karger, 1997). The output of the detector is a graphical record of the dependence of the detector response on the retention time, i.e. a chromatogram on which the area or height of the peak is evaluated (Karger, et al., 1971) (Figure 2). Quantitative analysis is performed on the principle of reading the result from a calibration curve (Karger, 1997).

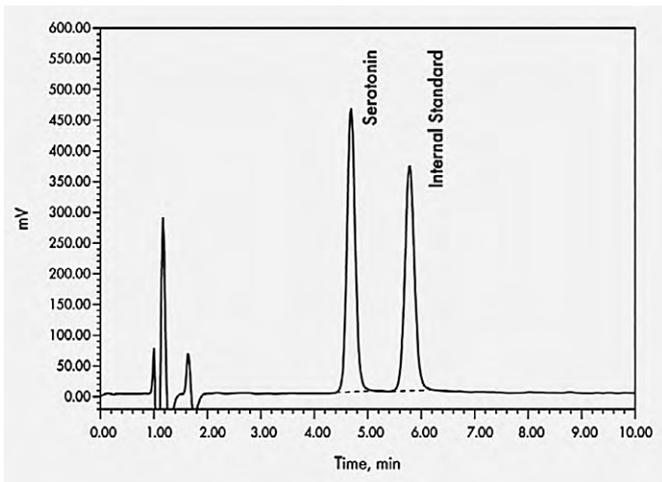


Figure 2. HPLC chromatogram of serotonin (Source: Karger, et al., 1971)

Blood collection should be performed in a standard biochemical tube with a separation gel. The reference values for both genders are 667–1097 nmol/l. A disadvantage of the test is the fluctuation of serum serotonin levels during the day due to the short biological half-life. Therefore, the basic test in the laboratory diagnosis of carcinoid is the determination of the daily urinary excretion of its major metabolite 5-hydroxyindoleacetic acid over a 24-hour period (Louthan, 2006).

5-Hydroxyindoleacetic acid (5-HIAA)

When carcinoid is suspected, urine 5-hydroxyindoleacetic acid (5-HIAA) testing is one of the first laboratory methods used. 5-HIAA is an important metabolite of serotonin, is formed by oxidative deamination by the enzyme monoamine oxidase and is excreted in the urine (Kiňová, et al., 2001) (Figure 3).

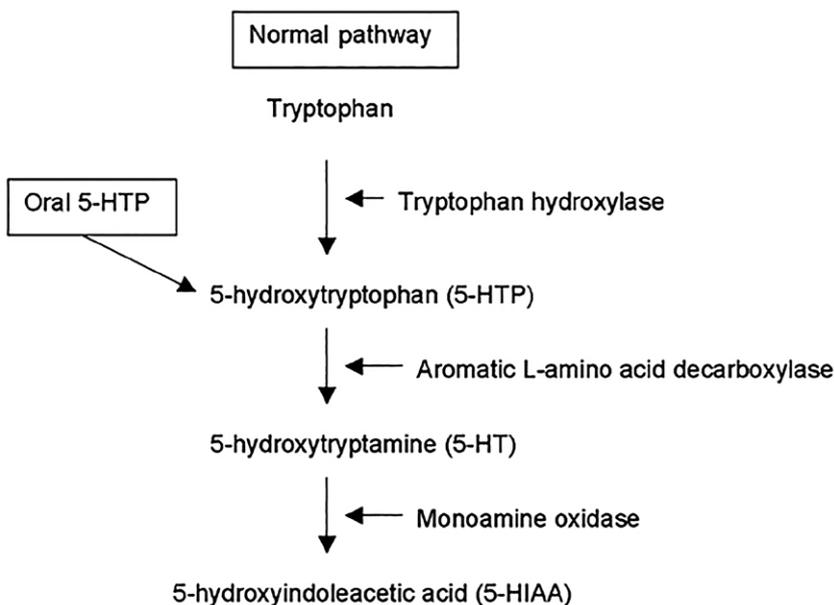


Figure 3. Metabolism of tryptophan to 5-HIAA. Normally, conversion of tryptophan to 5-HIAA occurs through the intermediates of 5-HTP and 5-HT (serotonin). Oral ingestion of 5-HTP can enter the metabolic pathway for conversion by aromatic L-amino acid decarboxylase, with eventual production of 5-HIAA (Source: Joy, et al., 2008).

Urinary 5-HIAA testing under urine collection conditions is virtually 100 % specific (Kiňová, 2011). Urine is collected for 24 hours in a dark container with the addition of 10 ml of 25 % HCl. 5-HIAA in urine is determined by the HPLC method using an HPLC analyser (Figure 4).

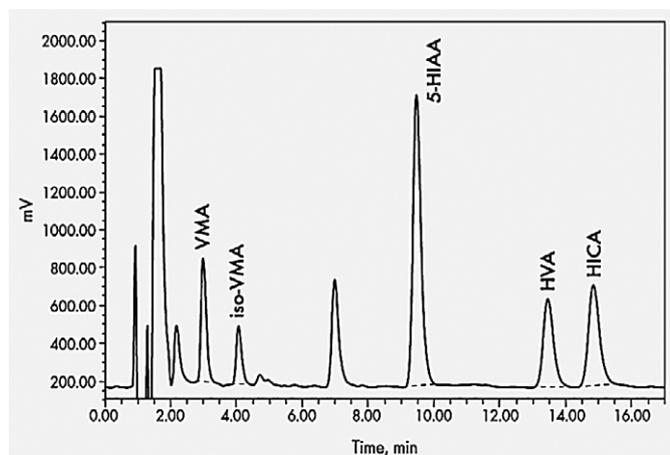


Figure 4. HPLC chromatogram of 5-HIAA in urine
(Source: <https://chromsystems.com/en/vma-hva-5-hiaa-in-urine-hplc-1000-b.html>)

The reference values are $< 30 \mu\text{mol}/24\text{h}$ in both genders. Prior to urinary 5-HIAA testing, a 2 – 3 day diet should be followed with exclusion of foods that falsely increase serotonin and consequently urinary 5-HIAA levels. Foods higher in serotonin include bananas, avocados, cocoa, coffee, cheese with mold, melon, plums, tomatoes, pecans, walnuts. In addition to serotonin-containing foods, interfering factors include various medications and diseases that significantly affect serotonin levels and urinary 5-HIAA waste. Diseases and medications that increase or decrease 5-HIAA levels include, for example, cystic fibrosis, celiac disease, depression, phenylketonuria, salicylates, L-DOPA, antidepressants, ACTH, ethyl alcohol, and alkaloids. Indication for a comprehensive examination of the patient should be an increase in waste 5-HIAA by 100 per cent or more (with dietary compliance) (Kiňová, 2011).

In cases of significant increases in urinary 5-HIAA levels, there is a positive correlation between tumor weight and urinary 5-HIAA levels. The examination also serves to monitor the course and effectiveness of treatment, possible postoperative recurrence or progression after previous successful response to conservative therapy. The 24-hour urine collection for 5-HIAA examination is one of the most common biochemical tests in carcinoid tumors to date (Blažíček, et al., 2014).

At our department, in addition to specific markers for the diagnosis of carcinoids such as serotonin and 5-HIAA, we also determine non-specific tumour markers. These markers are very likely to indicate the presence of NETs, but do not themselves provide further information about the characteristics of the NET under investigation. Non-specific markers include NSE (neuron specific enolase), chromogranin A, gastrin and calcitonin.

Neuron specific enolase

Neuron specific enolase (NSE) is one of the 5 isoenzymes of the glycolytic enzyme enolase (2-phospho-D-glycerate hydrolase). It occurs in different dimeric isoforms involving

3 immunologically distinct subunits α , β , γ . The α subunit of enolase is found in various mammalian tissue types, whereas the β subunit is found primarily in the heart and striated muscle. The $\alpha\gamma$ and $\gamma\gamma$ isoforms of enolase, which are referred to as neuron-specific enolase (NSE) or also γ enolase, are found in high concentrations in neurons and neuroendocrine cells or in tumours arising from them (Isgró, et al., 2015).

NSE values are determined in our laboratory by the ECLIA method.

ECLIA (Electro Chemi Luminescence Immunoassay) – is a homogeneous method in which a chemiluminescence reaction and subsequent emission of light from a ruthenium compound is initiated electrically by exposing the sample solution to an electrical voltage. Tripropylamine (TPA), which is a component of the measurement buffer, causes electron transfer to the ruthenium (Zanut, et al., 2020).

The two electrochemically active components, the ruthenium-labelled antibody and the tripropylamine (TPA), enter into reactions and as a consequence light emission occurs. The ruthenium-tris(bipyridyl) $^{2+}$ ion in the excited state transitions to its original stable state. It enters the excited state by reduction of $\text{Ru}(\text{bpy})_3^{3+}$ to $\text{Ru}(\text{bpy})_3^{2+}$. The reduction is mediated by TPA. At the electrode surface, TPA is oxidized to TPA^+ – a positively charged radical that spontaneously releases a proton, thereby becoming unstable. In the next step, this radical transfers its electron to the $\text{Ru}(\text{bpy})_3^{3+}$ complex, which thus transitions to the excited state $\text{Ru}(\text{bpy})_3^{2+}$. The excited state is lost by light emission detectable at 620 nm. Both reactions proceed simultaneously. This effect is achieved by applying a voltage to the immunochemical complex, which is attracted by binding to a magnetic particle to the electrode surface in the measuring cell of the system (Lee, 1997) (Figure 5).

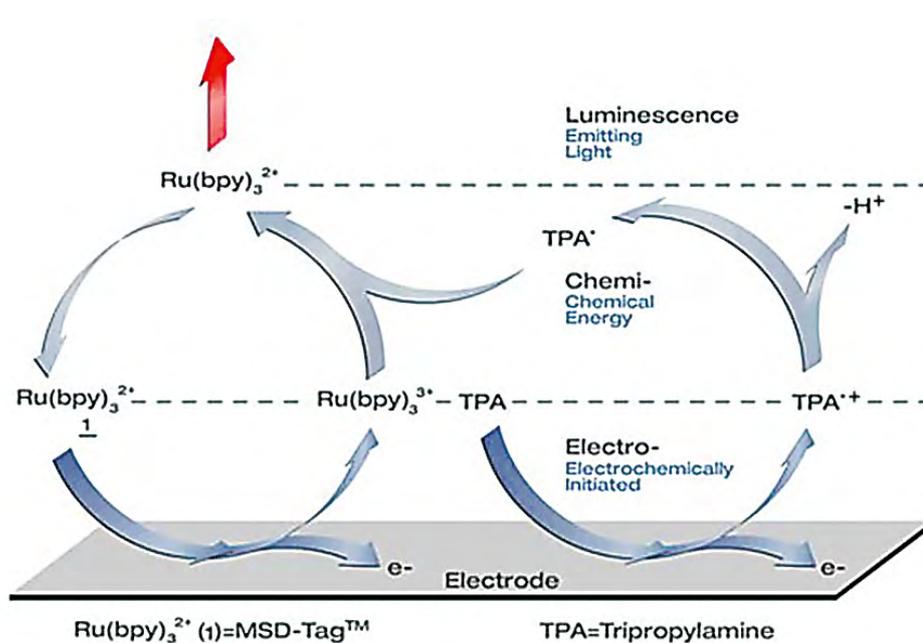


Figure 5. The principle of Electrochemiluminescence.

(Source: <https://www.creative-biolabs.com/drug-discovery/diagnostics/eclia-based-kits-development.htm>).

In the case of NSE determination by the diagnostic kit, it is a sandwich principle, which takes place in three steps: (Figure 6)

1. NSE in the sample (20 µl) + biotin-labeled NSE monoclonal antibody + ruthenium complex-labeled NSE monoclonal antibody react to form a sandwich complex.
2. Upon addition of streptavidin-coated microparticles, the complex binds to the solid phase via the interaction between biotin and streptavidin.
3. The reaction mixture is sucked into a measuring cell where the microparticles with bound complexes are captured by a magnet. The unbound components are removed by solution. The voltage at the working electrode induces chemiluminescence photon emission, which is measured by a photomultiplier tube (Chinen, et al., 2015).

Testprinzip: Einstufiges Sandwichprinzip (Testdauer: 18 Min.)



Figure 6. The sandwich principle of NSE determination (Source: Chinen, et al., 2015)

The collection should be done in a standard biochemical gel separation tube. The reference values for both genders are 0 – 16,3 µg/l. Interferences affecting the NSE value include serum haemolysis.

NSE is used as an immunohistochemical and serum marker and may also serve as a predictor of response to treatment (Louthan 2006). No relationship has been demonstrated between tumor extent and the degree of elevated NSE levels, in contrast to serum chromogranin A (CgA), where such a relationship has been demonstrated. These differences of CgA and NSE are explained by different intracellular localization. CgA is localized in neurosecretory granules and NSE is a cytoplasmic enzyme. Therefore, elevation of NSE occurs when the integrity of the cell membrane is compromised; elevated NSE levels should therefore be expected more in the more aggressive, rapidly growing forms of NETs, which are often subject to cell breakdown and necrosis. False high values, which tend to occur in renal insufficiency, pulmonary and hepatic diseases, should also be kept in mind when determining the patient (Kasprzak, et al., 2007).

Chromogranin A

Chromogranin A (CgA) is an acidic protein composed of 439 amino acids. It is produced and secreted by endocrine and neuroendocrine cells along with peptide hormones and neurotransmitters, primarily serotonin and glucagons. CgA is a component of many intracellular and extracellular processes. It is localized in dense secretory granules storing peptide hormones and in vesicles containing catecholamines. It is found in neurons, in the CNS and in peripheral sympathetic neurons. Other organs rich in CgA are e.g. parathyroid glands, lungs, exocrine cells of the pancreas, insulin- and glucagon-producing cells. The main source of CgA secretion is the adrenal medulla (Nehar, et al., 2004).

CgA levels are determined in our laboratory by ELISA.

ELISA (Enzyme Linked Immunosorbent Assay) is an analytical method used for the quantitative determination of various antigens. This method has a number of variants. They are all based on a highly specific interaction between an antigen and an antibody, one of which is covalently linked to an enzyme (most commonly peroxidase or alkaline phosphatase). The enzyme catalyses the chemical conversion of the substrate, which is added to the reaction mixture, into a product that is coloured. It is determined spectrophotometrically or by fluorescence. The concentration of the product is proportional to the concentration of antigen or antibody in the sample. Another common feature of ELISA methods is the anchoring of the antigen or antibody to an insoluble carrier (often the surface of a reaction vessel or microtiter plate), which simplifies the separation of immunochemically bound molecules (Engvall, 2010; Shah, et al., 2016; Konstantinou, 2017).

In the case of CgA determination, it is a sandwich principle that proceeds in the following steps: Test standards, controls and patient samples are added directly into the wells of the microplate, which is coated with the polyclonal antibody chromogranin A. After the first incubation, the antibody on the wall of the microtiter well captures the human chromogranin A in the sample and unbound proteins are washed away. A horseradish peroxidase (HRP)-labelled monoclonal anti-human chromogranin A antibody is then added to each microtiter well to form a 'monoclonal antibody-human chromogranin A-polyclonal antibody' sandwich. The unbound monoclonal antibody is removed in a subsequent washing step. The immunocomplex is incubated and the enzymatic activity is then measured spectrophotometrically. The enzymatic activity of the immunocomplex bound to chromogranin A on the wall of the microtiter well is directly proportional to the amount of chromogranin A in the sample. The concentration of human chromogranin A in the test samples is determined directly from a standard curve generated from the absorbance against the corresponding concentration of human chromogranin A (Tabatabaei, et al., 2022; Lequin, 2005) (Figure 7).

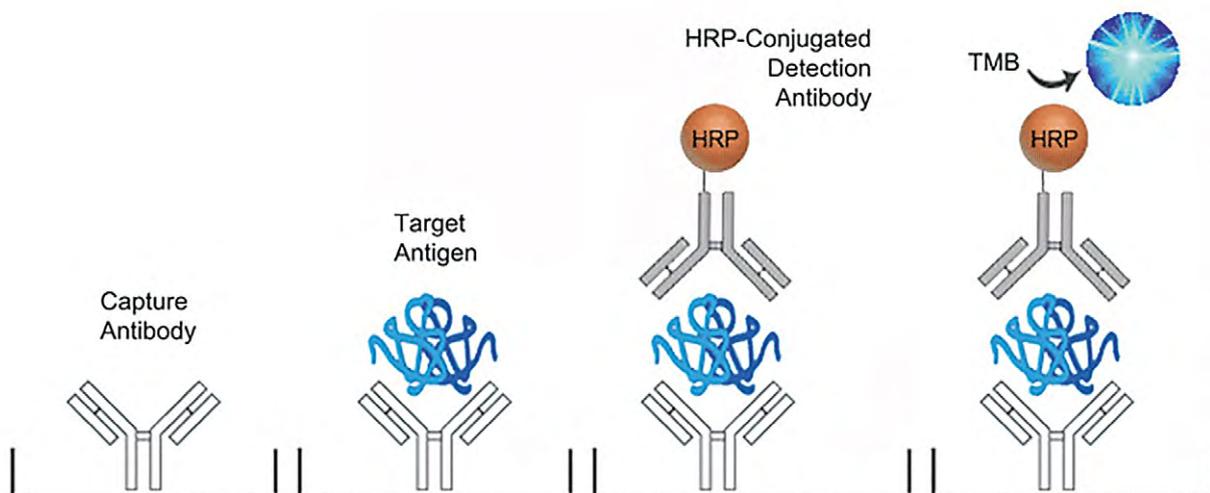


Figure 7. The sandwich principle of CgA determination (Source: Lin, 2015)

The collection should be performed in a standard biochemical tube with separation gel. The reference values for both genders are 0 – 100 µg/l.

Determination of CgA levels as a neuroendocrine serum marker is used in diagnosis, in the evaluation of disease progression and in the response to treatment (Kiňová, 2013). In most tumours that produce CgA, levels of this marker are well above normal and the occurrence of false-positive and false-negative results is very rare. The sensitivity and specificity of CgA in neuroendocrine tumours are 70–95 % and 70–80 %, respectively. The test is most accurate in tumours with intense secretory activity, especially metastatic midgut carcinoids and pancreatic tumours (Louthan, 2006).

There is a direct correlation between total tumor weight and plasma CgA level. There is also a correlation to histological type, with carcinoid expressing the highest levels, and these are elevated a hundredfold over the norm (Louthan, 2006).

When diagnosing and determining the CgA level, one should be aware of interfering factors causing a false elevation of the CgA level. A slight increase has been found in postmenopausal women, mainly in the context of an increase in gonadotropins. Higher CgA levels also tend to occur in healthy pregnant women where CgA is produced by the placenta. A rapid rise in CgA levels is also caused by treatment with low doses of Omeprazole (Nehar, et al., 2004). False positive or falsely elevated CgA levels also occur in patients with inflammatory bowel disease, atrophic gastritis, hepatic and renal insufficiency (Kiňová, 2011).

Conclusion

Carcinoid tumours belong to the group of neuroendocrine tumours (NETs) with a broad biological and clinical characteristic and a relatively low incidence. The highest incidence of carcinoids is in the gastrointestinal tract, mainly in the small intestine, rectum and stomach. The clinical manifestations of the tumour depend on its primary localisation and endocrine activity. The most common manifestations include cough, dyspnoea, dyspepsia, abdominal pain, obstipation, diarrhoea. Since carcinoids are among the endocrinally active tumors and produce a diverse spectrum of hormonally active substances, laboratory diagnosis of the given parameters plays a very important role. The most common hormonally active substances whose values are determined in our department include serotonin, NSE, CgA in serum and 5-HIAA in urine. The specificity and sensitivity of these markers is very high, almost 100 % in some types of NETs and carcinoids, and therefore very necessary for early diagnosis of these tumors.

Conflict of Interest

The autor declares that there is no conflict of interest in connection with the published article.

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LABORATORY MEDICINE AND VITAMIN D DIAGNOSTICS

LABORATÓRNA MEDICÍNA A DIAGNOSTIKA VITAMÍNU D

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Abstract

Introduction: In recent years, vitamin D has been making its way into to the forefront of interest of both the professional and lay public. New studies and findings are gradually emerging on its optimal levels, its effects, its worldwide deficiency in the population and, last but not least, its determination.

Research objectives: The aim of this review is to summarize the current knowledge about vitamin D, its forms, its main sources, its important functions in the human body and, most importantly, to point out the possibilities of laboratory diagnosis of this vitamin.

Core of work: Vitamin D is a fat-soluble steroid hormone precursor with a pronounced antirachitic effect. In addition to its important role in calcium and phosphorus homeostasis, the interest of clinicians in recent years has focused on its noncalcemic effects. The main and physiological source of vitamin D for the human body is the production of the vitamin in the skin, but we also obtain small amounts from food. In recent years, the worldwide problem of low levels of this vitamin has been highlighted. In European countries, it has been reported that up to 60 % of the population is vitamin D deficient.

Conclusion: The worldwide increase in hypovitaminosis D has resulted in a surge of interest in its laboratory determination. Intensive clinical research on vitamin D in recent years has highlighted the worldwide problem of low vitamin D levels in the population, which are significantly associated with the incidence of many diseases. Measurement of 25-hydroxyvitamin D [25-(OH)D₃] has been shown to be an optimal indicator of vitamin D saturation status in the body. Currently, 2 types of methods are mainly used to determine 25-hydroxyvitamin D: immunochemical (radioimmunoassay, chemiluminescent immunoassay, electrochemiluminescent immunoassay, enzyme immunoassay) and separation (high-performance liquid chromatography, liquid chromatography-tandem mass spectrometry).

Keywords: vitamin D, laboratory diagnostics, immunoassay, HPLC, ECLIA

Abstrakt

Úvod: V posledných rokoch sa vitamín D dostáva do vysokého záujmu ako odbornej tak aj laickej verejnosti. Pribúdajú postupne nové štúdie a poznatky, ktoré sa zaoberajú jeho optimálnymi hodnotami, účinkami, jeho celosvetovým nedostatkom v populácii a v neposlednej rade jeho stanovením.

Ciele práce: Cieľom tohto prehľadu je zhrnúť súčasné poznatky o vitamíne D, jeho formách, hlavných zdrojoch, jeho dôležitých funkciách v ľudskom organizme a hlavne poukázať na možnosti laboratórnej diagnostiky tohto vitamínu.

Jadro práce: Vitamín D je v tuku rozpustný prekurzor steroidného hormónu s výrazným antirachitickým účinkom. Okrem jeho dôležitej úlohy v homeostáze vápnika a fosforu sa v ostatných rokoch záujem klinikov sústreďuje aj na jeho nonkalciemické účinky. Hlavným a fyziologickým zdrojom vitamínu D pre ľudský organizmus je tvorba vitamínu v koži, no v malom množstve ho získavame aj z potravy. V posledných rokoch sa poukazuje na celosvetový problém nízkych hladín tohto vitamínu. V európskych krajinách sa uvádza, že až 60 % populácie je nedostatočne zásobených vitamínom D.

Záver: Celosvetový nárast hypovitaminózy D má za následok prudký vzostup záujmu o jeho laboratórne stanovenie. Intenzívny klinický výskum vitamínu D v posledných rokoch poukázal na celosvetový problém nízkych hladín vitamínu D v populácii, ktoré sú významne spojené s incidenciou mnohých ochorení. Ukázalo sa, že meranie 25-hydroxyvitamínu D [25-(OH) D3] je optimálny ukazovateľ stavu saturácie vitamínu D v organizme. Na stanovenie 25-hydroxyvitamínu D sa v súčasnosti využívajú najmä 2 typy metód: imunochemické (rádioimunoanalýza, chemiluminiscenčná imunoanalýza, elektro-chemiluminiscenčná imunoanalýza, enzýmová imunoanalýza) a separačné (vysokoúčinná kvapalinová chromatografia, kvapalinová chromatografia – tandemová hmotnostná spektrometria).

Kľúčové slová: vitamín D, laboratórna diagnostika, imunoanalýza, HPLC, ECLIA

Introduction

Vitamin D (also referred to as calciferol) is one of the most important vitamins for the human body. Historically, it has been classified as a fat-soluble vitamin, but as early as the 1970 s, research revealed that it is a very important and phylogenetically very old hormone precursor whose main physiological function is the regulation of calcium and phosphorus metabolism (Holick, 1994; Mohr, 2009).

There are two main forms, namely vitamin D2 (ergocalciferol) and vitamin D3 (cholecalciferol), which differ from each other in the structure of the side chain and are classified as secosterols (Chiellini, et al., 2011).

The main sources of vitamin D are sunlight, diet and supplementation. Common diets are generally low in vitamin D, with the exception of higher-fat fish (e.g., such as salmon, mackerel, cod, sardines, cod liver), shrimp, oysters, egg yolk, butter, milk, dairy products, and shiitake mushrooms. This is also why some foods are fortified with vitamin D, e.g. artificial milk formula, juices, margarines, milk or dairy products (Medical Advisory Secretariat, 2010) (Table 1).

Table 1. Vitamin D content in selected foods (Source: Račanská, 2014)

Food	Vitamin D (I. U./100 g)	Food	Vitamin D (I. U./100 g)
Cow's milk	0,3 – 54	Cod liver	10 000
Breast milk	0 – 10	Salmon	220 – 440
Gouda cheese	40	Sardines	1 500
Emmental cheese	120	Beef liver	8 – 40
White yoghurt 3,5 %	2,4	Poultry liver	50 – 65
Eggs	28	Spinach	0,2

Synthesis and activation of vitamin D

80 to 90 % of vitamin D is produced in the human body as a result of exposure of the skin to ultraviolet B (UVB) radiation. This photochemical process occurs in the plasma membrane of skin cells. UVB radiation in the range 280-320 nm produces previtamin D3 in the skin by a non-enzymatic photolytic reaction from provitamin 7-dehydrocholesterol (a cholesterol derivative), which is then converted relatively slowly at body temperature to vitamin D3 (cholecalciferol). Vitamin D3 is converted on further exposure to the biologically inert metabolites suprasterol 1 and 2 (Holick, 2004). In this way, the body protects itself from excessive production of cholecalciferol. In other words, we cannot overdose on vitamin D produced in the skin! The amount of UV-B radiation penetrating the earth depends on the latitude, season and time of day. The skin pigment melanin, as a natural protective factor, competes for radiation photons with 7-dehydrocholesterol. Therefore, dark-skinned individuals need longer sun exposure to produce the same amount of vitamin D than light-skinned individuals (Clemens et al. 1982). A smaller intake of only about 10 – 20 % is obtained through diet in the form of both D2 (ergocalciferol) and D3 (cholecalciferol) (Lehmann, et al., 2010).

D2 (ergocalciferol) and D3 (cholecalciferol) are physiologically inactive. For both forms of vitamin D to be subsequently biologically active, they must be hydroxylated twice in the liver and then in the kidneys. In the liver, hydroxylation (by the enzyme 25-hydroxylase) occurs at carbon 25 to form 25(OH)D (25-hydroxyvitamin D, calcidiol). The second hydroxylation occurs in the kidney in the mitochondria of the proximal tubule cells (and, according to recent findings, also in the distal tubule and collecting ducts) by the enzyme 1 α -hydroxylase, where the 25(OH)D formed in the liver is hydroxylated at carbon 1 to form the hormonally active form 1,25(OH)₂D (1,25-dihydroxyvitamin D, calcitriol), which is responsible for the biological functions of vitamin D. (Christakos, et al., 2010; Spustova, et al., 2004) (Figure 1).

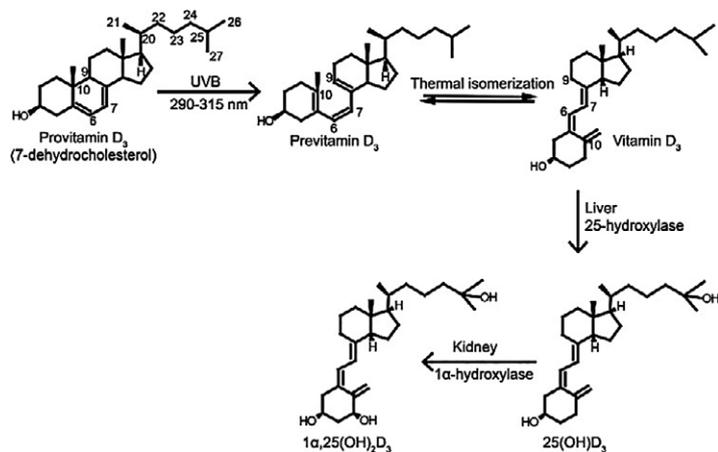


Figure 1. Synthesis and activation of vitamin D. Vitamin D₃ is synthesized in the skin upon UVB exposure. The UVB exposure of provitamin D₃ (7-dehydrocholesterol) in the skin breaks the B-ring to form previtamin D₃, which undergoes thermally induced rearrangement to vitamin D₃. Vitamin D₃ is transported to the liver where it is hydroxylated at C-25 by the enzyme 25-hydroxylase producing 25OHD₃, which is the major circulating form in vertebrates. The 25OHD₃ is hydroxylated a second time at C-1 in the kidneys to the active metabolite 1,25(OH)₂D₃. (Source: Jäpelt, et al., 2012).

The formation of calcitriol is subject to strict regulation. It depends on plasma concentrations of calcium and phosphorus, parathyroid hormone (PTH), and calcitriol itself, which feedback inhibits its production and inhibits gene expression for PTH. Excess calcitriol is rapidly degraded in the kidney by 24-hydroxylase (Dusso, et al., 2005).

Vitamin D₂ is similarly activated. While the dominant activator of this enzyme is PTH, the most prominent inhibitors are calcium, phosphate and 1,25(OH)₂D – vitamin D₃ (calcitriol) (Vávrová, et al., 2007).

Vitamin D binding protein and vitamin D receptor

Vitamin D and its hydroxylated metabolites are lipophilic substances, poorly soluble in water. 60–90 % of dietary calciferol is absorbed in the small intestine. Absorption is positively influenced by bile acids. Thus, it is clear that 25OHD₃ and its metabolites are subject to enterohepatic circulation. Vitamin D is released into the bloodstream where it binds to transport proteins. The most important of these are alpha1-globulin and a specific vitamin D binding protein – transcalferrin (VDBP). VDBP is characterised by a high affinity for 25OHD₃. Conversely, it binds 1,25(OH)₂D₃ relatively weakly, making this hormone readily bioavailable (Vávrová, et al., 2007). The transport protein system allows the circulation of active vitamin D metabolites in the bloodstream. This complex readily crosses cell membranes and subsequently 1,25(OH)₂D₃ binds intracellularly to the vitamin D receptor (VDR), which is responsible for most, if not all, of its biological effects. The activated VDR acts as a specific ligand – activated transcription factor that influences the expression of vitamin D – regulated genes. This link regulates the expression of at least 500 genes that control various bodily functions. The VDR is found in almost all human tissues, not just those involved in classical vitamin D action, such as bone, intestine, kidney and parathyroid glands. It has also been demonstrated in, for example, skin, muscle, pancreas, reproductive organs, the haematopoietic, immune and nervous systems and endocrine tissues (Yang, et al., 2012).

Effects of vitamin D

The main and best understood physiological function of vitamin D is to ensure the regulation of calcium and phosphorus metabolism. In the intestine and kidneys, activation of vitamin D receptors (VDR) increases the absorption of these minerals. By this action, it contributes, together with parathyroid hormone, calcitonin and adrenal hormones, to the maintenance of the mineral balance between calcium and phosphorus in body fluids and tissues. Maintaining adequate serum calcium and phosphorus concentrations is necessary for normal bone mineralisation to occur. It is also required for bone growth and remodeling by osteoblasts and osteoclasts (Norman, et al., 2012; Jones, 2014). With vitamin D deficiency, bones may become thin, brittle or deformed. Sufficient vitamin D prevents the development of rickets in children and osteomalacia in adults. Along with calcium, vitamin D also helps protect older adults from osteoporosis (Jones, 2014) (Table 2).

Table 2. Effect of calcitriol on calcium and phosphorus metabolism (Source: Dusso, et al., 2005)

Intestine	Absorption of calcium and phosphorus
Bone	Osteoblasts – protein synthesis and mineralization of bone matrix, formation of mediators of osteoclastogenesis Osteoclasts – increased bone resorption
Kidney	Induction of 24-hydroxylase, inhibition of 1 α -hydroxylase Increased reabsorption of calcium and phosphorus
Parathyroid glands	Decreased formation and secretion of PTH Inhibition of cell proliferation

In addition to maintaining adequate levels of calcium and phosphorus, vitamin D has other roles in the body. In recent years, the so-called noncalcemic effects of vitamin D mediated by the VDR receptor, which is found in other cells besides the organs involved in calcium-phosphorus homeostasis, have been intensively studied.

Calcitriol has significant immunomodulatory and immunoregulatory effects. It promotes immune function at multiple levels such as: inhibiting T lymphocyte proliferation by suppressing the G phase of the cell cycle, reducing cytokine production, preventing antigen presentation, increasing acquired immunity and reducing the propensity to develop autoimmune diseases. The VDR receptor has been found to be present in most immunocompetent cells. Macrophages even have the same ability to subduct the active form of vitamin D (Griffin, et al., 2003; Hewison, et al., 2004) (Figure 2).

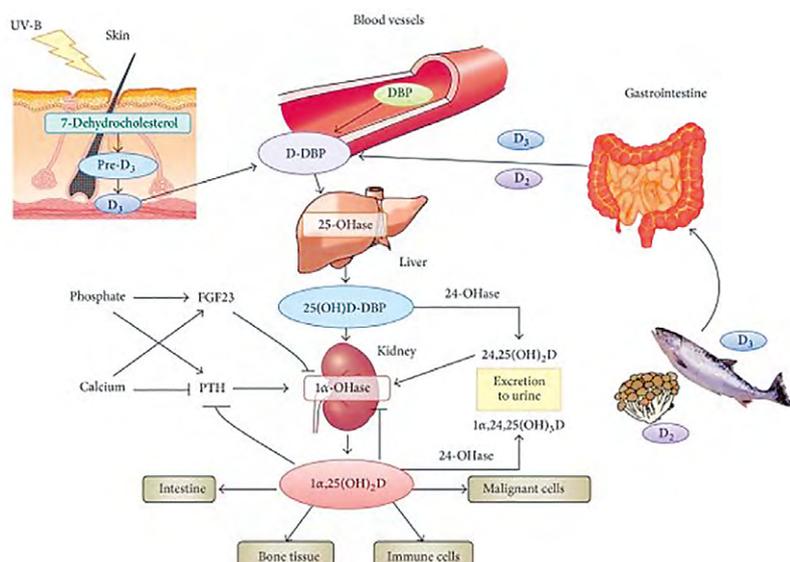


Figure 2. Vitamin D metabolism (Source: Dusso, et al., 2005).

It also stimulates cell differentiation, reducing cell proliferation. It may influence glucose metabolism, blood pressure regulation, and it is thought that it may be an independent predictor of carcinomas. Many epidemiological studies on colorectal, breast and lung cancer have shown a protective effect of higher concentrations of vitamin D (Skácelová, 2010; Brannon, et al., 2008; Mathieu, et al., 2005; Souberbielle, et al., 2010) (Table 3).

Table 3. The most important effects of vitamin D in individual tissues (Source: Dusso, et al., 2005).

Haematopoiesis	differentiation of immature cells, correction of anemia
Immune system	monocytes and macrophages – improve function lymphocytes – immunosuppressive effect
Skin	antiproliferative and pro-differentiation effect on keratinocytes, fibroblasts and melanocytes
Skeletal muscles	antiproliferative and differentiation effect, correction of muscle weakness
Heart muscle	antiproliferative and pro-differentiation effect, increase left ventricular function
Renin-angiotensin system	suppression of renin production
Liver	regeneration of liver tissue
Pancreas	increased insulin production and secretion
Brain	regeneration of nerve tissue, formation of nerve growth factor
Sexual organs	antiproliferative effect on the endometrium, modification of spermatogenesis and Sertoli cell function

Vitamin D deficiency

Intensive clinical research on vitamin D in recent years has highlighted the worldwide problem of low vitamin D levels in the population, which are significantly associated with adverse health effects (Mithal, et al. 2009). Vitamin D deficiency has been shown to be associated with a large number of diseases in the human body (Pazdiora, et al., 2011). Vitamin D deficiency is associated with many diseases, including cancer, cardiovascular disease, type 2 diabetes mellitus, infectious diseases and mental disorders, as well as autoimmune diseases such

as type 1 diabetes mellitus, Crohn's disease and sclerosis multiplex (Wacker, et al., 2013; Hossein-nezhad, et al., 2013).

In European countries, it is reported that up to 60 % of the population is not adequately supplied with vitamin D (Ginter, et al., 2009).

Vitamin D deficiency can arise from a variety of causes. The level of this vitamin depends on many factors. The amount of UV-B radiation passing through the skin depends on latitude, altitude, season and time of day, and air pollution and increased cloud cover also have an effect. Human factors include skin pigmentation, type of clothing, use of protective creams with protective factors, age, body composition, genetic factors and, of course, the length of time in the sun (Munns, et al., 2016). It has been reported that the production of vitamin D in the skin decreases by up to 95 % when sunscreen with SPF 8 or up to 98 % with SPF 15 is used (Holick, 2004) (Table 4).

Table 4. Groups at risk of vitamin D deficiency (Source: Munns, et al., 2016).

fetuses in utero	chronic liver and kidney disease
pregnant and lactating mothers	patients receiving long-term treatment with anticonvulsants and drugs affecting cytochrome P 450 activity
newborns and infants	elderly, postmenopausal women
children at puberty	patients with a predisposition to bone disease, recurrent fractures, osteopenia and osteoporosis
children with recurrent infections	cardiac patients, hypertensives, diabetics, obese individuals
vegetarians and vegans	people avoiding natural sun exposure
patients with malabsorption (cystic fibrosis, celiac disease, pancreatic insufficiency)	patients with disorders of calcium-phosphate metabolism, tetany, hypoparathyroidism

The determination of the amount of vitamin D

The determination of the amount of vitamin D in the body is based on the measurement of the serum calcidiol 25(OH)D concentration, which is the sum of the two sources of the vitamin. Calcidiol is the main circulating form of vitamin D. 25(OH)D levels are given in ng/ml or nmol/l, where 1 ng/ml corresponds to 2.5 nmol/l. In some laboratories, such as our department, we report vitamin D levels in ug/l, which corresponds to ng/ml (Hollis, 2010). The serum calcidiol concentration varies according to the season, with generally lower values in winter. Determination of calcidiol concentration is preferred over measurement of calcitriol concentration. Calcitriol concentrations are on the order of up to 1000 times lower, with reference values ranging from 15 to 60 pg/ml. Calcidiol is considered to be the most reliable biochemical parameter for determining vitamin D stores in the body (Bayer, et al. 2002). The definition of normo-calcidolemia has been widely debated among experts for years, with the most recent recommendations published in 2016 by the Global Consensus Recommendations on Prevention and Management of Nutritional Rickets (Global Consensus

Recommendations on Prevention and Management of Nutritional Rickets) (Munns, et al., 2016) (Table 5).

The worldwide increase in hypovitaminosis D has resulted in a surge of interest in its laboratory determination. Various analytical techniques are used to determine vitamin D in biological material. Vitamin D is most commonly determined from serum and plasma by chromatographic methods (HPLC and LC-MS/MS) or by immunochemical methods based on the principles of chemiluminescence, electrochemiluminescence (ECLIA), radioimmunoassay or ELISA (Enzyme Linked Immunosorbent Assay) (Ersfeld, et al., 2004).

Table 5. Calcidiol concentration assessment
(Source: Munns, et al., 2016)

Vitamin D status	ng/ml	nmol/l
Deficiency	< 12	< 30
Insufficiency	12 – 30	30 – 50
Sufficiency	30 – 100	50 – 250
Toxic concentration	> 100	> 250

In our laboratory we have experience in the determination of vitamin 25(OH)D3 by two methods, the HPLC method and the ECLIA method. These are methods based on different measurement principles.

HPLC

HPLC (High Performance Liquid Chromatography) – one of the most commonly used separation methods and at the same time one of the analytical methods that provides qualitative and quantitative information about the sample. It is characterised by high efficiency and good repeatability. It can be applied to a wide range of substances and is most commonly suitable for the separation of organic less volatile liquids and solids that are soluble in water, organic solvents or dilute acids. HPLC is based on the separation of analytes based on their partitioning between a stationary and a mobile phase, which is always liquid. The stationary phase is built into the chromatographic column. Many types of interactions occur during separation. Interactions of the analytes with the mobile phase, interactions of the mobile phase with the stationary phase, and absorption of the analytes on the stationary phase are all applicable. The measured quantity is fluorescence, absorbance, refractive index or electrical conductivity (Karger, 1997). The output of the detector is a graphical record of the dependence of the detector response on retention time, i.e., a chromatogram on which the area or peak height is evaluated (Karger, et al., 1971) (Figure 3). Most samples have to be treated by complex procedures (deproteination, hydrolysis, extraction) before direct HPLC analysis. These procedures can result in loss of the determined substance, so a certain amount of internal standard is added to the sample. To calculate the concentration of the unknown substance, the value of the ratio of the area or peak height of the substance to be determined and the internal standard in the sample is used (Dastych, et al., 2021).

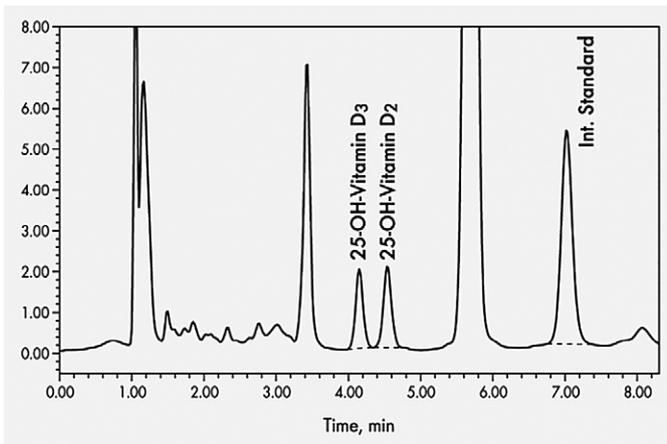


Figure 3. HPLC chromatogram of 25(OH)D2, 25(OH)D3, Int. Standard
(Source: Karger, et. al., 1971)

The principle of the HPLC method is the isolation of 25(OH)D3 and 25(OH)D2 metabolites from serum by deproteination, followed by multiple selective extraction using SPE columns. After washing and elution of the SPE columns, the eluate obtained is separated on an analytical column using an isocratic system at 40 °C. Both metabolites 25(OH)D3, 25(OH) D2 are detected using UV detector at 264 nm. The disadvantage of the HPLC method is the technical difficulty, namely the manual sample preparation (Figure 4). The analysis requires 400 ul of sample, is not affected by any analytical interferences, has a higher specificity and precision (CV 5 %), the working range is in the range (2.6 – 500 ug/l) and the result of the measured parameters is obtained in approximately 22 min: manual pre-preparation takes approx. 12 min + HPLC run time 10 min (Recipe).

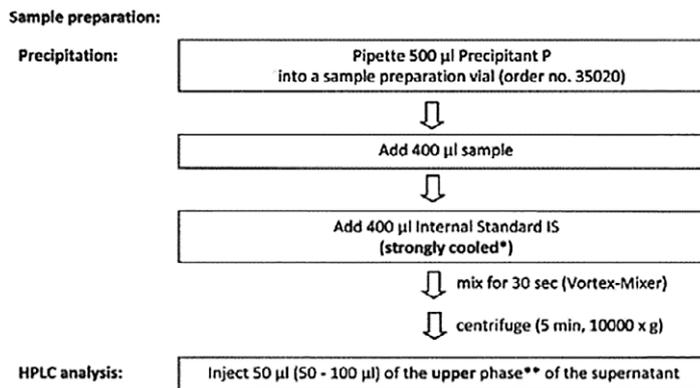


Figure 4. Sample preparation
(Source: RECIPE ClinRep® 25-OH Vitamin D2/D3 by HPLC Kit)

ECLIA

ECLIA (ElectroChemiLuminescence Immunoassay) – is a homogeneous method in which the chemiluminescence reaction and subsequent emission of light from a ruthenium compound is initiated electrically by exposing the sample solution to an electrical voltage. (Zanut, et al., 2020).

Two electrochemically active substances, a ruthenium-labeled antibody and trypropylamine (TPA), which is a component of the measurement buffer, enter the reactions and light emission occurs as a result. The ruthenium-tris(bipyridyl) $^{2+}$ ion in the excited state transitions to its original stable state. It enters the excited state by reduction of $\text{Ru}(\text{bpy})_3^{3+}$ to $\text{Ru}(\text{bpy})_3^{2+}$. The reduction is mediated by TPA. At the electrode surface, TPA is oxidized to $\text{TPA}^{\cdot+}$ – a positively charged radical which spontaneously releases a proton, making it unstable. In the next step, this radical transfers its electron to the $\text{Ru}(\text{bpy})_3^{3+}$ complex, which thus transitions to the excited state $\text{Ru}(\text{bpy})_3^{2+}$. The excited state is lost by light emission detected at a wavelength of 620 nm. Both reactions proceed simultaneously. This effect is achieved by applying a voltage to the immunochemical complex, which is attracted by binding to a magnetic particle to the electrode surface in the system's measuring cell (Lee, 1997).

In the case of vitamin D determination using the diagnostic kit, it is a competitive electrochemiluminescence.

The vitamin D total diagnostic kit uses vitamin D binding protein (VDBP) as the uptake protein to which 25-(OH)D $_3$ and 25-(OH)D $_2$ bind. Determination is preceded by denaturation and release of 25-(OH)D $_3$ from binding to VDBP. The method is based on the binding of 25-(OH)D to ruthenium labelled VDBP. Subsequently, biotin-labeled 25-(OH)D is added, competition for binding sites on ruthenium-labeled VDBP occurs. Upon addition of streptavidin-coated microparticles, biotin-streptavidin interaction takes place. The unbound components are removed. The reaction mixture is sucked into the measuring cell where the microparticles are trapped by the magnetic field on the electrode surface and subsequently detected by the aforementioned electrochemiluminescence process. The applied voltage at the electrode induces the chemiluminescence emission of photons. The emitted photons are measured by a photomultiplier tube and the amount of 25-(OH)D in the sample is inversely proportional to the amount of emitted photons. The results are evaluated from the calibration curve. The reagents are equipped with a bar code (barcode), which is used to automatically identify the respective kit. The sample consumption is 12 μl , the precision (CV 7 %), the working range (3 – 100 $\mu\text{g/l}$) and the required analysis time 27 min (Roche) (Figure 5).

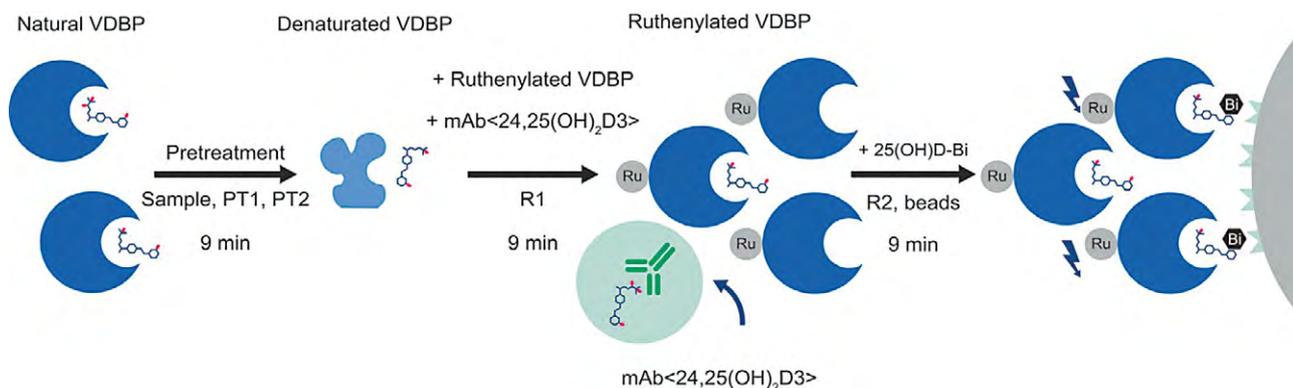


Figure 5. Assay principle of the Elecsys Vitamin D total II assay. PT1 – pretreatment 1, PT2 – pretreatment 2, R1 – reagent 1, R2 – reagent 2, VDBP – vitamin D binding protein (Source: Findeisen, et al., 2022)

Conclusion

Today, vitamin D is considered a broad-spectrum hormone because of its biological properties. It has a key impact on our health. In addition to ensuring normal bone development and metabolism, it is essential for proper cell division and differentiation, the immune system, insulin secretion, blood pressure regulation and other processes essential for life. Intensive clinical research on vitamin D in recent years has shown worldwide problem of low vitamin D levels in the population, which are significantly associated with adverse health outcomes. Vitamin D deficiency has become a global health problem in recent years, even in the developed world. The worldwide increase in hypovitaminosis D has resulted in a surge of interest in its laboratory determination. Currently, 2 types of methods are mainly used to determine vitamin D: immunochemical and separation methods. In our department we determine vitamin D by both methods, namely HPLC and ECLIA. The HPLC method is one of the recommended methods and its advantage is that it simultaneously determines both 25(OH)D₃ and 25(OH)D₂. Nevertheless, the ECLIA determination of vitamin D offers a number of undeniable advantages for the laboratory practice in question, in particular the automated determination of the metabolite, the shorter analysis time and the smaller sample volume required.

Conflict of Interest

The autor declares that there is no conflict of interest in connection with the published article.

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MICROCIRCULATION IN HUMAN SPLEEN, SOME POSSIBILITIES OF REPRESENTING MIKROCIRKULÁCIA V ĽUDSKEJ SLEZINE, NIEKTORÉ MOŽNOSTI ZOBRAZENIA

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Abstract

The representation of microcirculation can be approached in several ways. One of the possibilities is to represent the endothelium (endothelial or sinus lining cells) and their basement membrane on the basis of detecting the known components and the expression of the surface antigens by the methods of immuno-, enzyme- or lectino-histochemical analysis, or by staining or impregnation histological methods. The other possibility is the examination of samples by transmission and scanning electron microscopy. In this paper we describe the survey of immuno-, enzyme- and lectino-histochemical characteristics of the components of microcirculation in human spleen and our own results.

Key words: human spleen, microcirculation, methods

Abstrakt

K zobrazeniu mikrocirkulácie možno pristupovať viacerými spôsobmi. Jednou z možností je reprezentovať endotel (endotelové alebo sínusové výstelkové bunky) a ich bazálnu membránu na základe detekcie známych zložiek a expresie povrchových antigénov metódami imuno-, enzýmovej alebo lektinohistochemickej analýzy, alebo histologickými metódami farbenia alebo impregnácie. Ďalšou možnosťou je skúmanie vzoriek pomocou transmisnej a rastrovacej elektrónovej mikroskopie. V tomto príspevku popisujeme prehľad imuno-, enzýmových a lektín-histochemických charakteristík zložiek mikrocirkulácie v ľudskej slezine a vlastné výsledky.

Kľúčové slová: ľudská slezina, mikrocirkulácia, metódy

Introduction

Spleen is a lymphatic organ with specific microcirculation. It is formed by arteries and veins of various calibre, capillaries (within some sections sheathed), venous sinuses and spaces of cords in the red pulp. Some authors include here also the sinuses of the perifollicular zone (Wilkins, Wright, 2000). Prevailing in the spleen is the open type of circulation, its minor

part occurring in an closed system (Belko, et al., 1992). In closed circulation the artery walls are directly related to the sinus walls. In open circulation the arteries end blindly in the red pulp, while the blood freely flows out into the spaces of Billroth's cords. After going through the three-dimensional network of cords the blood subsequently gets into the sinuses by penetrating through the openings in their walls.

Material and Methods

We have gained the samples of human spleen by splenectomy from patients suffering from AITP, ALL, lymphoma. For ordinary LM we fixed them for 24 hours in 4 % formaldehyd or Baker's fixation liquid, for TEM and SEM for 3 hours in 3 % glutaraldehyde. For LM we embeded samples into paraffine. We stained the sections from them by hematoxyline-eosin, according to van Gieson's method and the modified (Pavlíková, 2008) Gomori's (Lillie, 1965) impregnation method. For TEM we post-fixed the tissue with 1 % OsO₄ in Millonig's buffering sollution and poured into Durcupan ACM. We contrasted the ultrathin sections with uranyl acetate and plumbous citrate (Mráz, Polóny, 1988). For SEM we identically postfixed the tissue, after dehydration we dried it at the critical point of CO₂ (CPD 020 Balzers Union) and galvanized it with gold for 2.5 minutes at the pressure of 2 500 Pa and the current of 50 mA in the apparatus SCD 030 Balzers Union, the anode-cathode distance being 55 mm (Polák, et al., 1983). We studied the tissue and documented it under the light microscope Leica DM 5000 B, in TEM MORGAGNI 268D a SEM VEGA TS 5136 XM. For the purposes of immuno- and enzyme-histochemical analysis we fixed the tissue in a mixture of dry ice and acetone and we made cryostatic sections. As to antiserums, we used rabbit antibodies against fibronectin (anti-fibroectin + SwAR-FITC) (Brozman, Jakubovský, 1988). By an enzyme-histochemical method we testified to the activity of dipeptidylpeptidase IV (Jakubovský, 1993).

Results and Discussion

Membrana basalis (MB) of the arterial and venous systems of the spleen were, with the help of antichondral substances, immuno-histochemically represented already by Brozman, et al., (1983). The MB of the sinuses proved to be interrupted and the authors did not find any direct transition of the continuous MB of artery capillaries into the discontinuous MB of venous sinuses. By the described finding they showed that in human spleen mainly open circulation exists. Galbavý, et al., (1996) investigated adult human spleen with the help of antibodies against collagens of type I – IV and chondroitin sulphate A, B and C. Collagen of type I, III and chondroitin sulphate C did not react with the samples. The absence of collagen of type III in adult human spleen corresponds to the information by Liakka, Autio-Harmaunen (1992) who proved it only in a developing spleen. From among the circulation components by the antiserums of collagen of type IV and II and chondroitin sulphate A were manifested the sinus walls, by collagen of type II – the fibrous components of the terminal arteriolar capillaries, by chondroitin sulphate A – the trabecular venous walls (Galbavý, et al., 1996). The presence of collagen of type IV and chondroitin sulphates A and B in spleen sinuses has also been proved

by Rovenská, et al. (2005). Määttä, et al. (2004) have proved the presence of collagens of type IV and XVIII in all the capillaries of the white and red pulp also in the ring fibers of the sinuses. However, they found collagen of type XVII exclusively only in the ring fibers of the sinuses. Šidlo, et al. (1996) demonstrated fibronectin in the wall of the sinuses. We, too, testify to its presence in the ring fibers of the sinuses in our material. On the contrary, Liakka, Autio-Harminen (1992) have not proved the presence of fibronectin in the ring fibers of the sinuses of an adult human. Nevertheless, they found there tenascin and vitronectin.

Many authors have dealt with proving various clusters of differentiation (CD) on the surface of endothelial cells in the vasal bed in spleen (Korkususz, 2002; Pusztaszeri 2006), and these findings have also been summarized in textbooks by Wilkins, Wright (2000) and Krieken, Orazi (2007). Spleen has been analyzed lectino-histochemically by Papinčák, et al. (2004). The sinus lining cells (SLC) and ring fibers have been represented by them by HPA (Helix pomatia agglutinin) and fibroblastic reticular cells of the red pulp cords with the help of SBA (soy bean agglutinin).

In addition to others, Heusermann, Stutte (1975), Brozman, Jakubovský (1988), as well as Belko, et al. (1992) have researched the enzym activity of the spleen endothelial cells. SLC manifested the activity of naphthol AS acetate esterase and dipeptidylpeptidase IV, but they did not have the activity of alkaline phosphatase typical for the endothelial cells of arterial capillaries. By observing the activity of dipeptidylpeptidase IV in SLC Belko, et al. (1992) have proved that although rarely at some places there exists a direct connection between arterial capillaries and venous sinuses. Thus they have proved the presence of an closed type of blood circulation in the spleen. We demonstrate the activity of dipeptidylpeptidase IV in the SLC of our material. The said characteristics enable a closer characterization of the circulation components of the spleen. At present the immuno-, lectino- and enzyme-histochemical methods are attractive and intensively developing, but they are still financially rather demanding. That is why we hold the opinion that the classical histological and above all electron-microscopic methods are still applicable. As the electron-microscopic technology is also becoming more refined, it is possible to examine in more detail the ultrastructure or the 3D image of the components of circulation in the spleen. In our work we demonstrate our results of representing the sinuses in the TEM as well as in the SEM. Together with histochemical methods the electrone microscopy is becoming part of the new discipline of nanopathology (Gatti, Montanari, 2008).

Conclusion

More than 35 years have passed since the time when Brozman, Jakubovský (1988) and Belko, et al. (1992) published the Slovak monographs dealing with the morphology of human spleen and the spleen of some experimental animals. Since then the morphological analysis of spleen has progressed. That is why we have recapitulated the known findings acquired with the help of newer apparatuses of electrone microscopy, as well as by the methods of classical histology.

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MANAGEMENT OF ARTERIAL HYPERTENSION IN METABOLIC SYNDROME IN CLINICAL PRACTICE MANAŽMENT ARTÉRIOVEJ HYPERTENZIE PRI METABOLICKOM SYNDRÓME V KLINICKEJ PRAXI

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Abstract

Introduction: Metabolic syndrome (MetS) is a set of metabolic and vascular abnormalities that include insulin resistance with compensatory hyperinsulinemia, central or visceral obesity, arterial hypertension, dyslipidemia, microalbuminuria, oxidative stress, prothrombotic and proinflammatory abnormalities, endothelial dysfunction, hyperuricemia, and others. These risk factors have a higher overall vascular and metabolic risk than the individual factors alone. The key mechanism of the etiopathogenesis of MetS is endothelial dysfunction with a vicious circle of acceleration of stenotic/obliterating disease processes, including atherosclerosis. Prospective epidemiological studies have repeatedly confirmed that obesity is associated with an increased risk of coronary heart disease, heart failure syndrome, atrial fibrillation, arterial hypertension as well as diabetes mellitus (Zhou, et al., 2021). Each 4.8-unit increase in Body Mass Index (BMI) is associated with a 35 percent increased risk of coronary heart disease (Lyll, et al., 2017), and each 5-unit increase in BMI is associated with a 29 % increased risk of atrial fibrillation (Powell-Wiley, et al., 2021). The distribution of adipose tissue itself is also important, as it has been found that epicardial and pericardial adipose tissue correlates with both the progression of coronary plaques and the finding of cardiac arrhythmias, primarily atrial fibrillation (Nalliah, et al., 2020). Many epidemiological studies indicate that the prevalence of hypertension increases progressively with increasing BMI in both men and women. The relationship between BMI and blood pressure (BP) is stronger for systolic than for diastolic blood pressure. The risk of developing arterial hypertension is closely related to both waist circumference and waist/hip ratio (WHR). In general, it is estimated that overweight or obesity is present in approximately 75 % of hypertension in men and in 65 % of hypertension in women, while persons with the simultaneous presence of diabetes mellitus have a significantly higher overall and cardiovascular risk (Böhm, et al., 2019). A meta-analysis of 239 prospective studies documents the association between BMI increase and mortality (Di Angelantonio, et al., 2016). In both sexes, the lowest mortality was found at a BMI of 22.5 to 25 kg/m². In all age categories 35 – 59 years, 60 – 69 years, 70 – 79 years. and 80 – 89 years, a significant increase in mortality was found in persons with a BMI of 25 to 50 kg/m². BMI was almost linearly related to systolic and diastolic blood pressure.

Research objectives: By using ambulatory blood pressure monitoring methodology (ABPM) to compare the effectiveness and specifics of antihypertensive treatment in two groups of patients, characterized by the presence or absence of metabolic syndrome.

Material and methods: Under the conditions of hospitalization at the 1st Department of internal medicine of the Faculty of Medicine, Comenius University and University Hospital Bratislava, we examined 56 people with metabolic syndrome (average age 66 years) and 21 people without metabolic syndrome (average age 61 years). To check the effectiveness of antihypertensive treatment, we used the ABPM methodology using CardioSoft-Tonoport V devices (General Electric, USA) with the oscillometric method of BP measurement.

Results: In the group with the presence of MetS, BP values in the 24-hour profile were 134/79 mmHg, in the day phase of measurement 135/82 mmHg and in the night phase of measurement (from 10:00 p.m. to 6:00 a.m.) 131/75 mmHg. In the group without the presence of MetS, these values were as follows: in the 24-hour profile 132/83 mmHg, in the daytime measurement phase 133/83 mmHg and in the night measurement phase 127/76 mmHg. The differences between the measured BP values in the investigated groups were not statistically significant, but there was a significant difference in the antihypertensive treatment itself from the aspect of the combination of antihypertensive drugs, when the group with MetS had a significantly more frequent 4-, 5- and 6-combination of antihypertensive drugs, while monotherapy was more often used in the group without MetS. In the group with MetS, monotherapy was used in 19.6 % of patients, 2-combination of antihypertensives in 18.0 %, 3-combination in 25.0 %, 4-combination in 23.2 %, 5-combination in 9.0 % and 6-combination in 3.5 % of cases. In the group without the presence of MetS, monotherapy was applied in 36.4 % of patients, 2-combination in 27.3 %, 3-combination in 22.7 %, 4-combination in 9.1 % and 5-combination in 4.5 % of cases. 6-combination antihypertensive treatment was not applied in this group. According to the groups of antihypertensive drugs, diuretics were used more often in people with MetS compared to people without MetS: 43 % vs. 19 %, calcium channel blockers 70 % vs. 52 % as well as centrally acting antihypertensives: 41 % vs. 23 %. When evaluating the presence of the physiological diurnal index in ABPM records, we found that in the group with MetS it was disturbed (non-dipping or rising) in 58.9 % of patients, while in the group without MetS it was disturbed less often, namely in 33, 3 % of cases.

Conclusion: The investigative method of ambulatory blood pressure monitoring plays an important role in checking the effectiveness of antihypertensive treatment. Our results confirm that in patients with MetS, achieving blood pressure target values is often a therapeutic problem, which usually requires a combination of three or more antihypertensive drugs. This fact also has a significant economic impact. From the perspective of the prognosis of patients with MetS, a significant finding is the frequent loss of the diurnal sign. It follows from the concept of MetS that influencing the adverse cumulative risk of developing cardiovascular diseases and other associated metabolic abnormalities requires the treatment of both arterial hypertension and all modifiable risk factors with the aim of improving cardiovascular, cerebrovascular and renal protection.

Keywords: obesity, arterial hypertension, metabolic syndrome, cardiovascular diseases, ABPM

Abstrakt

Úvod: Metabolický syndróm (MetS) je súborom metabolických a vaskulárnych abnormalít, medzi ktoré patrí inzulínová rezistencia s kompenzačnou hyperinzulinémiou, centrálna alebo viscerálna obezita, artériová hypertenzia, dyslipidémia, mikroalbuminúria, oxidatívny stres, protrombotické a proinflamačné abnormality, dysfunkcia endotelu, hyperurikémia, a ďalšie. Tieto rizikové faktory majú vyššie celkové vaskulárne a metabolické riziko, než majú jednotlivé faktory samostatne. Kľúčovým mechanizmom etiopatogenézy MetS je endotelová dysfunkcia s bludným kruhom akcelerácie stenotizujúcich/obliterujúcich chorobných procesov, vrátane aterosklerózy. Prospektívne epidemiologické štúdie opakovane potvrdili, že adipozita je spojená so zvýšeným rizikom koronárnej choroby srdca, syndrómu srdcovej insuficiencie, fibrilácie predsiení, artériovej hypertenzie, ako i diabetu mellitus (Zhou, et al., 2021). Každý nárast Body Mass Indexu (BMI) o 4,8 jednotiek je asociovaný s 35 percentným zvýšením rizika nálezu koronárnej choroby srdca (Lyall, et al., 2017) a každé zvýšenie BMI o 5 jednotiek je spojené so zvýšením rizika fibrilácie predsiení o 29 % (Powell-Wiley, et al., 2021). Dôležité je pritom i samotné rozloženie tukového tkaniva, keďže sa zistilo, že epikardiálne a perikardiálne tukové tkanivo koreluje ako s progresiou koronárnych plakov, tak i nálezom srdcových arytmií, predovšetkým fibriláciou predsiení (Nalliah, et al., 2020). Mnohé epidemiologické štúdie poukazujú na to, že prevalencia hypertenzie sa zvyšuje progresívne so zvyšujúcim sa BMI ako u mužov, tak aj u žien. Vzťah medzi BMI a krvným tlakom (TK) je silnejší pre systolický, než pre diastolický krvný tlak. Riziko rozvoja artériovej hypertenzie je v úzkom vzťahu ako k obvodu pásu, tak aj k pomeru pás/boky (WHR). Vo všeobecnosti sa odhaduje, že približne v 75 % hypertenzie u mužov a v 65 % hypertenzie u žien je prítomná nadmerná hmotnosť alebo obezita, pričom osoby so súčasou prítomnosťou diabetu mellitus majú signifikantne vyššie celkové i kardiovaskulárne riziko (Böhm, et al., 2019). Súvislosť medzi nárastom BMI a mortalitou dokumentuje metaanalýza 239 prospektívnych štúdií (Di Angelantonio, et al., 2016). U oboch pohlaví sa najnižšia mortalita zistila pri BMI 22,5 až 25 kg/m². Vo všetkých vekových kategóriách 35–59 rokov, 60–69 r., 70–79 r. a 80–89 rokov, sa zistil výrazný nárast mortality u osôb s BMI 25 až 50 kg/m². BMI takmer lineárne súvisel so systolickým a diastolickým tlakom krvi.

Ciele výskumu: Využitím metodiky ambulantného monitorovania krvného tlaku (AMTK) porovnať efektívnosť a špecifiká antihypertenzívnej liečby u dvoch skupín pacientov, charakterizovaných prítomnosť, resp. neprítomnosťou metabolického syndrómu.

Materiál a metódy: Za podmienok hospitalizácie na I. internej klinike LF UK a UNB sme vyšetrili 56 osôb s nálezom metabolického syndrómu (priemerný vek 66 rokov) a 21 osôb bez metabolického syndrómu (priemerný vek 61 rokov). Ku kontrole efektívnosti antihypertenzívnej liečby sme použili metodiku AMTK použitím prístrojov CardioSoft-Tonoport V (General Electric, USA) s oscilometrickou metódou merania TK.

Výsledky: V skupine s prítomnosťou MetS boli hodnoty TK v 24 hodinovom profile 134/79 mmHg, v dennej fáze merania 135/82 mmHg a v nočnej fáze merania (od 22,00 hod. do 6,00 hod.) 131/75 mmHg. V skupine bez prítomnosti MetS boli tieto hodnoty nasledovné: v 24 hodinovom profile 132/83 mmHg, v dennej fáze merania 133/83 mmHg a v nočnej fáze merania 127/76 mmHg. Rozdiely medzi nameranými hodnotami TK u vyšetovaných skupín neboli štatisticky významné, bol ale značný rozdiel v samotnej antihypertenzívnej liečbe z aspektu kombinácie antihypertenzív, keď skupina s MetS mala signifikantne častejšiu 4-, 5- a 6-kombináciu antihypertenzív, pričom monoterapia bola častejšie využívaná v skupine bez MetS. V skupine s MetS bola monoterapia využitá v 19,6 % pacientov, 2-kombinácia antihypertenzív v 18,0 %, 3-kombinácia v 25,0 %, 4-kombinácia v 23,2 %, 5-kombinácia v 9,0 % a 6-kombinácia v 3,5 % prípadov. V skupine bez prítomnosti MetS bola monoterapia aplikovaná v 36,4 % pacientov, 2-kombinácia v 27,3 %, 3-kombinácia v 22,7 %, 4-kombinácia v 9,1 % a 5-kombinácia v 4,5 % prípadov. 6-kombinačná antihypertenzívna liečba v tejto skupine nebola aplikovaná. Podľa skupín antihypertenzív boli u osôb s MetS v porovnaní s osobami bez MetS častejšie použité diuretiká: 43 % vs. 19 %, blokátory kalciových kanálov 70 % vs. 52 %, ako i centrálné pôsobiace antihypertenzíva: 41 % vs. 23 %. Pri hodnotení prítomnosti fyziologického diurnálneho indexu v záznamoch AMTK sme zistili, že v skupine s MetS bol tento v 58,9 % pacientov narušený (non-dipping alebo rising), pričom v skupine bez MetS bol narušený menej častejšie, a to v 33,3 % prípadov.

Záver: Vyšetrovacia metóda ambulantného monitorovania krvného tlaku zohráva dôležitú úlohu pri kontrole efektívnosti antihypertenzívnej liečby. Naše výsledky potvrdzujú, že u pacientov s prítomnosťou MetS je dosiahnutie cieľových hodnôt krvného tlaku často terapeutickým problémom, ktorý si spravidla vyžaduje kombináciu troch a viacerých antihypertenzív. Táto skutočnosť má i nezanedbateľný ekonomický dopad. Z aspektu prognózy pacientov s MetS je významným nálezom častá strata diurnálneho znaku. Z koncepcie MetS vyplýva, že ovplyvnenie nepriaznivého kumulatívneho rizika na vznik kardiovaskulárnych ochorení a ďalších asociovaných metabolických abnormalít, si vyžaduje liečbu ako artériovej hypertenzie, tak i všetkých modifikovateľných rizikových faktorov s cieľom zlepšenia kardiovaskulárnej, cerebrovaskulárnej a renálnej ochrany.

Kľúčové slová: obezita, artériová hypertenzia, metabolický syndróm, kardiovaskulárne ochorenia, AMTK

Introduction

Metabolic syndrome (MetS) is a set of metabolic and vascular abnormalities that include insulin resistance with compensatory hyperinsulinemia, central or visceral obesity, arterial hypertension, dyslipidemia, microalbuminuria, oxidative stress, prothrombotic and proinflammatory abnormalities that contribute to a hypercoagulable state, systemic endothelial dysfunction, hyperuricemia, and others. Diabetes mellitus and obesity (diabesity), dyslipidemia and arterial hypertension (lipitenzia), the prevalence of which is constantly increasing, have become particularly important risk factors in recent decades (Bhaskaran,

et al., 2018). These risk factors have a higher overall vascular and metabolic risk than the individual factors alone. The key mechanism of the etiopathogenesis of MetS is endothelial dysfunction with a vicious circle of acceleration of stenotic/obliterating disease processes, including atherosclerosis. Prospective epidemiological studies have repeatedly confirmed that obesity is associated with an increased risk of coronary heart disease, heart failure syndrome, atrial fibrillation, arterial hypertension as well as diabetes mellitus. Each 4.8-unit increase in BMI is associated with a 35 percent increased risk of coronary heart disease (Lyll, et al., 2017), and each 5-unit increase in BMI is associated with a 29 % increased risk of atrial fibrillation (Nalliah, et al., 2020). The distribution of adipose tissue itself is also important, as it has been found that epicardial and pericardial adipose tissue is correlated both with the progression of coronary plaques and with the finding of cardiac arrhythmias, especially atrial fibrillation (Powell-Wiley, et al., 2021). Arterial hypertension (AH) is considered the most common cardiovascular risk factor. According to current data, one third of the adult population worldwide has arterial hypertension, while in economically developed countries the prevalence is about 50 % (Zhou, et al., 2021). In the population of obese people, the prevalence of arterial hypertension increases up to 75 %. As a result of arterial hypertension, morphological-structural and functional changes occur in many organs, several of which are life-threatening, e.g. strokes (ischemic and hemorrhagic), or aortic dissection. As a result of arterial hypertension, hypertrophy of the walls of the left ventricle occurs, initially concentric, later eccentric, with the development of heart failure syndrome, as well as coronary heart disease. We cannot forget the fact that arterial hypertension is a risk factor also for vascular dementia. It is a significant risk factor for renal insufficiency, including progression to the terminal stage – renal failure. Changes in the fundus hypertonicus – can also result in vision loss when papilledema and optic nerve atrophy are found. Similar to the syndrome of chronic heart insufficiency, the incidence of arterial hypertension increases exponentially with age, while in the age group over 75 the incidence of AH is reported to be up to 85 % (Olsen, et al., 2016). In this age group, the occurrence of isolated systolic hypertension is also very common. In the clinical assessment of arterial hypertension, we must not be satisfied with only establishing the diagnosis and the degree of hypertension. We need to look for a secondary cause of hypertension, to identify factors that potentially contribute to the development of hypertension and diagnose concomitant CV risk factors and diseases and, last but not least, establish the presence of hypertension induced target organ damage (TOD), or existing cardiovascular, cerebrovascular or renal disease (Williams, et al., 2018).

Research objectives

The Health Yearbook of the Slovak Republic, NCZI, 2021, shows that cardiovascular diseases are also the main cause of mortality in Slovakia. In 2020 died in the Slovak Republic 27 190 people from diseases of the circulatory system, which represents 46 % of all deaths. Unfortunately, when compared to the average number of deaths from circulatory system diseases in the previous five years (2015 – 2019), which was 25 556 people per year, there

was an increase. According to statistical data of a comparison of 41 countries from 2019 (OECD Health Statistics, 2021), the Slovak Republic has one of the highest rates of coronary heart disease mortality (age-standardized per 100 000 inhabitants). Between 2000 and 2019, there was also a significant decrease in mortality from coronary heart disease in Slovakia (by 33 %), but this is less than the average decrease in this mortality in OECD countries (46 %). OECD – Organization for Economic Co-operation and Development (Organization for Economic Co-operation and Development) is an intergovernmental organization of the most economically developed countries in the world that have adopted the principles of democracy and market economy. The OECD was established in 1961, Slovakia became a member of the OECD in December 2000. From a statistical point of view, the unfavorable situation in Slovakia is also in terms of mortality from cerebrovascular accidents. One important fact emerges from the aforementioned publication (OECD Health Statistics, 2021), namely the fact that while in the years 2000 – 2019 there was an average reduction in mortality from strokes in OECD countries by 52 %, in Slovakia only by 13 %. The Slovak Republic is one of the countries worldwide with a medium-high incidence of strokes, with approximately 30 % of those affected being of productive age. In 2018, 11 265 new patients were reported to the National Stroke Register at National health information centre (NCZI), of which 10 176 (90.3 %) had ischemic stroke. In recent years, a growing trend in the reporting of new strokes to this register can be observed (1). Statistically, one third of patients die from this disease, and another third of those affected survive with permanent consequences. Based on this knowledge about cardiovascular and metabolic risks of metabolic syndrome, we implemented ambulatory blood pressure monitoring (ABPM) to compare the effectiveness and specifics of antihypertensive treatment in two groups of patients, characterized by the presence or absence of metabolic syndrome. On the results of ABPM, to evaluate the peculiarities and pitfalls of the management of arterial hypertension in metabolic syndrome.

Patients characteristics and methods

Under the conditions of hospitalization at the 1st Department of internal medicine of the Faculty of Medicine, Comenius University and University Hospital Bratislava, we examined 56 people with metabolic syndrome (average age 66 years) and 21 people without metabolic syndrome (average age 61 years). To check the effectiveness of antihypertensive treatment, we used the ABPM methodology using Cardiosoft-Tonoport V devices (General Electric, USA) with the oscillometric method of BP measurement. The night phase of measurement was from 10:00 p.m. to 6:00 a.m.

Results

In the group with the presence of MetS, BP values in the 24-hour profile were 134/79 mmHg, in the day phase of measurement 135/82 mmHg and in the night phase of measurement 131/75 mmHg. In the group without the presence of MetS, these values were as follows: in the 24-hour profile 132/83 mmHg, in the daytime measurement phase 133/83 mmHg and

in the night measurement phase 127/76 mmHg. The differences between the measured BP values in the investigated groups were not statistically significant, but there was a significant difference in the antihypertensive treatment itself from the aspect of the combination of antihypertensive drugs, when the group with MetS had a significantly more frequent 4-, 5- and 6-combination of antihypertensive drugs, while monotherapy was more often used in the group without MetS. In the group with MetS, monotherapy was used in 19.6 % of patients, 2-combination of antihypertensives in 18.0 %, 3-combination in 25.0 %, 4-combination in 23.2 %, 5-combination in 9.0 % and 6-combination in 3.5 % of cases. In the group without the presence of MetS, monotherapy was applied in 36.4 % of patients, 2-combination in 27.3 %, 3-combination in 22.7 %, 4-combination in 9.1 % and 5-combination in 4.5 % of cases. 6-combination antihypertensive treatment was not applied in this group. According to the groups of antihypertensive drugs, diuretics were used more often in people with MetS compared to people without MetS: 43 % vs. 19 %, calcium channel blockers 70 % vs. 52 % as well as centrally acting antihypertensives: 41 % vs. 23 %. When evaluating the presence of the physiological diurnal index in ABPM records, we found that in the group with MetS it was disturbed (non-dipping or rising) in 58.9 % of patients, while in the group without MetS it was disturbed less often, namely in 33, 3 % of cases.

Discussion

The aim of MetS therapy must be to reduce the associated high cardiovascular and renal risk as well as the increased risk of developing diabetes mellitus. In patients with MetS, arterial hypertension presents a particularly important risk factor. The results of studies indicate that the simultaneous occurrence of metabolic syndrome with arterial hypertension increases the risk of coronary heart disease (CHD) sevenfold, while metabolic syndrome with increased glycemia (5.6 – 6.9 mmol/L) increases this risk fourfold (Iribarren, et. al., 2006). Another study also shows a higher incidence of CHD in the presence of MetS together with arterial hypertension as e.g. in MetS with reduced HDL cholesterol or increased triglycerides (McNeill, et al., 2006). Therefore, it is extremely important that patients with arterial hypertension are consistently and purposefully examined for the presence of other components of the metabolic syndrome. Similarly, persons already diagnosed with metabolic syndrome should be examined for the presence of arterial hypertension. Only in this way is it possible to evaluate the overall cardiovascular risk of these patients. The risk factors of cerebral infarction, cerebral hemorrhage and subarachnoid hemorrhage are different, but the age factor and arterial hypertension are common and significant for all of them. Atrial fibrillation, diabetes mellitus, smoking, obesity and overweight, dyslipoproteinemia and others are also important risk factors for ischemic stroke. Most of these components participate in the process of atherosclerosis, its acceleration, as well as its subsequent clinical manifestations. As a rule, the process of atherosclerosis is not limited to one vascular river, but is diffuse, with polyvascular involvement (Anand, et al., 2018). Patients who have overcome stroke also have a high risk of its recurrence. Therefore, it is necessary to know

its pathogenesis (hemorrhagic, thrombotic, embolic) in order to choose the best strategy for its prevention. The increased mortality of patients with metabolic syndrome requires complex diagnostic and therapeutic management. In particular, the earlier occurrence of hypertension-associated sequelae in patients with MetS shows that rapid diagnosis and early therapeutic intervention should be given a high priority, especially in daily practice. This is necessary for optimizing the treatment of arterial hypertension in the effort to achieve blood pressure target values to reduce the cardiovascular risk of patients with metabolic syndrome.

Conclusion

The method of ambulatory blood pressure monitoring plays an important role in checking the effectiveness of antihypertensive treatment. Our results confirm that in patients with MetS, achieving blood pressure target values is often a therapeutic problem, which usually requires a combination of three or more antihypertensive drugs. This fact also has a significant economic impact. From the perspective of the cardiovascular prognosis of patients with MetS, a significant finding is the frequent loss of the diurnal sign. It follows from the concept of MetS that influencing the adverse cumulative risk of developing cardiovascular diseases and other associated metabolic abnormalities requires the treatment of both arterial hypertension and all modifiable risk factors with the aim of improving cardiovascular, cerebrovascular and renal protection. Only a comprehensive approach to solving this pressing issue will be able to reverse the unfavorable statistical indicators of the comparison of the Slovak Republic with other OECD countries.

Conflict of Interest:

None

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THE RELATIONSHIP BETWEEN INSULIN RESISTANCE, OBESITY AND HYPERTENSION

VZŤAH MEDZI INZULÍNOVOU REZISTENCIOU, OBEZITOU A HYPERTENZIOU

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Abstract

Introduction: Insulin resistance is characterized by a reduced response to insulin in target tissue and is considered to play a critical role in the development of hypertension. Obesity has an impact on the development of hypertension, and then subsequently obesity together with hypertension lead to cardiovascular complications.

Core of Work: The relationship between insulin resistance and hypertension is a complex and multifactorial phenomenon which involves both genetic basis and environmental factors. Insulin carries out various functions in different tissues, including liver, skeletal muscle, and adipose tissue. In healthy subjects, insulin evokes a net reflex in sympathetic outflow and at the same time it blunts the vasoconstrictive effect resulting from this sympathetic activation. On the contrary, in hypertensive patients insulin evokes a sympathetic activation that is three times greater than in normal subjects, and moreover its vaso-relaxant action is impaired. Molecular and pathophysiological mechanisms underlying the reciprocal relationship between insulin resistance and hypertension result in a vicious cycle which reinforces the link between metabolic and hemodynamic disorders.

Conclusion: More research is needed to clarify the relationship between insulin resistance, obesity and hypertension.

Keywords: insulin resistance, obesity, hypertension

Abstrakt

Úvod: Inzulínová rezistencia je charakterizovaná zníženou odpoveďou na inzulín v cieľovom tkanive a považuje sa za rozhodujúcu úlohu pri rozvoji hypertenzie. Obezita má vplyv na rozvoj hypertenzie, a potom následne obezita spolu s hypertenziou vedú ku kardiovaskulárnym komplikáciám.

Jadro práce: Vzťah medzi inzulínovou rezistenciou a hypertenziou je komplexný a multifaktoriálny jav, ktorý zahŕňa tak genetický základ, ako aj faktory prostredia. Inzulín má rôzne funkcie v rôznych tkanivách, vrátane pečene, kostrového svalstva a tukového tkaniva. U zdravých jedincov vyvoláva inzulín reflex v sympatikovom systéme a súčasne znižuje vazokonstrikčný efekt vyplývajúci z tejto sympatikovej aktivácie. Naopak u hypertonikov

inzulín vyvoláva aktiváciu sympatiku, ktorá je trikrát väčšia ako bežne a navyše je narušený jeho vazorelaxačný účinok. Molekulárne a patofyziologické mechanizmy, ktoré sú základom recipročného vzťahu medzi inzulínovou rezistenciou a hypertenziou, vedú ku kruhu, ktorý posilňuje spojenie medzi metabolickými a hemodynamickými poruchami.

Záver: Na objasnenie vzťahu medzi inzulínovou rezistenciou, obezitou a hypertenziou je potrebný ešte ďalší výskum.

Kľúčové slová: inzulínová rezistencia, obezita, hypertenzia

Introduction

Cardiovascular diseases are the leading cause of death worldwide. Overweight and obesity are strongly associated with comorbidities such as hypertension and insulin resistance, which collectively contribute to the development of cardiovascular diseases and resultant morbidity and mortality. A total of 1.9 billion adults worldwide are overweight or obese. These alarming numbers, which continue to climb, represent a major health and economic burden (Koenen, et al., 2021).

Core of Work

For many years, the term insulin resistance has been associated exclusively with an inadequate effect of insulin on glucose metabolism and did not address other aspects of insulin action. However, insulin is a pleiotropic hormone and exerts a multitude of effects on lipid and protein metabolism, ion and amino acid transport, cell cycle, proliferation and differentiation, and nitric oxide synthesis. Insulin resistance contributes to increase blood pressure through several mechanisms, among which are the enhanced tissue angiotensin II and aldosterone activities, the increased sympathetic nervous system activity and oxidative stress (Ferrannini, et al., 1987). According to this view, endothelial loss of insulin signalling may represent an important mechanism linking hypertension to endothelial dysfunction. Molecular and pathophysiological mechanisms underlying the reciprocal relationship between insulin resistance and hypertension result in a vicious cycle which reinforces the link between metabolic and hemodynamic disorders. The relationship between insulin resistance and hypertension is a complex and multifactorial phenomenon which involves both genetic basis and environmental factors (Mancusi, et al., 2020).

Insulin has complex vascular actions that appear as either vascular protective or deleterious effects (Mancusi, et al., 2020; Lembo, et al., 1992; Petersen, Shulman, 2018). Vascular protective effects of insulin, including induction of vasorelaxation, inhibition of vascular smooth muscle cell proliferation and anti-inflammation, are mediated by stimulating nitric oxide-dependent (NO) mechanisms in the endothelium. Vascular deleterious effects of insulin include induction of vasoconstriction, vascular smooth muscle cell proliferation and proinflammatory activity. These vascular effects are mediated through the mitogen-activated protein kinase pathway (Schulman, Zhou, 2009).

Adipose tissue is a highly dynamic organ that can be classified based on the cellular composition of different depots and their distinct anatomical localization.

Massive expansion and remodeling of adipose tissue during obesity differentially affects specific adipose tissue depots and significantly contributes to vascular dysfunction and cardiovascular diseases. Visceral adipose tissue accumulation results in increased immune cell infiltration and secretion of vasoconstrictor mediators, whereas expansion of subcutaneous adipose tissue is less harmful. Therefore, fat distribution more than overall body weight is a key determinant of the risk for cardiovascular diseases. Thermogenic brown and beige adipose tissue, in contrast to white adipose tissue, is associated with beneficial effects on the vasculature. The relationship between the type of adipose tissue and its influence on vascular function becomes particularly evident in the context of the heterogenous phenotype of perivascular adipose tissue that is strongly location dependent. The abnormal remodeling of specific adipose tissue depots during obesity contributes to the development of hypertension, endothelial dysfunction, and vascular stiffness (Koenen, et al., 2021).

Thermogenic brown and beige adipose tissue is considered to have protective effects on the vasculature, as individuals with detectable thermogenic adipose tissue have lower odds for hypertension and coronary artery disease relative to individuals without thermogenic adipose tissue (Becher, et al., 2021).

Weight reduction significantly improves blood pressure, and therefore, suggests a direct link between adipose tissue phenotype and odds of developing cardiovascular diseases and hypertension (Hall, et al., 2015). Angiotensinogen expression is significantly elevated in obese individuals and is also higher in visceral adipose tissue compared with subcutaneous adipose tissue (Rahmouni, et al., 2004).

Epidemiological studies have documented a high incidence of diabetes in hypertensive patients. Insulin resistance is defined as a less than expected biologic response to a given concentration of the hormone and plays a pivotal role in the pathogenesis of diabetes. However, over the last decades, it became evident that insulin resistance is not merely a metabolic abnormality, but is a complex and multifaceted syndrome that can also affect blood pressure homeostasis. The dysregulation of neurohumoral and neuro-immune systems is involved in the pathophysiology of both insulin resistance and hypertension. These mechanisms induce a chronic low grade of inflammation that interferes with insulin signalling transduction. Molecular abnormalities associated with insulin resistance include the defects of insulin receptor structure, number, binding affinity, and/or signalling capacity. For instance, hyperglycaemia impairs insulin signalling through the generation of reactive oxygen species, which abrogate insulin-induced tyrosine autophosphorylation of the insulin receptor. Additional mechanisms have been described as responsible for the inhibition of insulin signalling, including proteasome-mediated degradation of insulin receptor substrate, phosphatase-mediated dephosphorylation and kinase-mediated serine/threonine phosphorylation of both insulin receptor and insulin receptor substrates. Insulin resistance

plays a key role also in the pathogenesis and progression of hypertension-induced target organ damage, like left ventricular hypertrophy, atherosclerosis and chronic kidney disease. Altogether these abnormalities significantly contribute to the increase the risk of developing type 2 diabetes (Mancusi, et al., 2020).

Excess weight gain, especially when associated with increased visceral adiposity, is a major cause of hypertension, accounting for 65 % to 75 % of the risk for human primary (essential) hypertension. Increased renal tubular sodium reabsorption impairs pressure natriuresis and plays an important role in initiating obesity hypertension. The mediators of abnormal kidney function and increased blood pressure during development of obesity hypertension include (1) physical compression of the kidneys by fat in and around the kidneys, (2) activation of the renin-angiotensin-aldosterone system, and (3) increased sympathetic nervous system activity. Activation of the renin-angiotensin-aldosterone system is likely due, in part, to renal compression, as well as sympathetic nervous system activation. However, obesity also causes mineralocorticoid receptor activation independent of aldosterone or angiotensin II. The mechanisms for sympathetic nervous system activation in obesity have not been fully elucidated but may require leptin and activation of the brain melanocortin system. With prolonged obesity and development of target organ injury, especially renal injury, obesity-associated hypertension becomes more difficult to control, often requiring multiple antihypertensive drugs and treatment of other risk factors, including dyslipidemia, insulin resistance and diabetes mellitus, and inflammation. Unless effective antiobesity drugs are developed, the effect of obesity on hypertension and related cardiovascular, renal and metabolic disorders is likely to become even more important in the future as the prevalence of obesity continues to increase (Hall, et al., 2015).

While recent research has highlighted key links between obesity, adipose tissue, and vascular function, a number of important unanswered questions remain. From a basic standpoint, a more complete understanding of the developmental origin and cellular and molecular components of perivascular fat is necessary. Moreover, a comprehensive inventory of the secreted polypeptides and metabolites released by adipose tissues in normal physiology and the obese state will help further illuminate how excess adiposity contributes generally to vascular dysfunction and more specifically to the pathogenesis of hypertension and vascular stiffening. Future studies will also need to uncover the role of environment, genetics, epigenetics, and the microbiome on modulating the interactions between adipose tissues and the vasculature (Koenen, et al., 2021).

Insulin resistance is involved in the pathogenesis and progression of hypertension as well as type-2-diabetes. The low-grade of inflammation induced by insulin resistance is the principal mechanism that accounts for development of endothelial dysfunction and metabolic abnormalities (Carrizo, et al., 2018).

Chronically, both insulin resistance and hyperglycemia cause vascular damage through several intermediate pathways, including increased advanced glycation end products,

oxidative stress, and inflammation, leading to increased arterial stiffness and blood pressure elevation. Impaired fasting glucose, a type of prediabetes, is characterized by a marked increase in hepatic insulin resistance and is identified simply by elevated fasting glucose levels. Meanwhile, impaired glucose tolerance, another type of prediabetes, is characterized by a marked increase in insulin resistance of skeletal muscle and is identified by elevated postprandial glucose levels (Sasaki, et al., 2020).

Sasaki and al. investigated the association of adipose tissue insulin resistance with blood pressure and hypertension incidence, comparing it with hepatic and skeletal muscle insulin resistance. A high adipo-IR (Adipo-IR = the adipose insulin resistance index was calculated as the product of fasting serum insulin and free fatty acid levels), but not HOMA-IR or Matsuda index, was significantly associated with the incidence of hypertension. Moreover, the combination of high adipo-IR with high HOMA-IR or low Matsuda index showed no higher odds of hypertension than a high adipo-IR alone. These results suggest that insulin resistance is associated with blood pressure control regardless of the tissue in which it occurs; however, the risk of hypertension is determined by insulin resistance in adipose tissue rather than in liver or muscle tissue (Sasaki, et al., 2022).

Sasaki, et al., concluded from these results that the risk of developing hypertension is associated with insulin resistance in adipose tissue but not liver or muscle. Interestingly, the high Adipo-IR group had a higher proportion of individuals with normal glucose tolerance at baseline and a lower proportion of individuals with prediabetes or diabetes than the high HOMA-IR and low Matsuda index groups. These results suggest that among the three indices compared in this study, Adipo-IR is the first to increase in patients with a history of glucose intolerance and that Adipo-IR can be used as a new and useful index that can identify people at high risk for developing hypertension before they develop impaired glucose tolerance (Sasaki, et al., 2022).

Conclusion

More research is needed to clarify the relationship between insulin resistance and hypertension.

The vital role of insulin resistance in the pathogenesis of isolated systolic hypertension has been expounded at the theoretical level. However, research on the correlation between some specific insulin resistance indicators and isolated systolic hypertension is still rare, especially at different glycemic statuses (Gu, et al., 2022).

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REMOTE PATIENTS MONITORING

MONITOROVANIE PACIENTOV NA DIAĽKU

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Abstract

Introduction: Telemedicine is the transmission of health information at a distance. Transfer of health information is implemented through information and telecommunication technologies.

Core of Work: To monitoring health status of patients remotely, I use a set that includes an ECG recorder, which the patient himself can put on his body, the set also includes a blood pressure monitor, thermometer, glucometer, oxymeter. I use monitoring in patients with palpitations, with a condition after syncope, after an ischemic stroke, to rule out asymptomatic atrial fibrillation, to evaluate blood pressure during antihypertensive treatment, to monitoring blood pressure and pulse rate in heart failure, to detect presence of ventricular extrasystoles.

Conclusion: Telemedicine speeds up communication between the doctor and the patient, and increases the comfort of the patient.

Keywords: telemedicine, electrocardiogram, blood pressure

Abstrakt

Úvod: Telemedicína je prenos zdravotných informácií na diaľku. Prenos zdravotných informácií je realizovaný prostredníctvom informačných a telekomunikačných technológií.

Jadro práce: Na monitorovanie zdravotného stavu pacientov na diaľku používam sadu, ktorá obsahuje EKG záznamník, ktorý si pacient prikladá na povrch tela, ďalej sada obsahuje tlakomer, teplomer, glukomer, oxymeter. Monitorovanie používam u pacientov s palpáciami, so stavom po synkope, po prekonanej ischemickej cievnej mozgovej príhode, na vylúčenie asymptomatickej fibrilácie predsiení, na ohodnotenie tlaku krvi pri antihypertenzívnej liečbe, na sledovanie tlaku krvi a frekvencie pulzu pri srdcovom zlyhávaní, na zistenie prítomnosti komorových extrasystol.

Záver: Telemedicína umožňuje zrýchliť komunikáciu medzi lekárom a pacientom, zvýšiť komfort pacienta.

Kľúčové slová: telemedicína, elektrokardiogram, tlak krvi

Introduction

Telemedicine is the transmission of health information at a distance. The transmission of health information is carried out through information and telecommunication technologies.

Core of Work

The delivery of health care through electronic communication or telehealth has changed significantly since its introduction. Over the years, telehealth has developed rapidly with continued advances in available technology and innovation by the healthcare community in identifying new uses and applications for the technology. The implementation of electronic health records and expanded access to the internet and medical devices have allowed healthcare to move beyond the traditional clinical setting and into the patient's home (Hood, et al., online).

Remote patient monitoring is a type of telehealth in which healthcare providers monitor patients outside of the traditional care setting using digital health devices such as scales, blood pressure monitors, pulse oximeters, and glucose meters. Data collected from these devices is then transmitted electronically to providers for care management. Automated feedback and workflows can be built into data collection and out-of-range values or related to measured values can be flagged (Hood, et al., online).

Mobile health (mHealth) technologies are modernizing medicine by affording greater patient engagement, monitoring, outreach, and health-care delivery. The cardiopulmonary fields have led the integration of mHealth into clinical practice and research. mHealth technologies in these areas include smartphone applications, wearable devices, and handheld devices, among others, and provide real-time monitoring of numerous important physiological measurements and other key parameters. Use of mHealth-compatible devices has increased in recent years, and age and socioeconomic gaps of ownership are narrowing. These tools provide physicians and researchers with a better understanding of an individual's health and well-being. mHealth interventions have shown utility in the prevention, monitoring, and management of atrial fibrillation, heart failure, and myocardial infarction. With the growing prevalence of cardiopulmonary disease, mHealth technologies may become a more essential element of care within and outside of traditional health-care settings. mHealth is continuously developing as a result of technologic advancements and better understandings of mHealth utility. However, there is little regulation on the mHealth platforms available for commercial use and even fewer guidelines on implementing evidence-based practices into mHealth technologies. Online security is another challenge and necessitates development in data collection infrastructure to manage the extraordinary volume of patient data. Continued research on long-term implications of mHealth technology and the integration of effective interventions into clinical practice is required (MacKinnon, et al., 2020).

Remote patient monitoring has been used to measure symptoms of chronic conditions such as heart disease, diabetes, and asthma. Patients could experience this through wearable devices such as Holter monitors that can measure heart rhythm, remotely detect heart disease and monitor cardiovascular disease. The American Heart Association recommends remote monitoring of vital signs in hypertensive patients given the evidence and large number of research studies demonstrating the benefits of remote patient monitoring. These benefits

include patient involvement in their medical care, patient adherence to the treatment plan, and the ability to extend the reach of physicians and easily provide care to patients without patients having to travel for in-person visits (Hood, et al, online).

Telemedicine and remote monitoring represent more than the communication of health data via a 'remote connection'. Modern systems can be stand-alone and can be equipped with the ability to acquire and summarize data in order to inform the patient, carer or health care giver. The information can be held locally or be shared with a health care centre. Contemporary telemedicine and telemonitoring solutions have shifted their focus, trying to work on a system which is ubiquitous, efficient and sustainable. Along with devices that collect and elaborate data, a new generation of plug and play sensors has also come to life, which with standardization can lower management costs and make introduction into practice more feasible. Multiple trials (TIM-HF, TEN-HMS and BEAT. HF) have reported varying outcomes, depending on the monitoring system and the background health care process. A special mention is necessary for home tele-rehabilitation programmes for patients with heart failure. Despite the progress obstacles remain, including adequate training, data ownership and handling and applicability to larger populations. This article will review contemporary advances in this area (Volterrani, et al., 2019).

Specialized programs of heart failure disease management aim to improve care, clinical outcomes and reduce healthcare utilization. Inglis et al. evaluated 41 peer-reviewed published studies comparing structured telephone support or non-invasive home telemonitoring with usual care for people with chronic heart failure. In people with heart failure, structured telephone support and noninvasive home telemonitoring reduce the risk of all-cause mortality and heart failure-related hospitalizations; these interventions also demonstrated improvements in health-related quality of life and heart failure knowledge (Inglis, et al., 2015). The results of the TIM-HF2 (Telemedical interventional management in heart failure patients II) study suggest that remote monitoring in a well-defined population with heart failure, followed over 12 months, reduces unplanned hospitalizations due to cardiovascular disease, hospitalization due to heart failure and all-cause death (Koehler, et al., 2018).

Heart failure patients represent one of the most prevalent as well as one of the most fragile population encountered in the cardiology and internal medicine departments nowadays. Estimated to account for around 26 million people worldwide, diagnosed patients present a poor prognosis and quality of life with a clinical history accompanied by repeated hospital admissions caused by an exacerbation of their chronic condition. The frequent hospitalizations and the extended hospital stays mean an extremely high economic burden for healthcare institutions. Meanwhile, the number of chronically diseased and elderly patients is continuously rising, and a lack of specialized physicians is evident. To cope with this health emergency, more efficient strategies for patient management, more accurate diagnostic tools, and more efficient preventive plans are needed. In recent years, telemonitoring has been introduced as the potential answer to solve such needs. Different methodologies and devices have been progressively investigated for effective home monitoring of cardiologic

patients. Invasive hemodynamic devices, such as CardioMEMS™, have been demonstrated to be reducing hospitalizations and mortality, but their use is however restricted to limited cases. The role of external non-invasive devices for remote patient monitoring, instead, is yet to be clarified. In this review, we summarized the most relevant studies and devices that, by utilizing non-invasive telemonitoring, demonstrated whether beneficial effects in the management of HF patients were effective (Faragli, et al., 2021).

Modern advances in technologies have created new opportunities to provide telemedical care as an adjunct to medical management of patients with heart failure. Non-invasive telemonitoring can reduce morbidity and mortality in these patients as demonstrated by different meta-analyses and the recent clinical trial TIM-HF 2. The debate on the utility of non-invasive devices for home telemonitoring should concentrate on obtaining parameters and prediction algorithms based on more personalized risk profiles of heart failure patients (Faragli, et al., 2021).

Conclusion

Remote patient monitoring will be increasingly used and become a common part of healthcare. Remote patient monitoring speeds up communication between doctor and patient and increases patient comfort.

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ARTIFICIAL INTELLIGENCE IN MEDICINE: EARLY WARNING OF ALZHEIMER'S

UMELÁ INTELIGENCIA V MEDICÍNE: VČASNÉ VAROVANIE PRED ALZHEIMEROVOU CHOROBOU

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Abstract

Introduction: Artificial intelligence and machine learning and are highly interconnected. Currently, clinical decision support and image analysis are the most common tasks in medical settings. In this paper, the current trends of using artificial intelligence (AI) and new research on early prediction of neurodegenerative diseases using AI are reviewed.

Material and Methodology: Expert system was one of the first to develop algorithms based on well-processed data, as was the case with ECGs, which were able to quickly identify some cardiac diseases. Artificial intelligence tries to draw certain conclusions from a very large amount of even unrelated data. In 2013, IBM launched the first similar Watson Oncology application for decision-making in lung cancer treatment at a cancer centre in New York. Artificial intelligence approaches play a significant role in predicting diagnosis and treatment based on sufficient patient data and have great potential to improve healthcare delivery worldwide. Clinical decision support tools help providers make decisions about a patient's treatment, medications, mental health and other needs by giving them quick access to information or research that is relevant to the patient. In medical imaging, AI tools are used to analyse X-rays, CT scans, MRI scans, as well as other images to find lesions or other findings that a radiologist might miss, and to help the radiologist more quickly navigate a more accurate image description.

Results: The challenges that the COVID-19 pandemic has created for many healthcare systems have led many healthcare organisations around the world to begin testing new technologies using artificial intelligence, such as algorithms designed to monitor patients. Using a simple example, we demonstrate the theory and practice of AI for predicting neurodegenerative diseases in the medical field. The principles we demonstrate here can easily be applied to other complex tasks, including natural language processing and image recognition.

Conclusion: With advances in informatics, artificial intelligence has rapidly become an integral part of modern healthcare. Artificial intelligence algorithms are used to support physicians in clinical settings as well as in current medical research. This study confirmed that the use of AI in medicine is also very important for targeted population screening.

Keywords: artificial intelligence, expert system, machine learning, computer vision, prediction of neurodegenerative diseases

Abstrakt

Úvod: Umelá inteligencia a strojové učenie sú navzájom úzko prepojené. V súčasnosti sú podpora klinického rozhodovania a analýza obrazu najbežnejšími úlohami v lekárskom prostredí. V tomto príspevku sú zhrnuté súčasné trendy využívania umelej inteligencie (AI) a nový výskum včasnej predikcie neurodegeneratívnych ochorení pomocou AI.

Materiál a metodika: Expertný systém ako jeden z prvých vyvinul algoritmy založené na kvalitne spracovaných dátach, ako to bolo v prípade EKG, ktoré dokázali rýchlo identifikovať niektoré srdcové ochorenia. Umelá inteligencia sa snaží vyvodiť určité závery z veľmi veľkého množstva dokonca nesúvisiacich údajov. V roku 2013 IBM spustila prvú podobnú Watson Oncology aplikáciu na rozhodovanie o liečbe rakoviny pľúc v onkologickom centre v New Yorku. Prístupy umelej inteligencie zohrávajú významnú úlohu pri predpovedaní diagnózy a liečby na základe dostatočných údajov o pacientoch a majú veľký potenciál zlepšiť poskytovanie zdravotnej starostlivosti na celom svete. Nástroje na podporu klinického rozhodovania pomáhajú poskytovateľom rozhodovať sa o liečbe pacienta, liekoch, duševnom zdraví a iných potrebách tým, že im poskytujú rýchly prístup k informáciám alebo výskumu, ktoré sú pre pacienta relevantné. V medicínskom zobrazovaní sa nástroje AI používajú na analýzu röntgenových lúčov, CT skenov, MRI skenov, ako aj iných snímok na nájdenie lézií alebo iných nálezov, ktoré by rádiológovi mohli uniknúť, a na pomoc rádiológovi rýchlejšie navigovať v presnejšom popise snímky.

Výsledky: Výzvy, ktoré pandémia COVID-19 vytvorila pre mnohé systémy zdravotnej starostlivosti, viedli mnohé zdravotnícke organizácie na celom svete k tomu, aby začali testovať nové technológie využívajúce umelú inteligenciu, ako sú napríklad algoritmy určené na monitorovanie pacientov. Na jednoduchom príklade demonštrujeme teóriu a prax AI na predpovedanie neurodegeneratívnych ochorení v oblasti medicíny. Princípy, ktoré tu demonštrujeme, možno ľahko aplikovať na iné zložité úlohy vrátane spracovania prirodzeného jazyka a rozpoznávania obrázkov.

Záver: S pokrokom v informatike sa umelá inteligencia rýchlo stala neoddeliteľnou súčasťou moderného zdravotníctva. Algoritmy umelej inteligencie sa používajú na podporu lekárov v klinickom prostredí, ako aj v súčasnom lekárskom výskume. Táto štúdia potvrdila, že využitie AI v medicíne je veľmi dôležité aj pre ciele populáčny skrining.

Kľúčové slová: umelá inteligencia, expertný systém, strojové učenie, počítačové videnie, predikcia neurodegeneratívnych ochorení

Introduction

The basis of artificial intelligence was an artificial neuron, which works similarly to a real neuron and uses algorithmic methods used in computers. Rosenblatt introduced the

perceptron basis of the artificial neuron in 1957, and perceptron networks consisted of a set of signal-generating units connected in a network much like the neurons in the human brain (Rosenblatt, 1957). Artificial neural networks thus simulated brain activity. When it was found that such perceptron and their networks could only solve linearly separable problems, attempts were made to modify the model; for example, Orbach offered a different view of perceptron involving the design and testing of models of brain-like activity that were more concerned with the structures of natural intelligence (Orbach, 1962). Three areas closely related to artificial intelligence namely expert system, computer vision and machine learning.

An expert system is a computer system that mimics the decision-making abilities of a human expert. It is one of the first practical applications of artificial intelligence. Such systems are often used to find solutions to complex problems that require some kind of human skill, through reasoning based on a body of knowledge. These systems are built by first understanding the problem, determining the important input variables, and then using them to write rules that transform the inputs into outputs, represented mainly as „if-then” rules.

One of the breakthroughs was the Deep Blue expert system for playing chess, which was implemented on a unique IBM supercomputer. It was the first computer to win two chess games against a world champion in regular playing time in 1996. In 1997, it was improved and defeated Kasparov in a six-game rematch, winning two games and drawing three. Deep Blue’s victory is considered a milestone in the history of artificial intelligence and one of the approaches of machine learning (Hsu, 2002).

Machine learning is a subfield of artificial intelligence that deals with algorithms that allow a computer system to “learn”. In this context, learning is defined as changing the internal state of a system to make it adapt more effectively to changes in the environment. Machine learning also has wide applications in medicine. Its techniques are used to recognize and compress visual or acoustic, e.g. speech recognition, or electrical, e.g. ECG, EEG signals. In medicine, it is used for disease diagnosis and decision support.

Computer vision has been shaped since the early days of artificial neural networks, which aimed to mimic human vision and thus automate the process of image analysis. In the early days, many images were recognized in the smallest raster points (pixels), trying to discern boundaries between objects by measuring color hues and estimating spatial relationships between objects. With the development of computer vision, algorithms began to be programmed to solve increasingly complex problems. These technologies were the forerunners of intelligent image recognition. The initial enthusiasm for artificial neural networks in the 1980 s gradually waned as the performance limitations of computers at the time became apparent.

In the early 2010 s, there was a rapid shift thanks to supercomputers and improvements in deep learning techniques. Thanks to deep learning, we are now able to program supercomputers to train themselves and gradually improve their performance. There has

been an increase in open-source projects such as ImageNet, which created a large database of images that researchers could access to train and create new algorithms (see Figure1).

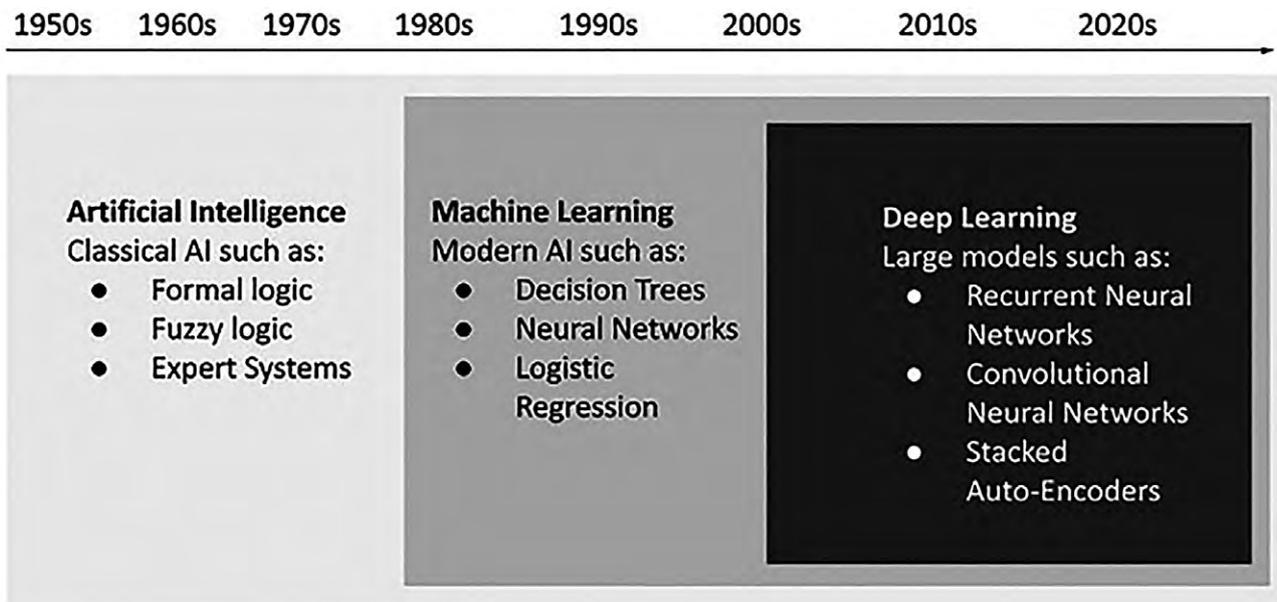


Figure 1. Figure illustrates the milestones in the field of artificial intelligence.

Artificial intelligence technologies have evolved in three successive periods, including transitional periods when interest in AI declined due to failure to achieve predicted successes (Penteado, et al., 2021):

- 1) Expert Systems, 1950 – 1970, focusing on machines with the ability to make inferences that only a human could make.
- 2) Machine Learning, 1970 – 2000, a period of reduced funding and interest in which some new prototype systems such as decision trees and regression were successfully developed.
- 3) Deep Learning, the 1990 s – 2020 s, where deep learning gained momentum to provide personalized medicine, supported by infrastructural developments for the collection and storage of data and processing power.

Artificial Intelligence in medicine

The history of Artificial Intelligence in Medicine (AIM) is closely linked to the history of AI itself, as some of the earliest work in applied AI was in biomedicine. In the 1970 s, AI applications were first used to help solve biomedical problems (Shortliffe, et al., 2022). One of the earliest uses of AIM was the MYCIN system, which was created to support doctors’ diagnostic decision-making. The system was created in an effort to create rules and knowledge for doctors using an expert system. Its main goal was to help doctors diagnose and treat bacterial infections by selecting the right drugs to fight the likely bacteria causing the infection.

The field of oncology requires accurate and timely diagnosis to ensure correct tumour diagnosis and optimal patient treatment. Artificial intelligence technology, with its ability to analyse vast amounts of data and recognise patterns, has huge potential in revolutionising

cancer diagnosis. In 2013, IBM announced the extension of the Deep Blue project to IBM Watson for the first commercial use for utilization decision making in lung cancer treatment at the Cancer Center, New York (Strickland, et al., 2019). Watson for Oncology provides physicians with access to a wealth of knowledge and expertise to improve their decision-making process. This huge effort by IBM has been difficult to get off the ground due to the need for a powerful server, the high price tag, and physician training. In 2022, IBM sold the entire AI system for healthcare to Merative for \$1 billion.

In 2017, a team of researchers from Stanford University created a convolutional neural network that outperformed trained cardiologists in the United States. The CNN neural network was able to diagnose arrhythmias as it received a 200 Hz ECG signal time series as input and provided a sequence of prediction labels every second at the output to detect any emerging risk from the ECG signal (Rajpurkar, et al., 2021).

AI aims to mimic human cognitive functions and paradigms in healthcare as well, aided by the increased availability of patient healthcare data. Popular AIM techniques include machine learning methods for structured data, such as classical support vector machines and neural networks, and advanced deep learning, natural language processing as recalled earlier.

Medical image processing and AI

Advanced techniques for the use of image recognition in radiology began in the late 2000 s when machine learning techniques began to be used for image classification. The technology progressed rapidly, and in 2012, a new neural network revolution, AlexNet, emerged when it destroyed the competition in one of the world's toughest image recognition competitions, ImageNet (Shellshear, et al., 2022).

The ability to visualize anatomical structures and pathological structures on X-ray, CT, and MRI images is affected by two critical factors: blurring and noise. Higher levels of blur can reduce the visibility of smaller objects or image details, while higher levels of visual noise can reduce the visibility of low-contrast objects. Recent advances in imaging technology have spurred the development of new techniques for processing CT, MRI images (Pula et al., 2023). Two important image reconstruction techniques used in CT namely Deep Learning Image Reconstruction (McLeavy, et al., 2021; Lee, et al., 2023) and Adaptive Statistical Iterative Reconstruction (Kaul, et al., 2016; Alagic, et al., 2022). Artificial intelligence is used extensively in medical image processing (Langlotz, et al., 2019). In the above examples of medical image processing, various deep learning algorithms are used, ranging from the simplest to the most complex problems in medicine:

1. Improving accuracy in patient positioning and CT image reconstruction.
2. Speeding up image acquisition in MRI scans.
3. Removing the complexity of ultrasound measurements to simplify the process of ultrasound measurements and reduce its complexity.
4. Assist radiologists in reading images faster and more accurately.

5. Promoting multidisciplinary collaboration in cancer treatment.
6. Guiding physicians during minimally invasive surgical procedures.
7. Improving anatomical classification, detection, segmentation, and registration among medical images.
8. Detection, recognition, and result description: image segmentation, classification, and result transformation into natural language.

Artificial intelligence is also playing an increasing role in the diagnosis and treatment of central nervous system disorders such as brain and eye tumours, functional diseases such as Parkinson’s disease, pain and arteriovenous malformations. For this purpose, the correct diagnosis of the central nervous system by means of image recognition from CT, MRI and PET scans and their structured descriptions by artificial intelligence methods is important (Sramka, et al., 2019).

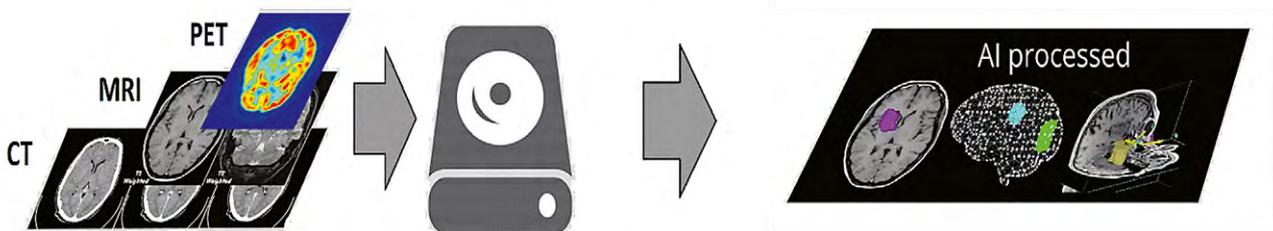


Figure 2. Medical image processing procedure using artificial intelligence for neurosurgery.

In radiosurgery, accuracy in planning and drawing target structures as well as defining structures at risk is very important. Radiosurgical planning is mainly performed using CT and MRI images, which are transferred to a virtual planning system after fusion. Visualization and virtual planning greatly assist the neurosurgeon in semi-automatically plotting the contours of brain structures in order to optimize the patient’s treatment (Figure 2). The new proposed system using artificial intelligence algorithms enables rapid acquisition of very large amount of information required for better diagnosis and treatment, which helps the physician in decision making and provides better treatment outcomes in radiosurgery (Ruzicky, et al., 2020).

Early warning of Alzheimer’s diseases

The most common neurodegenerative diseases are Alzheimer’s disease (AD), Parkinson’s disease (PD) and others, which are often determined by neurological and psychiatric examination using a variety of ancillary tests such as magnetic resonance imaging, positron emission tomography (PET), speech and vision tests, or laboratory tests of cerebrospinal fluid or blood. In this article, we focus on two neurodegenerative diseases in particular: AD, including the mild cognitive impairment (MCI) stage, and PD.

The number of patients with neurodegenerative diseases in the world is increasing every year, similarly in Slovakia, according to the National Centre of Health Information there are

more than 25 thousand patients in Slovakia and according to the latest surveys up to twice as many (NCZI, 2022). The aim of our Early Warning of Alzheimer's (EWA) project was to develop a data collection methodology, select appropriate images, questions and procedures to collect input data for early diagnosis of Alzheimer's disease, MCI and PD, especially using speech recognition. As part of the EWA project, we analysed the current state of research until 2022.

In the analysis of spontaneous speech, prosody is most often studied in people with neurodegenerative diseases because it relates to the phonetic and phonological properties of speech. Specifically, it involves the analysis of speech rhythm along with other parameters related to temporal and acoustic measures of voice, such as articulatory rhythm, vocal intensity (analysis of loudness and changes in amplitude over time), timing and frequency (changes in acoustic signal frequencies, colour or shape structure). There are several studies that jointly evaluate the process of extracting features from the vocal signal using different vocal parameters and different qualifiers (Pulido, et al., 2020).

Machine learning (ML) and Deep learning (DL) techniques are used for several of the above methods of detecting neurodegenerative disease. The most used methods for machine learning are support vector machines, decision trees, k-nearest neighbours, linear regression, linear discriminant analysis, neural networks, Bayesian networks and also techniques by combining several models such as bootstrap aggregating, boosting, stacking detailed (Kuhn, et al., 2019).

To evaluate machine learning models, accuracy is most often used according to the relationship:

- $Accuracy = (TP + TN) / (TP + TN + FP + FN)$,
- where the values are TP – true positive, TN – true negative, FP – false positive and FN – false negative classifications.
- Sensitivity (also recall) and specificity (also TNR) values are often given:
- $Sensitivity = TP / (TP + FN)$
- $Specificity = TN / (TN + FP)$.

As part of the EWA project on early prediction of neurodegenerative diseases, a mobile application for automatic detection has been developed that collects speech data of healthy people and patients with neurodegenerative diseases. The speech recording system was designed using image naming and verbal description of images, similar to the well-known "Stealing Cookies" image (a new version of Stealing Cookies in Berube, et al., 2019). The process of obtaining the data needed to best predict AD and PD according to the proposed procedure for patients diagnosed with AD, MCI and PD consisted of recording how they responded to the images shown, and their spontaneous speech was recorded in databases. In the case of the diagnosed patients, all their available information, in addition to their medical history, was used to make an accurate diagnosis. Three selected psychological tests were also administered: the Montreal Cognitive Assessment (MoCA), the Beck Depression

Inventory (BDI), and the Generalized Anxiety Disorder (GAD-7). According to the above scenario, audio recordings of picture descriptions as well as the MoCA, BDI, and GAD-7 tests were also recorded for the healthy control population.

The audio recordings were processed using specialized software and a suitable feature selection algorithm for speech and sound processing, which was developed at the Institute of Computer Science, Slovak Academy of Sciences in Bratislava. The experiments showed that recordings of patients' spontaneous speech in Slovak while describing images using a mobile app can also reveal subtle changes in the voice of people with neurodegenerative diseases, which helped in early detection of Alzheimer's disease and PD.

Obtaining data from a large group of clinical trial participants is critical to making the most accurate predictions, which is what we have tried to achieve in our EWA project. Data collected from Alzheimer's and Parkinson's patients and a group of healthy people are evaluated using special artificial intelligence algorithms to best determine accuracy, sensitivity, and specificity.

Table 1 shows the neurodegenerative disease data in the original dataset compared to the filtered dataset prepared for machine learning. As can be seen from the table, there is only a small fraction of positive samples compared to the samples without neurodegenerative disease, so for the algorithms we had to fit the data with an equal distribution for all groups.

Table 1. Data distribution over neurodegenerative disorder

Condition	Total number of samples	Filtered number of samples
No neurodegenerative disorder	1273 (~80 %)	1011 (~80 %)
Mild Cognitive Impairment (MCI)	70 (~4.4 %)	59 (~4.6 %)
Alzheimer's disease (AD)	56 (~3.5 %)	47 (~3.7 %)
Parkinson's disease (PD)	154 (~9.7 %)	154 (~12.1 %)
Other neurodegenerative disorder	41 (~2.6 %)	–

One way to deal with the imbalance of the dataset is to create more samples from the minority class to approximately even out the distribution of the dataset or, conversely, to reduce the majority healthy group. We used four methods: random resampling (Random), synthetic minority oversampling technique (SMOTE), adaptive synthetic algorithm (ADASYN), and TomekLinks. Of the 10 machine learning algorithms, two were clearly the best: Linear regression and Light gradient-boosting machine regression (LGBM regression). Table 2 shows the results of the two best algorithms with found accuracy, specificity and sensitivity for Alzheimer's disease. The above table shows very good results for early prediction of AD (Kepesiova, et al., 2023).

Table 2. Comparative analysis results of the best two algorithms with sampling for AD.

Machine Learning Algorithm	Sampling Method	Accuracy [%]	Sensitivity [%]	Specificity [%]
Linear Regression	TomekLinks	96.6	74.52	98.91
Linear Regression	Random	96.33	74.52	98.61
Linear Regression	SMOTE	95.97	72.64	98.41
Linear Regression	ADASYN	95.88	75.47	98.02
LGBM Regression	SMOTE	95.97	68.86	98.81
LGBM Regression	Random	95.08	70.75	97.61
LGBM Regression	TomekLinks	94.81	69.81	97.43
LGBM Regression	ADASYN	93.91	80.17	95.35

Table 3 shows the results of the two best algorithms from 10 algorithms with observed accuracy, specificity and sensitivity for Parkinson’s disease. The above table shows very good results for early prediction of PD (Kepesiova, et al., 2022). Linear regression predicts a resulting value that may lie outside the range $<0,1>$ and therefore the input must be scaled correctly. Logistic regression estimates the probability of the outcome and is therefore also often used for the classification problem.

Table 3. Comparative analysis results of the best two algorithms with sampling for PD.

Machine Learning Algorithm	Sampling Method	Accuracy [%]	Sensitivity [%]	Specificity [%]
Linear Regression	TomekLinks	97.2	83.5	97.9
Linear Regression	SMOTE	97.1	83.5	97.6
Linear Regression	ADASYN	97.0	81.6	97.4
Linear Regression	Random	96.9	84.5	97.0
Logistic Regression	ADASYN	96.9	77.9	97.8
Logistic Regression	Random	96.9	79.8	96.6
Logistic Regression	SMOTE	96.9	78.8	96.4

Conclusion

Patients with suspected Alzheimer’s and Parkinson’s disease need to be identified as early as possible so that treatment can be started early, and the patient’s disease progresses as little as possible. Results up to date show that the detection of neurodegenerative diseases using automated analysis of human voice and speech can be achieved with an accuracy of more than 90 % under laboratory conditions. As we have shown in Tables 2 and 3, disease prediction can achieve more than 92 % accuracy and 80 % sensitivity depending on the selected group of patients and healthy people, the processing of spontaneous speech of this group, and finally the algorithms and artificial intelligence methods that can be used to screen people for early detection of neurodegenerative diseases.

Artificial intelligence has great potential to improve healthcare delivery around the world, thanks in part to recent advances following the COVID-19 pandemic, which highlighted the need to monitor healthcare around the world. There are specific challenges in healthcare that also make the use of AI extremely challenging. These relate to a range of complex tasks, such as:

1. Privacy concerns when processing patient data.
2. The use of data to minimise bias and encourage diverse inputs to create more accurate outputs.
3. Explain the ability of the algorithms to be included in the algorithm output, as the adoption of an unusual outcome in medicine can have far-reaching consequences on patients' lives.

In the immediate period to 2030, the challenges are what the World Health Organization calls “social determinants of health”. This means that health care systems can, for example, anticipate when a person is at risk of developing a chronic disease and suggest preventive measures before it worsens. By 2030, it is proposed to link people’s care through different types of hospitals. In addition to specialised hospitals for the acutely ill and highly complex interventions, less urgent cases will be monitored and treated through smaller centres using telemedicine and artificial intelligence. In 2030, AI-based predictive healthcare networks will help reduce waiting times, improve staff workflows and cope with ever-increasing administrative burdens.

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ARTIFICIAL INTELLIGENCE AND 3D PRINTING IN CLINICAL PRACTICE

UMELÁ INTELIGENCIA A 3D TLAČ V KLINICKEJ PRAXI

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Abstract

Introduction: Artificial intelligence, a subfield of computer science, has the potential to impact and transform the living conditions of the present population in the new digital era through automation. It is well recognized that the associated digital transformation can start the automation of any digital activity. From the standpoint of healthcare, tasks of 3D printing in clinical practice on a regular basis stand to gain from applying artificial intelligence concepts and techniques.

Methods and material: The requirements specified by hospital management were obtained and analyzed using the „Design Science Research” research technique. By using a qualitative research methodology, we were able to identify the functional and structural building blocks for the 3D printing sub-processes and activities in conjunction with artificial intelligence techniques.

Results: The existing processes in the medical practice can be expanded using the artificial intelligence techniques. The requirements of the medical management for meeting the criteria resulted in the recommendations how the 3D printing using artificial intelligence techniques could be applied in the healthcare practice and can be verified by the surgeons and other medical staff.

Summary: The ideas for combining artificial intelligence and 3D printing technologies ought to show how they might be used in healthcare settings. In addition to facilitating a quicker response time for health processes, the partnership should result in significant time and resource savings through intelligent decision-making before and after the surgery process. This will improve patient health and staff satisfaction.

Key words: Digital Transformation, 3D Printing, Surgery Process, Artificial Intelligence, Design Science Research

Abstrakt

Úvod: Umelá inteligencia, podoblasť informatiky, má potenciál ovplyvňovať a transformovať životné podmienky súčasnej populácie v novej digitálnej ére prostredníctvom automatizácie. Je dobre známe, že súvisiaca digitálna transformácia môže spustiť automatizáciu akejkolvek

digitálnej činnosti. Z pohľadu zdravotníctva sa úlohy 3D tlače v klinickej praxi pravidelne získavajú z aplikácie konceptov a techník umelej inteligencie.

Metodika a materiál: Požiadavky špecifikované vedením nemocnice boli získané a analyzované pomocou výskumnej techniky „Design Science Research“. Použitím metodológie kvalitatívneho výskumu sa nám podarilo identifikovať funkčné a štrukturálne stavebné bloky pre podprocesy a činnosti 3D tlače v spojení s technikami umelej inteligencie.

Výsledky: Existujúce procesy v lekárskej praxi je možné rozšíriť pomocou techník umelej inteligencie. Požiadavky medicínskeho manažmentu na splnenie kritérií vyústili do odporúčaní, ako by sa 3D tlač s využitím techník umelej inteligencie dala aplikovať v zdravotníckej praxi a overiť ju chirurgovia a ďalší zdravotnícky personál.

Súhrn: Nápad na kombináciu umelej inteligencie a technológií 3D tlače by mali ukázať, ako by sa dali využiť v zdravotníckych zariadeniach. Okrem uľahčenia rýchlejšieho času odozvy zdravotných procesov by partnerstvo malo viesť k významnej úspore času a zdrojov prostredníctvom inteligentného rozhodovania pred a po chirurgickom procese. Tým sa zlepší zdravie pacientov a spokojnosť personálu.

Kľúčové slová: Digitálna transformácia, 3D tlač, chirurgický proces, umelá inteligencia, Design Science Research

Introduction

Charles W. Hull developed the first three-dimensional (3D) printer in the 1980s utilizing the stereo-lithography method. The practice of piling materials on top of one another to make specific objects was subsequently explained as 3D printing that was included in the technologies related to additive manufacturing (Schubert, et al., 2014).

Three decades ago, 3D printing technology was still evolving. However, its use in healthcare has just later gained traction as a means of addressing clinical problems and medication distribution, and it is always changing. Using biocompatible materials, this economical method creates model implants that help with understanding human anatomy and diseases. It can also be applied to organ transplants, and surgical planning (Tan, et al., 2022). Additionally, 3D printing is being looked into as a possible means of replacing or repairing damaged organs, such as the skin, heart, or kidneys. It also has the ability to develop whole new organs that would carry out the biological duties of the damaged or non-functioning organ, like in the instance of a diabetic pancreas (Schubert, et al., 2014).

These days, the word “artificial intelligence” is gradually becoming part of ordinary speech, so it is not unfamiliar. Few people can, however, truly articulate what is concealed beneath this phrase. Human intelligence is defined as a collection of various components in psychology. This concise introduction, which assumes no prior knowledge of the technical ideas of philosophy or computing, summarizes the developments in artificial intelligence since the field’s founding in 1956 (Copeland, 1993).

In the modern healthcare industry, computers should assist human input, decision-making, and data provision. For these reasons, artificial intelligence is utilized to make data-driven predictions, identify and quantify specific hazards, and draw conclusions for tracking broad medical trends. The healthcare sector is a knowledge-intensive one that relies on analytics and data to enhance treatments and procedures. The vast expansion in the variety of medical data being gathered, such as clinical, genetic, behavioral, and environmental data, is the trend. Massive volumes of data are generated daily by the healthcare industry from sources like genome sequencing equipment, high-resolution medical imaging, electronic health records, and Internet of Things devices used to track patient health (Puaschunder, Feierabend, 2019).

Artificial intelligence is regarded as the innovative entity with the greatest potential for disruption and as one of the crucial multipurpose technologies that many firms are currently frantically competing to offer their clients the finest services possible. However, a thorough understanding of the challenges associated with digital transformation processes can help minimize the negative effects of modern information technology deployment and optimize digital transformation strategies and business models. Nevertheless, many companies find it difficult to adopt these technologies and integrate them into their daily operations (Furda, Gregus, 2019; Podgorelec, et al., 2022).

This research aims to demonstrate how 3D printing and artificial intelligence may work together to streamline and enhance surgical processes and procedures in the medical field.

Methods and material

The authors used the Design Science Research approach to study the issue, utilizing the TOGAF standards for Enterprise architecture techniques for use case identification. The procedure was used to determine the requirements for healthcare management, which allowed for the identification of the functional and structural components for the pertinent domains. The multidisciplinary space's topic areas comprised several procedures associated with 3D printing and artificial intelligence. After analyzing the researched item of interest, which should represent the goals and specifications of the hospital management, the building blogs were created.

Results

Based on the research, the authors identified the use cases for surgical processes, one of which involved facilitating 3D printing in conjunction with artificial intelligence, from the perspectives of information and communication technologies and TOGAF standards for Enterprise architecture. One of the sub-processes in the healthcare industry that must meet the following criteria is the use case of operation planning:

- Boost the accuracy and applicability of the information.
- Increase information and communication technology's usability.

- Boost the efficiency of company processes.
- Enhance the methods for preparing 3D models.
- Develop better methods for artificial intelligence to make decisions.

The following are the information and communication technology building blocks used in surgery:

- Image recognition.
- Text recognition.
- Speech recognition.
- 3D surface scan.
- 3D printing.
- Intelligent decision-making.

Based on the information and communication technology building blocks and the specified requirements for healthcare, the goal status and vision is a surgical procedure that uses an optimized process and set of techniques along with a printed 3D model of the affected structure.

The following actors are involved in the actor-centric method for the planning sub-processes: registered nurse(s), doctor(s), surgeon(s), oncologist(s), and another registered clinical person(s).

The surgery process includes the following four sub-processes:

- Patient preparation with the analyzed health status including other material, e.g., CT/MRI images, and diagnosis description in the electronic health record.
- Surgery planning – in parallel to standard plan preparation provided image, text, speech recognition and 3D printing of either affected structure and/or new structure that will be used during the surgery.
- Detailed procedure of the surgery including the possible decision-making alternatives.
- End of operation – post-surgery procedure steps.

Artificial intelligence may eventually replace or supplement the actions of a registered clinical person by using specific applications during the decision-making process. Special applications can also take the place of the implemented option for picture, text, and speech recognition in tandem with the concurrent data analysis that is now supplied by a qualified physician.

Discussion

Because the setup costs for 3D printing are low and the cost of the first item is the same as the last, a great degree of customization is possible. Therefore, 3D printing is perfect for producing unique goods at reasonable costs. Using this method, for instance, it would be able to quickly screen novel therapeutic medications on patient tissue that has been 3D printed, significantly reducing both the time and cost of manufacture (Schubert, et al., 2014). A patient's living tissue may be printed as a strip, which can subsequently be used as a test

subject for a range of drug administrations to determine which is most effective for treating the specific ailment (Csete, 2010; Faulkner-Jones, et al., 2013). Additionally, 3D printing is being looked into as a possible means of replacing or repairing damaged organs, such as the skin, heart, kidneys, or patient-specific skull implants. It also has the ability to develop whole new organs that would carry out the biological duties of the damaged or non-functioning organ, like in the instance of a diabetic pancreas (Schubert, et al., 2014; Kropla, et al., 2023). Artificial intelligence-based optimization has the potential to significantly improve the final product's performance and safety while facilitating constraint satisfaction in patient-tailored solutions (Rojek, et al., 2020).

The rate of increase in healthcare expenses is almost twice that of our economy. The amount that individuals spend on healthcare is rising, but governments are also being compelled to foot the bill as expenses rise beyond what patients can afford. Considering how quickly expenses are rising, a number of steps need to be taken to ensure that healthcare expenditures do not spiral out of control. It also became brutally apparent that follow-up appointments, access to healthcare specialists, and any kind of communication between the patient and the physician were necessary. The advancement of technology and innovation could provide a remedy to the issues with the existing healthcare system and its procedures. On the other hand, the use of artificial intelligence in 3D printing has been recognized as one of the key methods in the healthcare industry. That can help the healthcare industry change in a way that will benefit all patients and providers (Schubert, et al., 2014; Bhardwaj, et al., 2017).

The curvature of the excised bone flap is precisely replicated using 3D surface scanning, a novel method. The extracted bone flap is intra-operatively scanned and digitalized for this reason. It is feasible to quickly create a patient-specific implant for each bone flap shape by utilizing a design process created for this purpose. Because the planned skull implants feature intricate free-form surfaces that closely resemble the curvature of the skull, additive printing is the best manufacturing technique in this situation (Andereggen, et al., 2021; Kropla, et al., 2023).

The intensity, intricacy, and specificity of robotic exercise can be made simpler with the aid of artificial intelligence approaches, which can be supplemented by patient-specific 3D-printed solutions. Non-optimal combinations of material features and technological parameters might nevertheless affect performance. Thus, based on artificial neural network optimization assisted by genetic algorithms, artificial intelligence with the computational optimization of the 3D-printing process in terms of features and material selection can reach the maximum tensile force of a hand exoskeleton component (Rojek, et al., 2020).

The extraordinary advantages of additive manufacturing, particularly with regard to 3D printing, over traditional manufacturing procedures have led to its recent rise in popularity. However, because they affect the characteristics and lifespan of produced items, 3D printing process parameters are difficult to optimize. Consequently, using typical optimization techniques to establish a relationship between process parameters and the attributes

of printed parts is a challenging challenge. 3D planning can be used in ophthalmology, neurosurgery, cardio-surgery or other specialties. It is now possible to identify complex patterns and establish deterministic relationships using machine learning, without the requirement to create and solve physical models, according to a recently validated technique (Sramka, et al., 2016; Olejník, et al., 2017; Furdova, et al., 2018; Mahmood, et al., 2020).

It makes sense that 3D printing was employed in the hospital's actual project, given that the trend in the healthcare industry also uses the newest artificial intelligence technologies and that budgetary constraints are driving healthcare providers to reduce expenses.

Conclusion

Intelligent decision-making in a quicker response to health processes, as well as considerable time and cost savings, are possible outcomes of 3D printing and genuine artificial intelligence use in healthcare. The resultant enhanced surgical procedures may lead to increased patient satisfaction. The progression of digital transformation through artificial intelligence applications continues to present numerous fascinating prospects for 3D printing, which have the potential to significantly enhance health and healthcare provision.

One important component that contributes to patient satisfaction is the shorter recovery period following surgery. Enhancing surgical accuracy and cutting down on the amount of time needed to operate on nearby structures are further benefits. Living quality will rise along with operational accuracy when such advancements are implemented in individual threads and processes through the use of 3D printing and artificial intelligence techniques.

Conflict of interest statement

The authors declare no competing interests.

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EPIBULBAR PIGMENTED LESIONS AND AMNIOTIC MEMBRANE USE IN SURGICAL TREATMENT

EPIBULBÁRNE LÉZIE A VYUŽITIE AMNIOVEJ MEMBRÁNY V RÁMCI CHIRURGICKEJ LIEČBY

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Abstract

Introduction: The amniotic membrane (AM) has special properties, making it ideal for clinical applications in various surgical fields like ophthalmology. It is used more frequently to cover conjunctival and corneal defects. Preserved AM is a very effective method to repair wound after giant conjunctival tumor operation. Complete removal of tumor and perfect fixation are the key of ocular surface reconstruction.

Material and Methods: To evaluate the possibility of AM for the surgical treatment of epibulbar tumors. Retrospective study in the period of 2011 – 2021.

Results: In a group of 68 patients treated in the period of 2011 – 2021, 7 (10.3 %) patients have been treated with AM application after surgical removal of the tumor. 54 (79 %) cases were malignant, and 14 (21 %) were benign. In the analyzed dataset the males had just slightly higher chance of malignancy than females, 80 % male versus 78.3 % female.

Summary: The results of our study indicate that AM grafts are an effective alternative to cover defects after removal of epibulbar lesions due to their anti-inflammatory properties because the conjunctiva must be preserved, and especially the most important application is in malignant epibulbar conjunctival tumors to cover large defects after the surgical treatment.

Keywords: Epibulbar Tumors, Periocular Tumors, Amniotic Membrane

Abstrakt

Úvod: Amniová membrána (AM) má špeciálne vlastnosti, vďaka čomu je ideálna pre klinické aplikácie v rôznych chirurgických oblastiach, ako je oftalmológia. Častejšie sa používa na prekrytie defektov spojovky a rohovky. Konzervovaná AM je veľmi účinná metóda na hojenie rán po operácii obrovského spojivkového nádoru. Kompletné odstránenie nádoru a dokonalá fixácia sú kľúčom k rekonštrukcii povrchu oka.

Materiál a metódy: Zhodnotiť možnosť aplikácie AM v chirurgickej liečbe epibulbárnych nádorov. Retrospektívna štúdia v období rokov 2011 – 2021.

Výsledky: V súbore 68 pacientov liečených v období 2011-2021 bolo 7 (10,3 %) pacientov liečených AM aplikáciou po chirurgickom odstránení nádoru. 54 (79 %) prípadov bolo malígnych a 14 (21 %) bolo benígnych. V analyzovanom súbore údajov mali muži len o niečo vyššiu pravdepodobnosť malignity ako ženy, 80 % u mužov oproti 78,3 % u žien.

Súhrn: Výsledky našej štúdie naznačujú, že našitie AM je efektívnou alternatívou pre krytie defektov po odstránení epibulbárnych lézií pre ich protizápalové vlastnosti, pretože spojovka musí byť zachovaná a najmä najvýznamnejšia je aplikácia pri malígnych epibulbárnych nádoroch spojovky na prekrytie rozsiahlych defektov po chirurgickej liečbe.

Kľúčové slová: Epibulbárne nádory, nádory okolia oka, amniová membrána

Introduction

The incidence and prevalence of the epibulbar lesions is significantly high, with an incidence of 90 % of the benign lesions and only 10 % of malignant lesions. There is a need to perform a brief discussion of these lesions to develop the information of these lesions among the general population and the healthcare professionals. This would enable the successful diagnosis of the different types of epibulbar lesions (Shields, Shields, 2004).

Epibulbar pigmented lesions include conjunctival epithelial melanosis, conjunctival freckle, primary acquired melanosis, conjunctival nevus, congenital ocular melanocytosis, and malignancy – malignant melanoma. The amniotic membrane (AM) has special properties, making it ideal for clinical applications in various surgical fields like ophthalmology. It is used more frequently to cover conjunctival and corneal defects. Preserved AM is a very effective method to repair wound after giant conjunctival tumor operation. Complete removal of tumor and perfect fixation are the key of ocular surface reconstruction (Furdova, et al., 2007).

The epibulbar space of the eye globe can be affected by a wide variety of epibulbar lesions. The incidence and prevalence of the epibulbar lesions is significantly high. The incidence of benign lesions is extremely increasing in last decades with an incidence of 90 % of the benign lesions. The smaller number rate are the malignant lesions that accounted for about 10 %. Another authors similar results as the prevalence of malignant lesions was higher, about 24 % while that of the benign lesions was 75 % (Furdova, Lukacko, 2017).

Most common of malignancies are the basal cell carcinoma, melanoma, squamous cell carcinoma and sebaceous cell carcinoma. This signifies the importance of the in-depth knowledge of the anatomy of the epibulbar region and also the human eye and the different types of lesions that can affect the adnexal tissues. There is a variation in the prevalence of the lesions with regards to the region differences. This would enable the successful diagnosis of the different types of epibulbar lesions (Agraval, et al., 2017).

There are two types of the epibulbar lesions that include the pigmented and the non-pigmented lesions. These lesions are further classified into benign, premalignant and malignant lesions. The probability of the incidence of malignant lesions is only fifteen

to twenty percent of all the periocular lesions of the skin; therefore, most of the lesions are benign. The other classification based on clinical classification (TNM) or pathological classification (pTNM) which shows the clinical and pathologic features of the lesions. Lesions that are pigmented are one of the major reasons of surgery in the United States. These lesions are considered undesirable by the patients due to their appearance, color, location and size. The pigmented lesions can be either benign or malignant. These lesions include conjunctival epithelial melanosis, conjunctival freckle, primary acquired melanosis (PAM), conjunctival nevus, congenital ocular melanocytosis, and melanoma.

Conjunctival epithelial melanosis occurs due to the production of melanin in an increased amount. Melanin is a pigment that is produced primarily upon exposure to the UV rays. It mostly occurs in the individuals who are dark skinned. It can affect both eyes but there might be some difference in the intensity as it can be asymmetrical. It is usually presented during the early years of life but the prominence of melanosis occurs in the early adulthood (Kanski, Bowling, 2011)

Approximately 1 – 2 % of the ocular melanomas are accounted by the conjunctival epithelial melanosis. The incidence of conjunctival epithelial melanosis has increased during 1973 to 1999 that accounted for 5.5 % biannually. It has no restriction of the gender but the incidence is commonly observed in the middle age or in the adulthood. The incidence of conjunctival epithelial melanosis is lower in the individuals belonging to Africa or in the individuals of African-American origin. The highest incidence is observed in the Caucasian population (Cohen, et al., 2018).

The appearance of the conjunctival epithelial melanosis lesion is fleshy that comprise of elevated lesions. The pigmentation of these lesions is variable and the primary location of these lesions is temporal bulbar conjunctiva or the nasal area. Those lesions that arise from primary acquired melanosis can be diffuse or circumscribed. Extension of lesion can occur towards the margin of the eyelid or could be adjacent to the margin of the eyelid. It could also be located towards the orbit or the globe (Salmon, Bowling, 2015).

Diagnosis of conjunctival epithelial melanosis requires the examination of tarsal and bulbar conjunctivae. It is also significant to perform the examination of rim of the orbit as the rate of recurrence is high. Regional lymphadenopathy must be examined in all the patients who have been diagnosed or are under treatment or in follow-up period. CT scan of the entire body can be performed along with the lymphoscintigraphy, ultrasonography, and ultrasound. Immediate referral should be made to the ophthalmological services upon suspicion of conjunctival epithelial melanosis. Surgical excision can be performed for the management of conjunctival epithelial melanosis. Histopathologic evaluation of the dissected lesions is required to confirm the diagnosis of conjunctival epithelial melanosis (Paridaens, et al., 2001).

Diagnosis of the conjunctival freckle requires careful eye examination by an ophthalmologist. Proper documentation of the eye examination is also required in this regard. Sometimes testing is required for diagnosing conjunctival freckle which could include ultra sound

testing, angiogram of the interior portion of the eye, and specialized photography. These tests are beneficial for the documentation of the characteristics, size and shape of the conjunctival freckle. This enables to determine whether there have been some changes or not. The histology consists of increased pigmentation in the basal cell layer of the conjunctival epithelium the number of melanocytes is normal or decreased (Halas, et al., 2013).

Treatment is not required for a conjunctival freckle and there is unavailability of the procedures that could be performed to safely remove these freckles. However, regular eye examination should be performed to reduce the incidence of development of a conjunctival freckle from benign to malignant form. Individuals with conjunctival freckle should try to sustain from UV rays as the production of pigmentation is commonly associated with exposure to UV rays. Sunglasses can be worn to prevent exposure of the eyes to direct sunlight to prevent the transition of benign form into malignant (Chen, et al., 2008).

Primary Acquired Melanosis (PAM) is categorized mostly as malignant and premalignant lesion of the epibulbar. The most common occurrence of primary acquired melanosis is in the white individuals who have a fair complexion. It is a unilateral condition which has two types. One type is primary acquired melanosis with atypia and other type is primary acquired melanosis without atypia. Primary acquired melanosis with atypia is premalignant lesion while primary acquired melanosis without atypia is a benign lesion. It usually occurs in the individuals who are middle-aged. The most common incidence of primary acquired melanosis among the Caucasian. Its prevalence is increased in the regions having high temperature with sunlight. Therefore, prevalence is increased upon exposure to sunlight. There is no significant difference in the clinical features of the primary acquired melanosis without and with atypia. Therefore, there is a need to perform histopathological examination (Salmon, Bowling, 2015).

Lesions that are presenting atypia must be treated with topical mitomycin C or cryotherapy. Treatment can also include the excision of the lesions that are small. Incision biopsy can be performed for the lesions that are large. This biopsy includes the incision from various sites of the lesion. Conjunctival nevus is the most common type of the melanocytic conjunctival lesions. It has very low risk of transformation into malignant form of the lesion. This accounts for only 1 % of the transformation rate. It has similarity to cutaneous nevus, the only difference is in the absence of dermis as the dermal is replaced by the stromal and subepithelial in nomenclature. The conjunctival nevus is one of the most common benign tumors of the ocular surface (Furdova, et al., 2018).

These are the discrete melanocytic lesions that are most commonly observed. The initial appearance of the conjunctival nevus is in the first ten years of life in which it appears as a flat pigmented lesion. Its incidence is not dependent on the gender; however, the prevalence is usually among the Caucasian population. Its association in this population is with familial atypical mole and melanoma syndrome. This syndrome is an autosomal condition which is characterized by increased incidence of ocular and cutaneous melanoma. The incidence

of this lesion is in the individuals with presence of melanoma in the family. It usually appears during the 1st to 2nd decades of life with the presentation of the lesion in the form of unilateral and solitary lesion. The lesion is also pigmented and which is slightly elevated and discrete. The intraepithelial bulbar lesion has variable size and the incidence is usually in the juxtalimbal area. There is variation in the extent of pigmentation with the exception of possibility of some virtually non-pigmented lesions (Collins, et al., 2004; Boniol, et al., 2012; Dummer, et al., 2015).

The diagnosis of conjunctival nevus can be performed by biomicroscopy with slit lamp. In order to detect the region of the presence of the intra-lesional cysts, optical coherence tomography of the anterior segment can be performed. It is also possible to use the immunohistochemical markers to detect the lesions that are not clinically diagnosed. However, the antigen specific to melanoma can demonstrate a positive reaction to both melanoma and nevus (Shields, Shields, 2004).

Indication of treatment is limited only for the cosmetic reasons. It is not required to perform the treatment of the lesions that are small as their resolution is often spontaneous. Treatment of large lesions can be performed through cryotherapy and excision. In cases where there is recurrence of the lesion, treatment includes laser vaporization with carbon-dioxide, application of topical mitomycin C, subconjunctival alpha-interferon and oral cimetidine (Kanski, Bowling, 2011).

Congenital ocular melanocytosis is a melanocytic hyperplasia that is unilateral and has two clinical divisions that include oculodermal melanocytosis and ocular melanocytosis. Oculodermal melanocytosis is referred to the condition when there is involvement of the periocular skin. Both of these clinical conditions are non-hereditary (Shields, et al., 2013).

Congenital ocular melanocytosis is a benign condition that does not require treatment. Review of the patients should be performed by the ophthalmologist. This is recommended due to the risk of meningeal, uveal and orbital malignant melanomas. It is also advice do perform periodic intraocular pressure measurements. The association with an increased frequency of uveal melanoma in the affected eye, has further implications on morbidity and mortality (Furdova, et al., 2011; Shields, et al., 2013).

The prevalence of melanoma can be predicted by the fact that it accounts for 2 % of the ocular malignancies that are caused in the individuals. Melanomas are rare; they can arise without a preexisting conjunctival nevus or due to malignant transformation in case of primary acquired melanosis (PAM) (Furdova, et al., 2007).

Conjunctival melanoma originates de novo in about 5 percent of all cases, from preexisting conjunctival PAM in 75 percent, and from nevi in 20 percent. It is an aggressive tumor and recurrence rates may be as high as 51 percent over 10 years, especially if the tumor is not located at the limbus and has not been completely excised at the time of surgery the margins of amelanotic lesions can be troublesome, and careful evaluation at the slit lamp should be done before surgical excision. Excisional biopsy is always preferred. Incisional biopsy may

promote tumor seeding and lead to local scarring. The best option is a complete excisional procedure. This will give the patient the highest likelihood for an optimal outcome while minimizing the risks. If the area of suspected tumor or the area of pigmentation is extensive, map biopsies are justified. The best way to make the correct diagnosis is by histopathologic evaluation. But conjunctival melanoma is a great mimic. The surgical plan starts at the slit lamp, with careful evaluation of lesion extension and margins, detailed schematic drawings and photodocumentation (Yu, Shields, 2018).

Excision of the circumscribed lesions can be performed with wide free margin. Adjunctive radiotherapy should be administered if histology demonstrates extension of the tumor deeper into the surface of the specimen (Kanski, Bowling, 2011).

Malignant melanoma of the conjunctiva most often arises from PAM, but can also arise from a preexisting nevus or de novo. It usually arises in middle-aged to older adults, but less common cases of conjunctival melanoma in children have been observed. Approximately, 1 % of all conjunctival melanomas occur in children. Conjunctival melanoma shows considerable clinical variability, as it can be pigmented or nonpigmented, pink, yellow or brown in color and involve the limbal, bulbar, forniceal or palpebral conjunctiva (Fahradyan, et al., 2017; Furdova, et al., 2018).

Primary melanocytic orbital tumors include melanoma, melanocytic hamartoma and melanotic neuroectodermal tumor (Furdova, et al., 2011; Furdova, Babal, 2017). Primary orbital melanoma usually originates from congenital ocular melanocytosis or hypercellular blue nevus that affects the orbital tissue. Rarely; it can arise from the optic nerve or after orbital irradiation for rhabdomyosarcoma. Melanoma from melanocytosis and from blue nevus are similar. Over 90 % of primary orbital melanomas arise from melanocytes (congenital ocular melanosis, oculodermal melanosis ((Shields, et al., 2013).

Most orbital melanomas arise from the uveal tract, conjunctiva, eyelids or sinuses and infrequently, as metastases from distant primary sites. Approximately 90 % of primary orbital melanomas arise from melanocytes found in congenital ocular melanocytosis (including blue nevus and cellular blue nevus), orbital melanocytosis, or oculodermal melanocytosis (nevus of Ota). Orbital biopsy may be required to diagnose orbital melanoma when no clinical evidence of melanocytosis of the periocular tissues or uveal tract is present. Even with an orbital biopsy, the histopathologic diagnosis can often be difficult, especially if the tumor is amelanotic. Melanomas arising in the orbit can present diagnostic and management challenges to the physician. The entire tumor should be removed and intact, because the orbital melanoma usually well circumscribed. An incisional biopsy of circumscribed orbital mass in the setting of congenital ocular melanocytosis is contraindicated if there is a chance of removing the tumor intact. Orbital melanoma is more likely can recur or metastasize to distant organs if not removed intact. The surrounding flat congenital pigmented should be examined at surgery, biopsied and treated with heavy cryotherapy or recurrent orbital melanoma should usually be managed by eyelid sparing orbital exenterations (Shields, et al., 2008).

Exenteration which is surgical removal of the entire orbital contents, including the globe, optic nerve, extraocular muscles, lacrimal gland and lacrimal drainage system, as well as the orbital fibroconnective and adipose tissues, is undertaken only in extreme circumstances, such as malignant invasive tumors or adenoid cystic carcinoma. Over 90 % of orbital exenterations are performed as a last resort for invasive neoplasms (Bartley, et al., 1989; Furdová, et al., 2015; Furdova, et al., 2020).

Material and Methods

To evaluate the possibility of AM for the surgical treatment of epibulbar tumors. Retrospective study in the period of 2011 – 2021 at the Department of Ophthalmology, Faculty of Medicine, Comenius University in Bratislava.

Results

In a group of 68 patients treated in the period of 2011-2021, 7 patients (10.3 %) have been treated with AM application after surgical removal of the tumor. 54 patients (79 %) were malignant, and 14 (21 %) were benign. In the analyzed group the males had just slightly higher chance of malignancy than females, 80 % male versus 78.3 % female. The most frequent malignancies indicated to application of AM covering the defect after surgical removal of the epibulbar tumor were squamous cell neoplasia and conjunctival malignant melanoma.

Discussion

Melanocytic lesions of the ocular adnexa include nevi, primary acquired melanosis of the conjunctiva (PAM) with or without atypia, and malignant melanoma (MM). The classification divides them into congenital and acquired lesions, which are generally unilateral. Conjunctival nevus is the most common type of benign tumors of the conjunctiva. This lesion is usually congenital, with the highest incidence in the second and third decade of life if they are pigmented. Conjunctival MM has an incidence of less than one per million per year and represents only 2 % of all malignant diseases of the eye. It is lethal neoplasm, with an average 10-year mortality rate of 30 %. Melanoma of the conjunctiva tends to present in adulthood, especially in Caucasian population. The median age at diagnosis is 60 years. MM arises from three sources – PAM, nevus or de novo. Approximately 75 % of cases have PAM, up to 20 % of patients have history or microscopic evidence of a benign nevus and 5 % are de novo melanomas. MM of the conjunctiva are deeply pigmented, lightly pigmented or amelanotic. Their margins may be discrete or diffuse. They can be unifocal or multifocal. Side effects of this tumor are dilated supplying vessels and degenerative changes of the cornea when the tumor involves cornea. Histopathology of these lesions shows a loss of normal polarity. Clinical examination findings involve discrete well defined congenital lesions that are most commonly found on the interpalpebral bulbar conjunctiva. These lesions can also involve the caruncle, plica, and lid margin. They are rarely found in the fornix. Histopathological findings show benign proliferation of nevus cells present predominantly in the substantia propria (Yu, Shields, 2018).

Melanoma of the conjunctiva spreads into the regional lymphatics. The median time of regional and systemic metastases is about 2 years, the risk of malignant melanoma of the conjunctiva within 10 years is up to 30 %. All suspicious lesions should be histologically examined to confirm the clinical diagnosis. Risk factors for metastasis include more than 2 mm in thickness, the infiltration of surrounding tissues, and tumor recurrence. Therefore, local excision with a “no-touch technique“ is the goal of treatment. If the disease is too extensive for ocular conservation, exenteration is performed. Some authors advocate sentinel lymph node biopsy in high-risk cases. Good results in tumor control can be achieved by brachytherapy. Latest trends in therapy with interferon alfa2b were reported by the PAM. Mitomycin C is used in ophthalmology for many and ocular use of topical MMC helps in prevention of pterygium recurrence in the treatment to prevent transformation to squamous neoplasia of the conjunctiva (Halas, et al., 2013).

There is limited knowledge of the common eye diseases and conditions among the medical staff which suggests the need of increased knowledge of these conditions. Therefore, further studies are required to describe the various types of the epibulbar lesions to enhance the information of the healthcare staff for improved diagnosis and treatment of the various conditions of eye. The results of this thesis support the fact that there is an increased requirement of the improved knowledge of these conditions so that further treatments can be developed by performing further research. Surgical procedures should be explored to demonstrate their significance and efficiency for the treatment of the epibulbar pigmented and non-pigmented lesions (Furdová, 2016).

Epibulbar lesions are the lesions that are formed in the eyeballs particularly in the conjunctiva and cornea. These lesions are classified into two distinct types that include pigmented and non-pigmented epibulbar lesions. The pigmented epibulbar lesions are those lesions that have pigments while the non-pigmented lesions are those that are translucent or transparent due to the absence of the pigments.

There is an increased need of the improved knowledge of these conditions so that further treatments can be developed by performing further research. Further studies are recommended to provide an in-depth analysis of the effectiveness of different treatments that can be used for the treatment of the epibulbar lesions.

Conclusion

Epibulbar pigmented lesions include conjunctival epithelial melanosis, conjunctival freckle, primary acquired melanosis, conjunctival nevus, congenital ocular melanocytosis, and malignant melanoma. The benign pigmented epibulbar lesions are not harmful but can transform into malignant form of the lesion. Most of the small benign lesions do not require surgical removal or treatment.

Considering the significance of the knowledge of clinical presentations and treatment possibilities of the different types of epibulbar lesions, there is a need to perform a brief discussion to develop the information of these lesions among the general population and the healthcare professionals.

Conflict of interest statement:

The authors declare no competing interests.

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TREATING AN AUTOIMMUNE PERIPHERAL CORNEAL ULCER IN THE PRIMARY CARE SETTING

LIEČBA AUTOIMUNITNÉHO PERIFERNÉHO VREDU ROHOVKY V PRIMÁRNEJ STAROSTLIVOSTI

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Abstract

Introduction: Peripheral Ulcerative Keratitis (PUK) is a group of inflammatory diseases whose final common pathway is peripheral corneal thinning. Such diseases are usually associated with systemic diseases, such as Rheumatoid arthritis, polyarteritis nodosa, inflammatory bowel disease, collagen vascular disease and ANCA vasculitides. It manifests as a crescent shaped destructive lesion of the juxtalimbal corneal stroma. The differential diagnosis of PUK is broad. It includes other inflammatory conditions such as Mooren's Ulcer. Mooren's ulcer is a chronic, painful, progressive ulceration of the peripheral corneal stroma and epithelium. It typically starts in the periphery and spreads circumferentially and then centripetally, with an undermined edge of deepithelialized tissue. It is by definition not associated with any systemic autoimmune disease, however it may be triggered by factors including infection like hepatitis C, salmonella, and intestinal parasites. Differentiation between those two entities is often very difficult.

Objective: In this case report, we present a case of Mooren ulcer, which is a type of peripheral ulcerative keratitis, that was successfully treated at a state hospital with a multidisciplinary approach.

Materials and methods: Patient evaluation was carried out on the slit lamp, with serial anterior segment photography both under diffuse light and under cobalt blue light stained with fluorescein.

Case presentation: A 75-year-old male with a medical history of triple bypass, systemic hypertension, hyperlipidemia, and type 2 diabetes presented to the Emergency Department with a three-day history of hyperemia (redness) and a foreign body sensation in his right eye. His best corrected visual acuity was 5/10 in both eyes, and neurological examination findings were normal. Slit lamp biomicroscopy revealed a peripheral corneal ulcer, approximately 3 mm in diameter, with signs of melting, located at 7 o'clock position, 2 mm from the limbus, with involvement of the limbus. Due to concerns about central infiltration, the patient was started on topical moxifloxacin every 2 hours. When there was no improvement, subconjunctival dexamethasone was administered along with topical dexamethasone 1 drop every 5 hours. The frequency of topical moxifloxacin was reduced to 1 drop every 5 hours.

Additionally, a comprehensive rheumatologic evaluation was performed to rule out any underlying systemic diseases.

Results: The next day, there was clear improvement after a 2-week course. Upon daily follow up, the patient remained on topical steroid and surface lubrication. Topical cyclosporine was also considered. The steroid was gradually tapered over 4 weeks., Rheumatologic workup came out negative, leading us to the suspicion of a Mooren's ulcer.

Conclusions: It is vital to rule out systemic disease in cases of peripheral ulcerative keratitis, which may also be owed to autoimmunity. One must take a proper history and do diagnostic tests and then move along therapeutically. Long-term monitoring of the patient and tailored regime also requires a relationship of trust with the patient.

Keywords: Mooren, PUK, keratitis, treatment, autoimmunity

Abstrakt

Úvod: Periférne ulcerózne keratitídy (PUK) sú skupinou zápalových ochorení, ktorých konečným výsledkom je periférne stenčenie rohovky. Takéto ochorenia sú zvyčajne spojené so systémovými ochoreniami, ako je reumatoidná artritída, polyarteritis nodosa, zápalové ochorenie čriev, kolagénové vaskulárne ochorenie a ANCA vaskulitídy. Prejavuje sa ako deštruktívna lézia juxtalimbálnej strómy rohovky v tvare polmesiaca. Diferenciálna diagnostika PUK je široká. Zahŕňa ďalšie zápalové stavy, ako je Moorenov vred. Moorenov vred je chronická, bolestivá, progresívna ulcerácia periférnej strómy rohovky a epitelu. Typicky začína na periférii a šíri sa obvodovo a potom do centra, s ulceráciou v centre tkaniva. Podľa definície nie je spojená so žiadnym systémovým autoimunitným ochorením, ale môže byť spustená faktormi vrátane infekcie, ako je hepatitída C, salmonela a črevné parazity. Rozlíšenie medzi týmito dvomi ochoreniami je často veľmi ťažké.

Cieľ: V kazuistike prezentujeme prípad Moorenovho vredu, čo je typ periférnej ulceróznej keratitídy, ktorý bol úspešne liečený v štátnej nemocnici multidisciplinárnym prístupom.

Materiály a metódy: Hodnotenie pacienta sa uskutočnilo na štrbinovej lampe so sériovou fotografiou predného segmentu oka pod difúznym svetlom aj pod kobaltovo modrým svetlom, lézia bola zafarbená fluoresceínom.

Kazuistika: 75-ročný muž s anamnézou trojitého bypassu, systémovej hypertenzie, hyperlipidémie a diabetu 2. typu bol prijatý na pohotovosť s trojdňovou anamnézou hyperémie (začervenania) a pocitom cudzieho telesa v pravom oku. Jeho najlepšia korigovaná zraková ostrosť bola 5/10 v oboch očiach a nálezy neurologického vyšetrenia boli negatívne. Biomikroskopia na štrbinovej lampe odhalila periférny vred rohovky, priemer približne 3 mm, so znakmi ulcerácie, lokalizovaný v polohe 7 hodín, 2 mm od limbu, s postihnutím limbu. Kvôli obavám z centrálnej infiltrácie bola pacientovi nasadená lokálna liečba moxifloxacínom každé 2 hodiny. Keď nenastalo žiadne zlepšenie, podal sa subkonjunktívny dexametazón spolu s topickým dexametazónom 1 kvapka každých 5 hodín. Frekvencia lokálneho podávania

moxifloxacínu sa znížila na 1 kvapku každých 5 hodín. Okrem toho sa vykonalo komplexné reumatologické vyšetrenie, aby sa vylúčili akékoľvek základné systémové ochorenia.

Výsledky: Na druhý deň po 2-týždňovej kúre nastalo jasné zlepšenie. Pri dennom sledovaní pacient zostal na topickej steroidnej a povrchovej aplikácii a lubrikácii. Zvažoval sa aj topický cyklosporín. Steroid sa postupne znižoval počas 4 týždňov. Reumatologické vyšetrenie vyšlo negatívne, čo nás viedlo k podozreniu na Moorenov vred.

Záver: V prípade periférnej ulceróznej keratitídy je nevyhnutné vylúčiť systémové ochorenie, ktoré môže byť spôsobené aj autoimunitou. Je nevyhnutné urobiť správnu anamnézu a urobiť diagnostické testy a potom postupovať terapeuticky. Dlhodobé sledovanie pacienta a režim „na mieru“ si vyžaduje individuálny prístup k pacientovi a vzťah dôvery s pacientom.

Kľúčové slová: Mooren, PUK, keratitída, liečba, autoimunita

Introduction

Peripheral Ulcerative Keratitis (PUK) is a group of inflammatory diseases whose final common pathway is peripheral corneal thinning. Such diseases are usually associated with systemic diseases, such as Rheumatoid arthritis, polyarteritis nodosa, inflammatory bowel disease, collagen vascular disease and ANCA vasculitides. It manifests as a crescent-shaped destructive lesion of the juxtalimbal corneal stroma

Pathophysiology

The peripheral cornea's distinct anatomy, characterized by its lack of defined borders, increased thickness, and unique immunological profile, renders it highly susceptible to local and systemic immune responses. Unlike the central cornea, the peripheral region contains higher concentrations of Langerhans' cells, elevated levels of immunoglobulin M, and complement component C1 due to limited diffusion from the limbal vessels. This area receives blood supply and lymphatics from the adjacent conjunctiva, providing a gateway for immune system interaction, potentially leading to the degradation of the cornea. The pathophysiological mechanisms of Peripheral Ulcerative Keratitis (PUK) remain uncertain, with hypotheses suggesting an involvement of circulating immune complexes, autoimmune reactions to corneal antigens, and hypersensitivity to external antigens. This involves humoral and cell-mediated responses where immune complexes activate the complement pathway, inducing immune vasculitis, vascular damage, and subsequent inflammatory responses contributing to corneal degradation, emphasizing the interplay between structural and immunological aspects in the development and progression of PUK in the peripheral cornea.

Etiology and systemic associations

The etiology and systemic associations of Peripheral Ulcerative Keratitis (PUK) reveal that about half of PUK cases have a concurrent systemic condition, predominantly falling within the spectrum of collagen vascular diseases (CVDs). Rheumatoid arthritis (RA) stands out as

the most common CVD associated with PUK, likely due to its relatively high prevalence in the general population, affecting around 2.5 % to 3 % of adults. While less common, conditions such as granulomatosis with polyangiitis (GPA) and other antineutrophil cytoplasmic antibody (ANCA)-associated vasculitides also play a substantial role in PUK's etiology.

A significant link between PUK and scleritis, particularly in cases of necrotizing scleritis, indicates an active vasculitic process. In instances of PUK associated with RA, patients typically have a confirmed systemic diagnosis or clinical signs supporting the RA diagnosis, reflecting an advanced disease stage. However, up to 25 % of cases might present PUK as the initial manifestation of undiagnosed systemic vasculitis, underscoring the importance of a thorough systemic evaluation. Moreover, when PUK coexists with scleritis, the presence of PUK indicates a less favorable ocular and systemic prognosis, highlighting the severity of these ocular manifestations and their potential implications for overall health.

Clinical manifestations

The initial symptoms of Peripheral Ulcerative Keratitis (PUK) lack specificity and commonly include foreign body sensation, pain, and photophobia, which are indicative of corneal epithelial erosion and ulceration. Visual impairment may result from the progression of the peripheral inflammatory process towards the central cornea or due to induced astigmatism. Occasionally, accompanying anterior uveitis can further contribute to photophobia and reduced visual acuity, while severe pain may occur in the presence of associated scleritis. Key clinical characteristics of PUK encompass the loss of corneal epithelium, visible through fluorescein staining, as well as varying degrees of stromal inflammation and/or thinning caused by keratolysis, commonly referred to as corneal melting. This corneal melting can occur at any clock hour of the peripheral cornea, with or without a clear zone between the cornea and the limbus. The condition may progress circumferentially, centrally, and posteriorly, potentially leading to corneal perforation. The specific clinical manifestations at the time of presentation depend on the disease's severity, rate of progression, and the interval between symptom onset and clinical evaluation. Notably, corneal melting, once initiated, can progress rapidly. The extent of stromal loss may initially be obscured by debris and necrotic tissue at the ulcer's base, becoming more apparent after corneal scrapings are obtained to investigate possible infectious etiology. Additionally, limbal, conjunctival, and episcleral injection is frequently observed, with concurrent scleritis indicating a higher likelihood of active vasculitis. The presence of PUK with concomitant scleritis is associated with a more adverse ocular and systemic prognosis compared to isolated scleritis. Cataracts and glaucoma may develop either due to the inflammatory process itself or because of corticosteroid usage.

The differential diagnosis of PUK is broad. It includes other inflammatory conditions such as Mooren's Ulcer.

Differential Diagnosis of Peripheral Ulcerative Keratitis

Ocular Conditions and Diseases	Systemic Conditions and Diseases
Microbial	Microbial
Bacterial (<i>Staphylococcus</i> , <i>Streptococcus</i> , <i>Gonococcus</i> , <i>Moraxella</i> , <i>Haemophilus</i>)	Bacterial (tuberculosis, syphilis, gonorrhea, borreliosis, bacillary dysentery)
Viral (herpes simplex, herpes zoster)	Viral (herpes zoster, AIDS, hepatitis C)
<i>Acanthamoeba</i>	Helminthiasis
Fungal	Rheumatoid arthritis
Mooren ulcer	Systemic lupus erythematosus
Traumatic or postsurgical	Granulomatosis with polyangiitis (Wegener granulomatosis)
Terrien marginal degeneration	Polyarteritis nodosa
Exposure keratopathy	Relapsing polychondritis
Rosacea	Progressive systemic sclerosis and scleroderma
	Sjögren syndrome
	Behçet disease
	Sarcoidosis
	Inflammatory bowel disease
	α_1 -Antitrypsin deficiency
	Malignancy

Picture 1. The etiology of PUK (obtained from AAO BCSC: 8, external disease and cornea) Feder, Robert S. External Disease and Cornea. American Academy of Ophthalmology, 2022.

Understanding Moore’s Ulcer

Mooren’s ulcer was first described by Bowman in 1849 and McKenzie in 1854. As the “chronic serpiginous ulcer” of the cornea or “ulcus rodens”. However, Moore’s name was associated with this rare disorder because he published cases in 1863 and 1867. He was the first to clearly describe this mysterious corneal problem and define it as a clinical entity. Moore’s ulcer is characterized as a chronic, painful, and progressive ulceration affecting the peripheral corneal stroma and epithelium. Typically initiating in the periphery, it spreads both circumferentially and centripetally, marked by an undermined edge of deepithelialized tissue. The condition starts with intense inflammation in the limbal area, accompanied by swelling in the episclera and conjunctiva. It can present either as unilateral or bilateral disease. Unilateral manifestation typically affects older patients, ages 50–70 with mild to moderate symptomatology, while bilateral occurs in younger subjects, aged 30–40, particularly of African descent. Bilateral ulceration is typically refractory to therapy. There is a male predilection over female. The ulceration may be peripheral (partial or complete) or even total, involving the entire cornea.

Initial changes manifest as grey swellings near the limbus, expanding rapidly over 4–12 months, affecting the superficial cornea or, in severe cases, replacing the stroma with a thin fibrovascular membrane.

Notably, inflammation is restricted to the limbal area without involvement of the adjacent sclera or Descemet's membrane. The ulcer predominantly affects the corneal stroma, leaving the endothelium and epithelium intact. The ulcer's central edges may have overhanging characteristics, potentially resulting in opacification, while neovascularization extends from the limbus into the ulcer bed without extending beyond the ulcer's advancing edge. (A proteomic approach towards understanding the pathogenesis of Mooren's ..., n.d) Visual acuity at presentation may range from 10/10 to light perception.

Corneal perforation more commonly occurs in patients under 60 years of age, with complete peripheral ulceration having the highest rate. The rate and pattern of perforation does not differ significantly between men and women. Perforation rates are lower in patients with bilateral involvement.

Etiology and pathogenesis

Mooren's ulcer is a condition of uncertain origin, yet mounting evidence suggests an autoimmune foundation, possibly influenced by genetic and environmental factors. Studies propose that the disorder may arise from the body's response to calgranulin C, an antigen typically concealed in the corneal stroma by keratinocytes. This antigen has been detected in circulating polymorphonuclear leukocytes, and its receptors are found on certain helminths, raising speculation about a potential link to helminthic infections. Notably, Mooren's ulcer hasn't been conclusively associated with higher prevalence in areas where ascariasis is common.

Moreover, research indicates an association between specific HLA alleles and Mooren's ulcer. HLA-DR17, HLA-DQ2, and HLA-DQ5 alleles have been notably prevalent in Mooren's ulcer patients, surpassing frequencies in control populations. A recent proteomic study also suggests that the presence of anti-citrullinated protein antibodies (ACPA), often referred to as anti-CCP, may serve as a signature for Mooren's ulcer, shedding light on its immunopathological mechanisms. In addition to its potential autoimmune basis, Mooren's ulcer is linked to various risk factors. Corneal surgery is a known risk factor, but a study in South India revealed a unique observation where extracapsular cataract extraction through a superior limbal incision led to Mooren's ulcer in a subset of cases, although not exclusively at the surgical site. Furthermore, an intriguing association exists between Mooren's ulcer and hookworm infection, suggesting cross-reactivity with calgranulin C. Prior infections are identified as risk factors, and a connection with pyoderma gangrenosum suggests shared immunopathological mechanisms.

These findings underscore the complexity of Mooren's ulcer etiology, emphasizing the need for further research to unravel its underlying mechanisms.

Materials and methods

Patient evaluation involved determination of the best corrected visual acuity, icare rebound tonometry, and serial anterior segment photographs on the slit lamp both under diffuse light and under cobalt blue light stained with fluorescein. This sequence was performed in every subsequent visit.

Objective

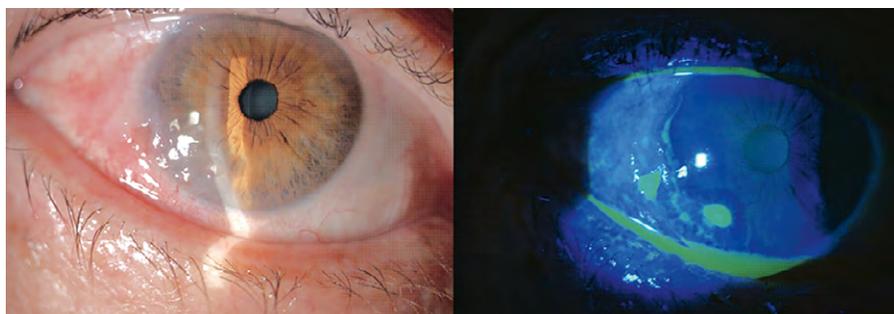
In this case report, we present a case of Mooren ulcer, which is a type of peripheral ulcerative keratitis, that was successfully treated at a state hospital with a multidisciplinary approach.

Case presentation

The patient was a 75-year-old male, who presented to the Emergency department with a three-day history of severe eye pain, redness, and blurring of vision in his right eye.

His past medical history involved a triple coronary bypass, systemic hypertension, hyperlipidemia, and type 2 diabetes mellitus. He denied any rheumatological history or history of autoimmunity. His only systemic complaint was peripheral arthralgia, which he attributed to the nature of his occupation as a builder. His best corrected visual acuity was 5/10 in both eyes. Pupillary light reflex (direct and consensual) was normal and symmetric, without rAPD. Red desaturation screen and Ishihara pseudoisochromatic plate test were also normal. No pathology was discovered during the confrontational visual field testing. Icare rebound tonometry yielded intraocular pressures of 13 and 15 mmHg respectively.

Slit lamp biomicroscopy revealed a peripheral corneal ulcer, approximately 3 mm in diameter, with signs of melting, located at the 7 o'clock position, 2 mm from the limbus, with concomitant limbal involvement. Due to concerns about central infiltration, corneal scrapings were obtained from the ulcer bed according to protocol. The patient was started on topical moxifloxacin every 2 hours.



Picture 2. Anterior segment findings and changes in the corneal structure; slit lamp photography of the patient's right eye in both diffuse light and cobalt blue light with fluorescein staining. On the left we can distinguish the crescent-shaped lesion, accompanied by corneal melting. On the right, positive fluorescein staining and pooling in the ulcer region. Photos taken at the emergency department of PAGNI hospital

Diagnosis Process for Mooren Ulcer

Our potential differential diagnoses involved the following.

- 1. Terrien's marginal degeneration, Pellucid marginal degeneration, and Senile furrow degeneration** present distinct clinical characteristics compared to Mooren's ulcer. **Terrien's marginal degeneration** is a non-inflammatory, painless condition leading to peripheral corneal thinning without ulceration. It typically initiates in the superior cornea and proceeds circumferentially without central involvement, maintaining a clear zone with superficial vascularization between the limbus and the infiltrate. **Pellucid marginal degeneration**, on the other hand, results in inferior corneal thinning and irregular astigmatism but lacks the inflammation and pain associated with Mooren's ulcer. **Senile furrow degeneration**, common in elderly patients, causes corneal thinning between the limbus and an arcus without inflammation or vascularization.
- 2. Rheumatoid arthritis:** can also cause peripheral corneal ulcers, characterized by gray, swollen areas within 2 mm of the limbus, rapid corneal thickness diminishment, and possible descemetocoele formation. Scleritis may accompany rheumatoid arthritis-associated corneal ulcers, distinguishing them from Mooren's ulcer, which spares the sclera. In addition to peripheral ulcerative keratitis, rheumatoid arthritis is linked to keratoconjunctivitis sicca, episcleritis, and sclerosing keratitis, as well as keratolysis, a central corneal stromal disintegration that often occurs in long-standing rheumatoid arthritis patients.
- 3. Peripheral ulcerative keratitis associated with other collagen vascular diseases** such as systemic lupus erythematosus, systemic sclerosis, and relapsing polychondritis. It has been reported in conjunction with inflammatory bowel disease, giant cell arteritis, staphylococcal marginal keratitis, HSV, and acanthamoeba keratitis. In granulomatosis with polyangiitis (GPA; formerly known as Wegener's) and polyarteritis nodosa, peripheral ulcerative keratitis is part of a broader spectrum of ocular involvement. These conditions can lead to proptosis, scleritis, uveitis, and choroidal or retinal vasculitis. In GPA, granulomas that destroy limbal tissue may be observed, both in the corneal and scleral sides of the vascular changes. While limbal involvement is characteristic of Mooren's ulcer, other causes of peripheral ulcerative keratitis usually spare the limbus.

Treatment Plan for Mooren Ulcer at Our State Hospital

Due to our concerns about corneal infiltration, corneal scrapings were obtained from the ulcer bed according to protocol. The patient was started on empiric topical moxifloxacin every 2 hours.

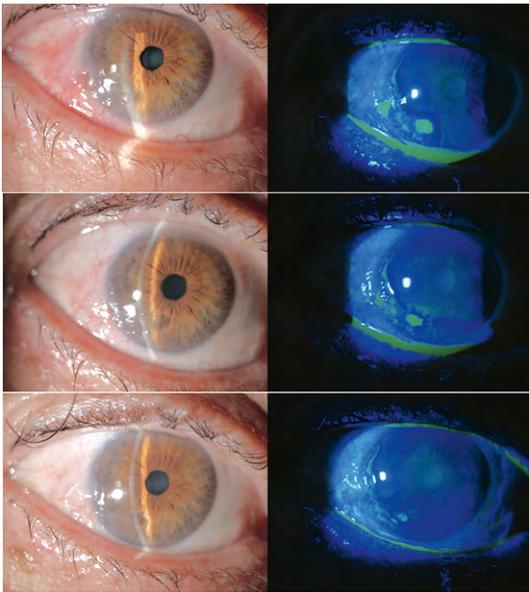
Upon a 2 day follow-up, little improvement was evident, concerning the ulcer margins and conjunctival defect, thus we decided to inject dexamethasone 0,2 ml subconjunctivally, while adding topical dexamethasone 5 times daily. The frequency of topical moxifloxacin was reduced to 1 drop every 5 hours. Topical cyclosporin was also considered. Additionally,

a comprehensive uveitis evaluation was performed to rule out any underlying systemic diseases. The workup involved the following:

- Complete Blood Count (CBC)
- Complete Metabolic Profile (CMP) – liver and kidney function
- Urinalysis
- Antinuclear Antibody (ANA)
- Anti-Neutrophil Cytoplasmic Antibody (ANCA)
- Rheumatoid Factor (RF)
- Anti-Cyclic Citrullinated Peptide (anti-CCP)
- Rapid Plasma Reagin (RPR) -VDRL
- Fluorescent Treponemal Antibody (FTA-Abs)
- Herpes virus panel
- Hepatitis B Virus
- Hepatitis C Virus
- HIV
- ACE
- Lysozyme
- Serum and urine Calcium
- Chest X-Ray (CXR)
- Purified Protein Derivative (PPD-mantoux) and TB quantiferon
- Sacroiliac joint X-Ray

Patient's Response to Treatment

On the next day, the margins of the ulcer began to shrink, the conjunctival defect healed completely and the hyperemia began to gradually improve. This course took up two weeks, through which we weaned the patient completely off moxifloxacin while gradually tapering off the topical steroid over 4 weeks. The rheumatologic workup yielded no positive result for systemic disease. Corneal scrapings came back sterile. Chest xray displayed no signs of granulomatous lung disease, nor had the sacroiliac joint xray yielded any signs of bamboo spine (ankylosing spondylitis). The aforementioned led us to the ultimate diagnosis of a Mooren ulcer.



Picture 3. Serial anterior segment photography under diffuse light and cobalt blue/ fluorescein staining, displaying the gradual epithelization and healing of the ulcer over a 2-week period. Photos taken at the emergency department of PAGNI hospital.

Discussion

Mooren's ulcer is a rare and debilitating autoimmune disorder characterized by peripheral corneal ulceration and thinning. The treatment approach for Mooren's ulcer typically involves topical steroids, as well as other interventions such as conjunctival excision, systemic immunosuppression, and keratoplasty. The patient in this case report responded positively to treatment with moxifloxacin and topical steroid therapy, as the margins of the ulcer began to shrink and the conjunctival defect epithelialized. Response to treatment was monitored closely, over a two-week period, through serial anterior segment photography which provided valuable insight into the effectiveness of therapeutic interventions and the progression of the disease. This response to treatment suggests that the chosen therapeutic approach was effective in managing the Mooren's ulcer in this particular case. However, it is important to note that the etiology of Mooren's ulcer remains unclear, and there are various risk factors associated with the disease. Furthermore, while topical steroids are commonly used as a first-line treatment for Mooren's ulcer, they can be difficult to discontinue due to the chronic nature of the disease and the potential for relapse. In conclusion, Mooren's ulcer is a challenging autoimmune disorder that requires comprehensive treatment strategies tailored to each individual case.

Conclusions

In summary, Mooren's ulcer is a rare and potentially blinding disease. It is widely believed to be an immune-mediated condition directed against the cornea, with evidence supporting systemic immune complex formation and serum antibodies against corneal antigens. There is a fivefold male to female predominance, and most cases occurred between age 40 and 70. Unilateral involvement prevails. Risk of corneal perforation occurs, more commonly

in patients under 60 and in eyes with peripheral ulceration. The exact pathogenesis is not fully understood, but corneal trauma, previous corneal surgery, and hookworm infestation, especially in the developing countries, where poor hygiene and inadequate medical coverage may contribute. In every case of peripheral ulcerative keratitis we should bear in mind that, such entity may also be owed to autoimmunity, and it is also vital to rule out systemic disease. It is required that one take a detailed history and do diagnostic tests and then proceed to the appropriate treatment. Long-term monitoring of the patient to ensure successful remission and to prevent recurrence, along with a tailored regime is crucial in managing Mooren's ulcer.

Conflict of interest:

I have none to declare.

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OPHTHALMOLOGICAL APPROACH TO PATIENTS WITH DYSLEXIA

OFTALMOLOGICKÝ PRÍSTUP K PACIENTOM S DYSLEXIOU

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Abstract

Introduction: Dyslexia is defined as a specific learning disorder of neurobiological origin. It should not be confused with visual stress, which, however, often occurs simultaneously with dyslexia

Research objectives: Investigating the proportion of pseudo dyslexia versus true dyslexia. Evaluation of the ratio of ocular causes in dyslexia, pseudo dyslexia.

Material and methods: Each patient underwent a medical anamnesis, a comprehensive ophthalmological examination focusing on oculomotor and near fusion ability. Subsequently, examinations were again carried out with a focus on distinguishing pseudo dyslexia from dyslexia and trial testing of color contrast – Overlay Screening with colored plastic overlays on the text or the use of ChromaGen filters.

Results: 14 patients diagnosed as dyslexic underwent a detailed ophthalmological examination, of which eye disorders were diagnosed in up to 9 patients, including 3 insufficient correction of central vision, 2 color vision disorders, 6 oculomotor disorders. Of the remaining 5 presumed dyslexics, 1 was a pseudo-dyslexic child with psychological problems.

Conclusion: Despite the very low number of patients, we recorded a high number of undiagnosed eye disorders that can be corrected with optical aids. In our opinion, in cases of dyslexia are necessary no basic eye screenings, but precise ophthalmological examinations are necessary.

Keywords: Dyslexia; Ophthalmological examination; Special pedagogical and psychological counseling.

Abstrakt

Úvod: Dyslexia je definovaná ako špecifická porucha učenia neurobiologického pôvodu. Nemožno si ju zamieňať so zrakovým stresom, ktorý sa však často vyskytuje súčasne s dyslexiou.

Cieľ práce: Posúdenie podielu pseudo dyslexie oproti skutočnej dyslexii. Zhodnotenie podielu okulárnych príčin pri dyslexii, pseudo dyslexii.

Materiál a metodika:

Každý pacient bol podrobený zdravotnej anamnéze, komplexnému oftalmologickému vyšetreniu so zameraním na okulomotoriku a fúznú schopnosť do blízka. Následne boli opäť realizované vyšetrenia so zameraním na odlíšenie pseudo dyslexie od dyslexie a skúšobné testovanie farebného kontrastu – Overlay Screening s farebným plastovým prekrytím na texte alebo využitie filtrov ChromaGen.

Výsledky: 14 pacientov diagnostikovaných ako dyslektici boli podrobne oftalmologicky vyšetrení, kde boli diagnostikované očné poruchy až u 9 pacientov, z toho 3 nedostatočné korekcie centrálného videnia, 2 poruchy farebného videnia, 6 okulomotorických porúch. Zo zvyšných 5 predpokladaných dyslektikov bolo 1 dieťa s pseudo dyslexiou s psychickými problémami.

Záver: Napriek veľmi nízkemu počtu pacientov sme zaznamenali vysoký počet nediagnostikovaných očných porúch, ktoré je možné korigovať optickými pomôckami. Podľa nášho názoru pri vyšetrení dyslexie nestačí iba očný screening, ale je potrebné podrobné oftalmologické vyšetrenie.

Kľúčové slová: Dyslexia; Oftalmologické vyšetrenie; Špeciálne pedagogické a psychologické a poradenstvo.

Introduction

Dyslexia is defined as a specific learning disability that is neurobiological in origin (IDA 2023). Up to 50 % of dyslexia is caused by mild cerebral palsy. Dyslexia also often refers to a range of complex specific learning problems, often including reading and spelling problems. Worldwide, it is estimated that approximately 10 % of the population suffers from dyslexia. Dyslexia is not to be confused with visual stress, which often occurs simultaneously with dyslexia. Visual stress can also occur in non-dyslexic individuals. It is extremely important to filter patients – the exclusion of any eye disorder.

Research objectives

The goal of the project is to assess the proportion of pseudo dyslexia versus real dyslexia. To evaluate the proportion of ocular causes in dyslexia, pseudo dyslexia. Improving reading ability – reading comprehension in children with dyslexia using learning and optical devices. Perceptually relate dyslexia to the cognitive abilities of pupils according to variant A, B, C. We would like to present our procedure for investigating potential dyslexics.

Material and methods

A detailed medical history was taken for each patient. A thorough medical history is extremely important in relation to head and eye injuries, possible complicated childbirth or past infections, strabismus operations and the presence of any neurological disease. The detailed

ophthalmological examinations themselves mainly consisted of psychophysical methods, such as: Examination of central vision with appropriate correction, including cylindrical and prismatic; Evaluation of intraocular pressure: we used the iCare device, where the physiological values of intraocular pressure were 11 – 18 torr.; Examination of the peripheral visual field: we used portable perimetry iVa for increased convenience, accuracy of assessment; Contrast sensitivity: we have chosen a more acceptable form of examination for children – the computer game – Gabory test; Color vision: we used the Wagoner CCVT certified color vision test; Pupilometry examinations were performed for possible photophobia; Ophthalmological examination of the anterior and posterior parts of the eye; Evaluations of the presence of developmental defects, the presence of macular reflex, exclusion of amblyopia. Oculomotor tests are extremely important tests that can show a disorder masquerading as dyslexia. These examinations included: a) Hess screen for the assessment of movement disorders of individual extraocular muscles with the possibility of subsequent correction. b) Stereopsis examinations – using the Itorsion application and the EyeTilt application to evaluate the asymmetry of the eye slits with regard to binocular fusion. c) The Thomson Clinical Eye Tracker enabled a convenient, accurate and repeatable examination and measurement of the coordination of eye movements, including saccadic movements. This method enables the assessment of oculomotor skills even with nystagmus; d) DEM – Bernell's exclusive DEM™ test with the DEM Calculator application to evaluate oculomotor skills: fixation and saccades in children using a psychometric test. The disadvantage of this test is that it does not detect eye motility disorders in nystagmus. Subsequently, there was an examination in a pedagogical-psychological consulting room: It was important to distinguish pseudo dyslexia from dyslexia, whether of exogenous or endogenous etiology. The conclusion was the examination and therapy of dyslexia using teaching and optical devices, which include changing the color contrast – Overlay Screening with colored plastic overlays on the text or the use of ChromaGen filters in order to determine the optimal color to reduce visual stress in the case of scotopic sensitivity syndrome (Meares-Irlen syndrome), color blindness or photophobia.

Results

14 patients previously diagnosed as dyslexic were examined in detail by an ophthalmologist. During a detailed ophthalmological examination, eye disorders were diagnosed in up to 9 patients, who were helped by adequate eye therapy, or the symptoms of dyslexia improved. Of these, there were 3 insufficient corrections of central vision, 2 color vision disorders (together with insufficient optical correction), and 6 oculomotor disorders. Of the remaining 5 presumed dyslexics, 1 was a pseudo-dyslexic child with psychological problems.

Discussion

Dyslexia is a complex problem that has different classification schemes (Kotrbova, 2021). It is generally manifested by problems in processing words from written language to spoken speech, also in decoding words. The result is the inability to read or very difficult reading. Most often, it is about distinguishing the shapes of letters, where it is difficult to separate similar sounds, such as the letters: b, d, p, q, m, n, etc. (Birth Injury Justice Center, 2023). In addition, it is difficult for dyslexics to recognize letters that are in the wrong position. Other manifestations of dyslexia include omitting letters and syllables in words and not understanding the content of the quoted text (Kotrbova, 2022). Consequently, the eye movements of dyslexics have been observed to differ from those of non-dyslexics, particularly in saccadic movements. There were several studies where ophthalmological findings were evaluated in relation to dyslexia (IDA – International Dyslexia Association; 2023). In all studies, it was necessary to exclude visual problems: amblyopia, refractive, oculomotor and perceptual difficulties. It is not always possible, because dyslexia can be present simultaneously with ophthalmological findings. Therefore, proper ophthalmological correction or adjustment can improve the overall appearance of dyslexics (Kotrbova, 2022). The most frequent ophthalmological findings in dyslexia tend to be insufficient stereoscopy and insufficient near fusion (Horkovicova, 2020). In our group – on the contrary, most of the difficulties were conditional only, or even of an ophthalmological nature. It was probably due to the different classification and diagnostic approach to dyslexia itself and, above all, to a precise eye examination.

Conclusion

Despite the very low number of patients, we noted a high number of undiagnosed eye disorders that can be corrected with glasses and optical equipment. Only after obtaining a larger number of examined patients will it be possible to recognize the proportion of eye disorders and the importance of color filters in some disorders of dyslexia and dysgraphia.

In our opinion, screening alone is not enough to diagnose dyslexia, but a detailed ophthalmological examination is necessary.

Conflict of Interest:

The authors of the paper declare that the creation and topic of the professional work and its publication are not in conflict of interest and are not supported by any pharmaceutical company.

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NAJČASTEJŠÍ NEMALANÓMOVÝ ZHUBNÝ NOVOTVAR KOŽNÝ, AKTUÁLNE MOŽNOSTI JEHO DIAGNOSTIKY A LIEČBY

MOST COMMON NON MELANOMA SKIN CANCER, EARLY DIAGNOSIS AND THERAPY

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Abstrakt

Jeden z vôbec najčastejších zhubných novotvarov je bazocelulárny karcinóm kože. Autor poukazuje na aktuálne možnosti včasnej diagnostiky, a následne adekvátnej liečby. Na základe viac ako 230 diagnostikovaných a odoperovaných pacientov v období rokov 2020 – 2023 je zhodnotené a porovnané nielen obdobie tesne pre tzv. kovidovým obdobím a po ňom, ale i diferenciácia ochorenia podľa veku, pohlavia, rozsahu a štádia ochorenia. Nepodstatné nie sú ani faktory, ktoré oddalujú či komplikujú následnú operačnú liečbu. Autor i na základe porovnanie našich a zahraničných údajov konštatuje výrazný nárast ochorenia a súčasne posun do mladších vekových ročníkov.

Dispensarizácia rizikových skupín pacientov, ich medicínsky manažment, včasná diagnostika a následne vhodný terapeutický prístup sú základom pre úspešný celkový výsledok. Chirurgický prístup je stále hodnotený ako najbezpečnejší.

Kľúčové slová: nemelanómová rakovina kože, bazocelulárny karcinóm, diagnostika, terapia, plastická chirurgia

Abstract

Introduction: the most common malignant form of all is basocellular carcinoma. the author points out the current possibilities of early diagnosis and subsequently adequate treatment.

Core of work: on the basis of more than 230 patient in the years 2020 – 2023 they compare the period before covid and after it. Author differentiate the disease according to the age sex, extent and stage of cancer.

factors that delay and complicate the subsequent surgical treatment are also very important.

on the basis of a comparison of our and foreign data it is a possible to state a significant increase in the disease in all age categories.

Conclusion: The dispensation of risk groups of patients, their medical management, early diagnosis and subsequently an appropriate therapeutic approach are the basis for a successful overall results. The surgical approach is still rated as the safest.

Key words: Non melanoma skin cancer, basocell carcinoma, diagnosis, therapy, plastic surgery

Úvod

Jeden z vôbec najčastejších zhubných novotvarov je bazocelulárny karcinóm kože (BCC). Autor poukazuje na aktuálne možnosti včasnej diagnostiky a následne adekvátnej liečby

Na základe viac ako 230 diagnostikovaných a odoperovaných pacientov v období rokov 2019 – 2022 je zhodnotené a porovnané obdobie nielen tesne pred tzv covidovým časom, ale i po ňom. Taktiež diferenciacia ochorenia podľa veku, pohlavia rozsahu a štádia ochorenia, Nie nepodstatne sú faktory, ktoré sa oddiaľujú či komplikujú včasnú diagnostiku, a tým pádom i liečbu.

Na základe porovnania našich domácich i niektorých zahraničných údajov konštatujeme výrazný nárast počtu ochorení, a súčasne i posun smerom do mladších vekových kategórií.

Jeden z vôbec najčastejších zhubných novotvarov je jednoznačne bazocelulárny karcinóm kože. jeho incidencia v posledných dvoch desaťročiach výrazne narastá. Na jednej strane je tu určite vyššia informovanosť verejnosti, preventívne akcie medicínskych centier, preventívne prehliadky, ale i vplyv nadmerneho slnenia, najmä určitých rizikových skupín kožných fototypov či nekontrolované návštevy solárii. V neposlednom rade zvyšovanie priemerného veku populácie. Bazocelulárny karcinóm predstavuje približne 70 – 80 percent všetkých kožných zhubných novotvarov. V ďalšom slede nasleduje spinocelulárny, squamocelulárny karcinóm, a malígny melanóm (Bartoš, et al., 2009).

Jadro práce

Do nášho súboru bolo zahrnutých 232 pacientov s histologicky verifikovaným bazocelulárnym karcinómom za sledované obdobie január 2019 – december 2022, odoperovaných a liečených na našej klinike.

Priemerný vek pacientov v súbore bol 64,5 roka, pričom pomer medzi mužmi a ženami bol M: Ž – 63 : 37. Naša najmladšia pacientka mala vek 29 rokov, najstarší pacient dosiahol vek 92 rokov.

Lokalizáciou s najčastejším výskytom bol tzv. centrálny tvárový kosoštvorec, kde sa nachádzalo takmer 69 percent lézií. Ostatne časti tvare boli zastupené 9 percentami, z toho styri krát sa nachádzal vo vlasovej oblasti- dva krát u žien, a dva krát u mužov. Ostatných 12 percent sa nachádzalo predovšetkým b oblasti šije, proximálnej tretiny ramien, hrudníku, chrbáte, a dve lézie na dolných končatinách.

V uvedenom období sme síce v čase zavedených protiepidemických opatrení proti šíreniu ochorenia „COVID-19“ sme síce registrovali výrazne zníženie počtu diagnostikovaných a operovaných pacientov, na druhej strane však počet operačných výkonov po jeho ukončení vzrástol o takmer 40 %. Toto zvýšenie je len kvantitatívneho charakteru, ale rozsah tumorózných lézií výrazne prekračoval milimetrový priemer 10 mm a viac, navyše i v tak

problematických lokalitách, ako sú vnútorný očný kútik, priestor dolného či horného viečka, špičky nosov, alebo oblasti nosových krídiel.

V roku 2022 sme v našom súbore registrovali až u takmer 13 percent pacientov dve a viac lézii diagnostikovaných u jedného pacienta. Pritom v roku 2019 sme ich registrovali len u sedem percent pacientov.

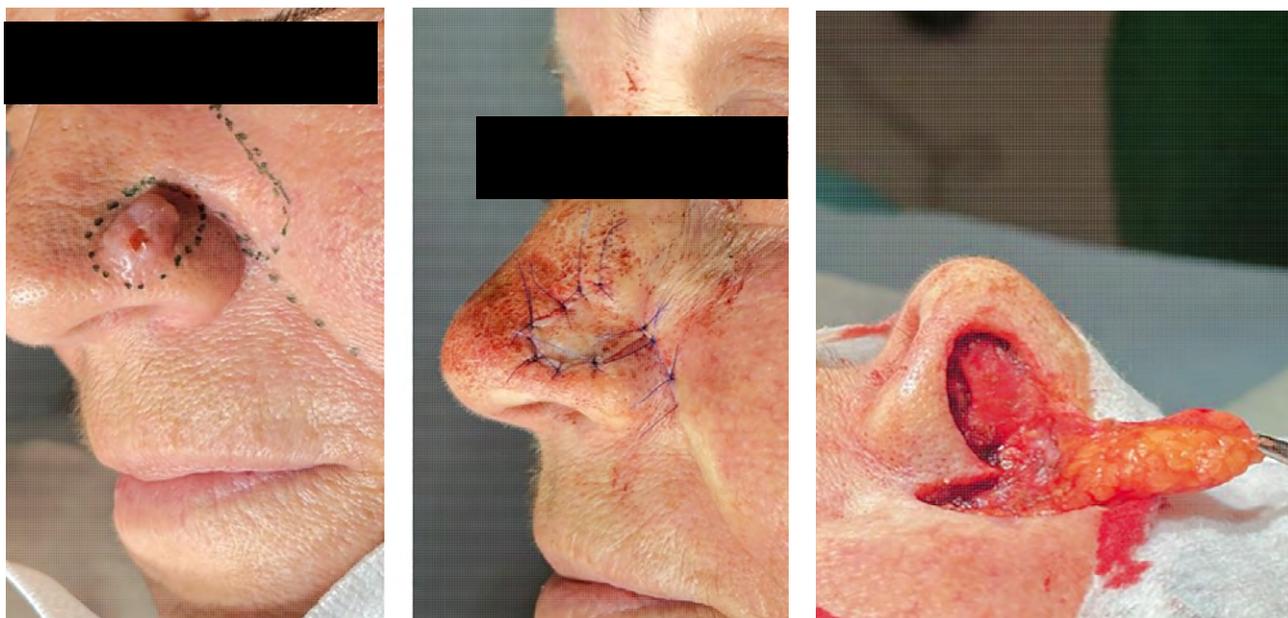
Z hľadiska histologickej klasifikácie absolútne prevládal nodulárny typ BCC (zastúpený u viac ako 73 percent pacientov). Nasledoval superficiálny BCC s 13 percentami, čo je v dobrej zhode s niektorými zahraničnými údajmi (Guo, et al., 2021) Infiltratívny 6 percent, ostatné formy boli zastúpené minimálne.

Najmä v poslednom období evidujeme – ako potvrdzujú posledné roky – ulcerózne formy BCC; o takmer 18 percent viac ako napr. v roku 2019).

Histologické hodnotenie a výsledky excízií poukazali v 93,6 percentách kompletnosť výkonu.

Pri reexcíziách absolútna väčšina opakovaného histologického záveru vykazovala buď len reparačné zmeny resp len prítomnosť jazvovej štruktúry. Štyri výsledky boli s potvrdením patologického procesu a následnou kompletnosťou excízie.

V nami sledovanom období, výskyt novej afekcie (recidivy) bazocelulárneho karcinómu, napriek kompetnosti excízie sa vyskytol v 13 prípadoch (5,5 percenta), nová afekcia v inej lokalite až v 19 prípadoch, čo znamená približne 8,2 percenta. Niektorí autori (Poláková, 2009; Guo, et al., 2021) udávajú podobné údaje, avšak najmä periorbikulárna a perinasálna oblasť sú postihnuté vo zvýšenej miere. V zhode s inými autormi i u našich pacientov sa takmer vždy jednalo o formu infiltratívneho BCC.



Obraz 1a, b, c. histol: verifikovaná nodulárny bsocelelarny karcinom, centrálne s exulceráciou, kompletná excízia, s okrajmi 1 – 1,2 mm.



Obraz 2a, 2b.

a) Histol: pacient p.h. 52r. Rast tu 2,5 roka

Po približne pol roku od začiatku rastu aplikovaný dusík. Neskôr rapídne zväčšenie

b) Histol: bazocelulárny karcinóm s fokálnou diferenciáciou, kompletná excízia, lemy sú na hranici 0.9 – 1.4 mm, spodina voľná.



Obraz 3a, 3b.

Kazuistika: 4x basocelulárny karcinóm

popis: I. II. III. tzn: I. na čele, II. v oblasti nasolabialnej ryhy a III.- na lici: BCC nodulárneho typu, s kompletnými excíziami, bezpečnostne lemy na hranici 1-3,5 mm.

IV. v lokalite hornej pery takmer BCC infiltratívneho typu, centrálna ulcerácia, zasahujúci tesne sval musc. orbicularis oris, kompletná excízia, s laterálnymi okrajmi 1- 1,5 mm spodina, spodina 2,3 mm voľne.

Záverom

Bazocelulárny karcinóm má, nielen ako je uvedené v našom aktuálnom súbore za posledné štyri roky, ale všeobecne v posledných dekádach výrazne stúpajúcu tendenciu. Najčastejšie je diagnostikovaný dermatológom, onko dermatológom, samozrejme všeobecnými lekármi, POKO ambulanciami, avšak nezriedka sa stretávame napríklad odoslaním zo stomatologických pracovísk, či na ORL. Včasná a správna diagnostika, a na ňu nadväzujúca predovšetkým presná chirurgická excízia a následná verifikácia sú základom dobrého výsledku u pacienta (Poláková, 2009).

Určitú zmenu v počtoch našich ošetrovaných pacientov v pred, počas a po kovidovom období samozrejme sú resp boli dôsledkom v zmenesprávania sa nielen pacientov, ale i zdravotníckeho personálu. Určitou formou dispenzarizácie vybraných a potenciálne problematických pacientov môžeme určite zvýšiť záchytnosť v skorších a úspešne riešiteľných štádiách ochorenia. dokonalé chirurgické odstránenie ostáva naďalej základným a najbezpečnejším spôsobom liečby.

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Topics 4

**Health,
Public Health,
Quality of Life**

CHILDHOOD OBESITY PANDEMIC AS A RISK FACTOR FOR CIVILIZATION DISEASES

PANDEMIA OTYŁOŚCI U DZIECI JAKO CZYNNIK RYZYKA CHORÓB CYWILIZACYJNYCH

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Abstract

Background: Overweight and obesity is a serious problem of modern civilization. The World Health Organization identifies Poland among the leading countries struggling with overweight and obesity in children and adolescents. The available scientific literature points mainly to the causes of obesity and ways of dealing with it, and recent post-pandemic years have drawn attention to the compounding of the problem, seeing the causes in a significant reduction in the level of physical activity, sedentary lifestyles and limited access to coordinated care. Why overweight and obesity in children and adolescents has become a problem of the modern world and how it can be prevented became the main focus of the study.

Material and methods: The first part of the study analyzed empirical works in the field of overweight and obesity prevalence statistics worldwide, and then extracted works indicating various ways of secondary and tertiary prevention of obesity disease.

Results: Statistics on the prevalence of excessive body weight are very high and are increasing every year, especially in Western European countries including Poland. There are various approaches to solving this problem indicating, among others, the significant role of diet, physical activity, behavioral therapy, as well as education in terms of recommendations for intervention by parents, the patient's environment, educational or medical institutions. Publications emphasize a multifaceted approach to weight control taking into account age, degree of obesity and obesity-related comorbidities, and lifestyle modification.

Conclusions: Obesity is a chronic disease of civilization, which does not go away on its own, and the disorders associated with it will have their consequences in adulthood, so systemic solutions to this problem, based on specialists who form interdisciplinary teams, are necessary.

Key words: overweight, obesity, lifestyle, health consequences, prevention programs

Streszczenie

Wstęp: Nadwaga i otyłość stanowią poważny problem współczesnej cywilizacji. Światowa Organizacja Zdrowia wskazuje Polskę wśród czołowych Państw borykających się z nadwagą i otyłością dzieci i młodzieży. Dostępna literatura naukowa wskazuje głównie na przyczyny

otyłości i sposoby radzenia sobie z nią, a ostatnie lata postpandemiczne zwracają uwagę na spotęgowanie problemu, upatrując przyczyny w znacznym zmniejszeniu poziomu aktywności fizycznej, sedenteryjnym trybie życia oraz ograniczonym dostępem do opieki skoordynowanej. Dlaczego nadwaga i otyłość dzieci i młodzieży stała się problemem współczesnego Świata i jak można jej zapobiegać stały się głównym celem pracy.

Materiał i metody: W pierwszej części pracy dokonano analizy prac empirycznych z zakresu statystyk występowania nadwagi i otyłości na całym Świecie, a następnie wyodrębniono prace wskazujące na różnorodne sposoby profilaktyki choroby otyłościowej.

Wyniki: Statystyki występowania nadmiernej masy ciała są bardzo wysokie i z roku na rok ulegają zwiększeniu, szczególnie w krajach Europy Zachodniej w tym w Polsce. Różne są sposoby rozwiązania tego problemu wskazując m.in. na znaczącą rolę diety, aktywności fizycznej, terapii behawioralnej, a także edukacji w zakresie zaleceń dotyczących interwencji rodziców, otoczenia chorego, placówek edukacyjnych czy medycznych. Publikacje podkreślają wielostronne podejście do kontroli masy ciała z uwzględnieniem wieku, stopnia otyłości i chorób współistniejących związanych z otyłością oraz modyfikacji stylu życia i zaleceń profilaktycznych.

Wnioski: Otyłość jest przewlekłą chorobą cywilizacyjną, nieustępującą samoistnie, a zaburzenia z nią związane będą miały swoje konsekwencje w wieku dorosłym, dlatego niezbędne są systemowe rozwiązania tego problemu, opierające się na specjalistach, tworzących zespoły interdyscyplinarne.

Słowa kluczowe: nadwaga, otyłość, styl życia, konsekwencje zdrowotne, programy profilaktyczne

Introduction

The World Health Organization makes the point clear that a child needs the proper dose of exercise for healthy psychomotor development. Therefore, what does a proper dose of exercise mean? (Bull, et al., 2020). Research indicates daily regular physical activity of 60 min/day for children and adolescents from age 5 to 17. Younger children under the age of 5 should be moving even more because of the advantage of the stimulatory system over inhibition (Buzz, et al., 2021). Nowadays, it is not necessary to prove the usefulness of regular exercise, regardless of the form (Brzęk, et al., 2021; Liu, et al., 2022; Ludwig-Walz, et. al., 2023), having beneficial effects on organs, tissues, and systems (Winck, et al., 2016; Alves, et al., 2019; Demetriou, et al., 2019; Meena, et al., 2022; Shah, et al., 2022; Mallah, et. al., 2023), affecting mental, physical, and social health (Booth, et al., 2012; Dabas, et. al., 2018; Soltani, et. al., 2020; Brown, et al., 2019). Physical activity also has an important role in maintaining normal body weight and preventing obesity (Dabas, et. al., 2018; Brown, et. al., 2019; Bull, et al., 2020), and in a group of children with obesity, exercise is considered a non-pharmacological intervention that influences the delay of obesity-related consequences including the reduction of visceral fat mass (Gleeson, et al., 2011; Calcaterra,

et al., 2022). Primary prevention aims at establishing a healthy, active lifestyle and keeping children and adolescents within a range of body weight which is considered to be healthy (Zwiauer, 2000).

WHO gives us some key facts such as:

1. Worldwide obesity has nearly tripled since 1975.
2. In 2020 more than 39 million children under the age of 5 were overweight or obese and over 340 million children and adolescents aged 5 – 19 were overweight or obese in 2016.
3. Obesity is preventable.

Than the WHO recommends 5 steps on childhood obesity: initiate, diagnose, discuss, treat and follow up (Rethink Obesity, 2022).

The available research literature mainly points to real problem in the last 5 years. Whether there are risk factors of children obesity became the focus of the analysis of manuscripts in PubMed.

Study analyzed and discussion

The first part of the study analyzed empirical papers on the children obesity. A computer search of the English-language literature only from the PubMed database was conducted, from 2019 – 2023 to retrieve eligible studies. Only published free and available in open access or free full text were considered. Publications including the keywords: children or/ and adolescent and obesity and risk factors were considered. In the original review, 6 407 full-text papers met the criteria. However, studies that met the keywords evaluation criteria but were related to lifestyle/quality of life among children and adolescents with specific chronic diseases, as well as other studies, including reviews, meta-analyses, and case reports, were sequentially excluded.

A review of the literature indicates several facts:

1. Consistent evidence suggests that the disease-burden of obesity on the overall health starts very early in life and is particularly serious for the development of cardiometabolic disease risk factors during childhood and adolescence and the association with premature mortality in adults (Valerio, et al., 2018)
2. Most obese adolescents stay obese as adults (Canoy, Bundred, 2011)
3. In Africa, the number of overweight children under 5 has increased by nearly 24 % percent since 2000 (Ramos-Salas, et al., 2021 – COSI Round 4 – 2015 – 2017)
4. Previous obesity status has a role in determining later status, and thus, early detection and intervention are needed for the prevention of adolescent obesity (Chung, 2021)
5. High intensity interval training (HIIT) requires less time than low-intensity activities, making them applicable for use in schools as a strategy to combat the childhood obesity pandemic (Delgado-Floody, et al., 2019)
6. Children from European countries who were either overweight/obesity (+ 17.1 min/day of MVPA) or normal weight (+16.4 min/day of MVPA) displayed the highest min/day of MVPA differences between weekdays versus weekend days (Brazendale, et al., 2021)

7. Parental support of children in performing physical activity influences the levels of moderate PA that they do during PE classes (Khan, et al., 2020)
8. Evidence suggests that lifestyle interventions can benefit cognitive function and school achievement in children of normal weight (Martin, et. al., 2014)
9. Child obesity has increased significantly in recent years (Figure 1 and 2).

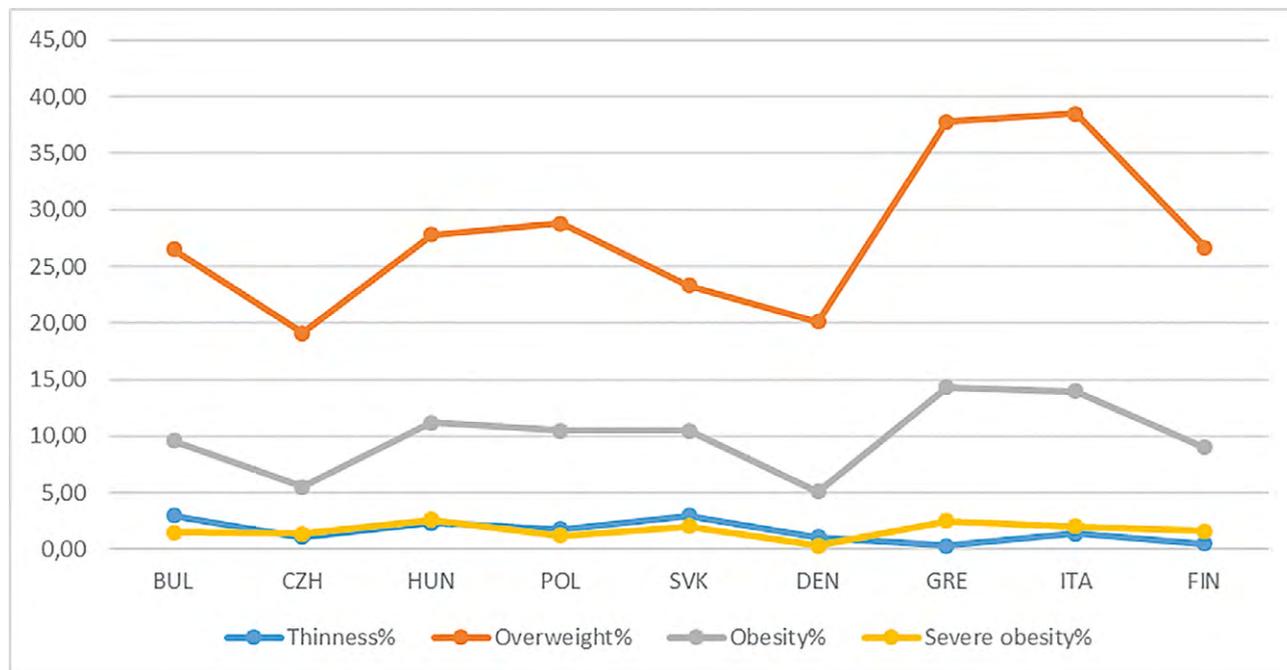


Figure 1. Prevalence values (%) of thinness, overweight, obesity and severe obesity according to the WHO growth references among 7- to 9-year-old boys by country (COSI Round 2015 – 2017)

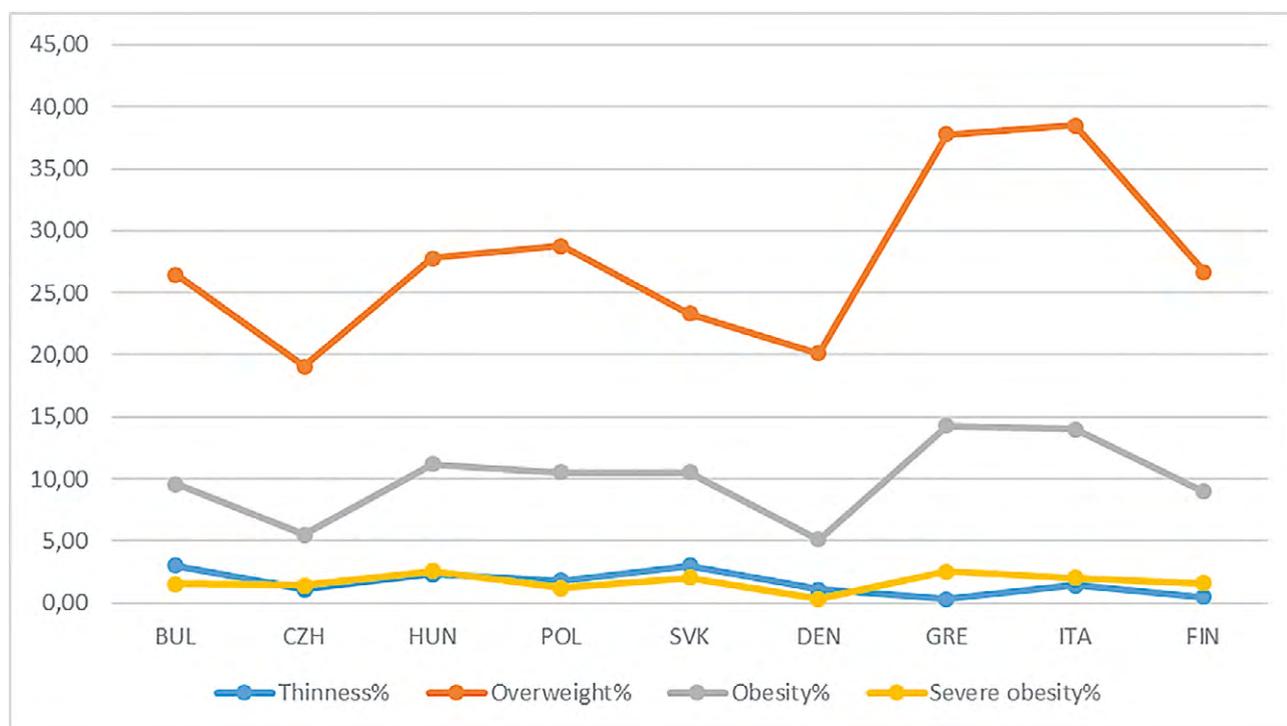


Figure 2. Prevalence values (%) of thinness, overweight, obesity and severe obesity according to the WHO growth references among 7- to 9-year-old girls by country (COSI Round 2015 – 2017)

One of the risk factors is avoiding exercise during PE lessons

The question of whether a child with obesity can exercise in P. E.? It is often asked by the child's parents/legal guardians, children, and adolescents themselves, but is also an unknown among physical education teachers. Increasing the PE or PA time required or recommended by state laws has not slowed the obesity epidemic (von Hippel PT, Frisvold, 2023) School-based physical education (PE) and organised leisure-time sports participation (LTSP) represent important physical activity opportunities for children (Sénéchal, et al., 2021)

Figure 3 below indicates the proposed algorithm in this regard.

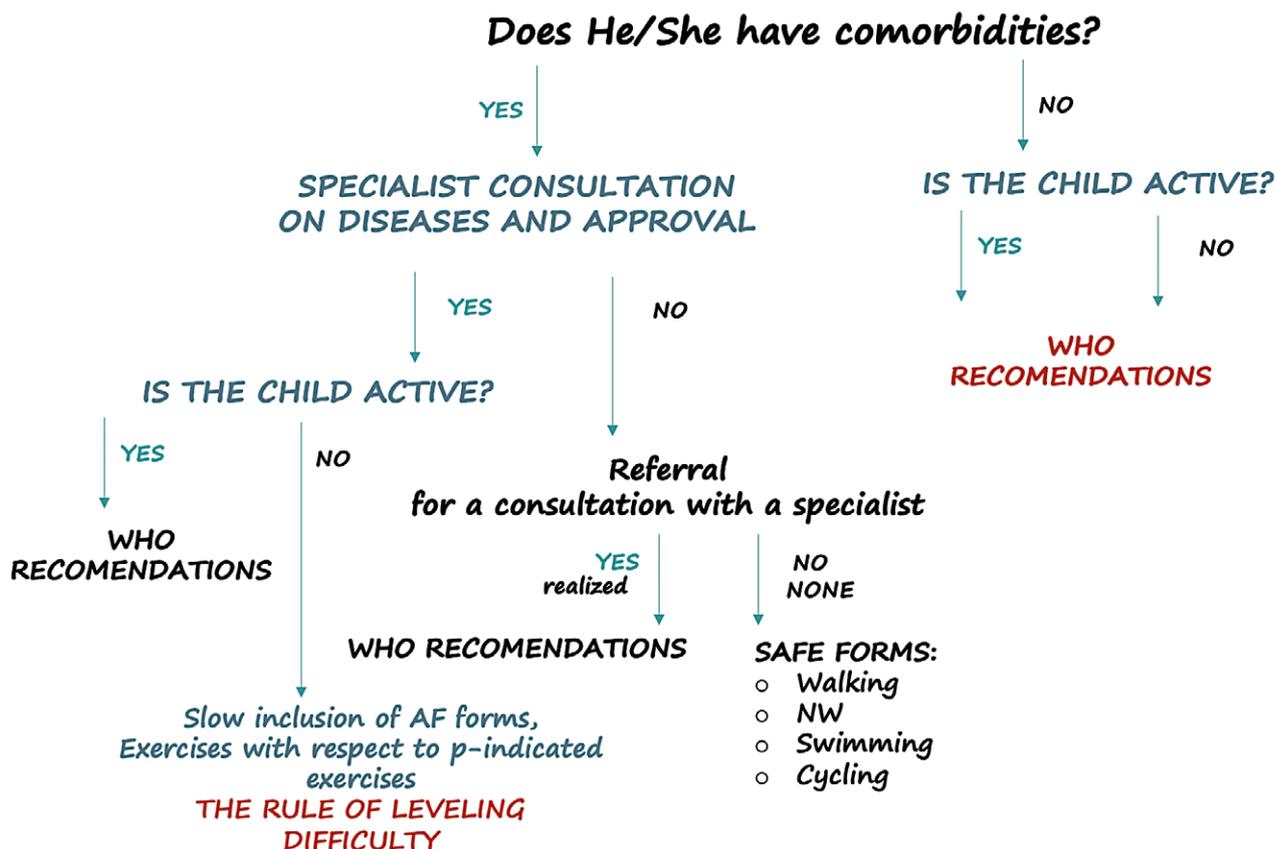


Figure 3. Treatment scheme – participation in physical education classes [own study].

Recommendations for exercise and various forms of physical activity – a review of the literature

The objectives of exercise in obesity treatment itself are to increase physical fitness, reduce or mitigate obesity-related complications, improve quality of life, and support the child in achieving age-appropriate levels of physical activity (Martin, et al., 2014; Dabas, et al., 2018; Brown, et. al., 2019; Bull, et al., 2020). The goal is achieved by the method of small steps, gradually increasing the level of physical activity. However, studies have shown that the most effective weight-loss interventions have exercise sessions of 60 minutes or longer for at least 3 days a week for at least 12 weeks (Stroner, et al., 2019). Another form dedicated as an adjunct to the treatment of children and adolescents with obesity is high-intensity

interval training (HIIT), also recommended during physical education classes. This training significantly affects changes in body composition, body mass index, adipose tissue (%), waist circumference and reduces skinfold thickness and muscle mass. HIIT protocols should consist of 2-3 sessions per week, each session should last 40 minutes (6 minutes of work 4 minutes of rest) for a period of 6 to 24 weeks (Delgado-Floody, et. al., 2019).

In addition, a reduction in sedentary lifestyle is recommended for all age groups. However, insufficient evidence has been gathered to quantify the acceptable level of sedentary behavior, although recommendations can be found in a range between 60-120 min/day. For school-aged children, limiting sedentary behavior to 2 hours/day is not authoritative due to the time spent in school, mainly in sitting positions, where energy expenditure is minimal. Children and adolescents should limit the amount of time also spent in a sitting position, especially in front of screens (TV, computer, smartphone) during leisure time. This is a problem of modern society not excluding children and adolescents (Brzęk, et al., 2017). There are no significant differences in sedentary behavior between children/youth with normal body weight and obesity. These differences are noticeable only when taking into account the level of leisure-time physical activity. Children and adolescents with normal body weight actively participate in extracurricular activities based on MVPA (*Moderate – to Vigorous Physical Activity*) and children with obesity spend this time passively or their physical activity is at a low level (Pope, et al., 2020), which becomes a significant risk factor for comorbidities.

Controlling the level of fatigue during exercise is extremely important. To systematic control HR values, one should use watches or other heart rate monitors according to the scheme, once the fatigue threshold has been established with a specialist:

- Light effort (low intensity) HR < 120u/min – dry skin
- Moderate exertion (medium intensity) 120 u/min < HR < 150 u/min – moist skin
- Heavy effort (high intensity) HR > 150 u/min – wet skin

The heart rate limit to which the patient can exercise is determined with a specialist.

Summary and conclusion

There are high hopes in physical activity, and although as a preventive measure for overweight and obesity the scientific results are spectacular (Dabas, Seth, 2018; Bull, et al., 2020; Brzęk, et. al., 2021; Ludwig-Walz, et al., 2023), the complex process of treating a child with obesity in scientific studies involving physical activity is no longer so satisfactory (Garaulet, et al., 2000; Riddoch, et al., 2004; Martin, et al., 2014; Brzęk, et. al., 2016; Shah, et. al., 2022; Marcus, et al., 2022). Research is still needed to inform the personalization of obesity treatments in children and adolescents and their translation into clinical practice.

It is important that obesity physioprevention education be implemented throughout the ontogenesis process and include the entire family taking into account secondary and tertiary physioprevention.

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JOINPOINT ANALÝZA TRENDU ÚMRTNOSTI A DALYS V DÔSLEDKU ISCHEMICKEJ CHOROBY SRDCA V KRAJINÁCH V4 V ROKOCH 2010–2019

JOINPOINT ANALYSIS OF MORTALITY AND DALYS TREND DUE TO ISCHEMIC HEART DISEASE IN V4 COUNTRIES FROM 2010 TO 2019

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Abstract

Introduction: Cardiovascular diseases (CVD) remain the leading cause of death in Europe, accounting for 45 % of all fatalities. Each year, more than 4 million Europeans primarily succumb to CVD, including ischemic heart disease (IHD) and strokes. CVDs impose significant economic consequences on Europe, with estimated annual costs to the EU economy totalling 210 billion euros. This encompasses direct healthcare expenses and other non-healthcare costs, such as productivity losses and informal care for individuals with CVD (Wilkins, 2017). The European Union region, including Central and Eastern Europe, has the highest number of CVD-related deaths in the world (Roth, 2015; Ezzati, 2015). Although CVD mortality in Europe has declined in recent decades, the pace of this decline varies within the European region among individual countries (Movsisyan, 2020).

The aim of this paper is to describe the epidemiological patterns of the ischemic heart disease (IHD) and to describe the diseases burden in the V4 countries during years 2010 – 2019.

Methodology: a cross-sectional epidemiological study design was used for the purpose of this study. Data on the occurrence of IHD and factors according to the observed period of 2000 – 2019 were used. The primary data source was data obtained from the Institute of Health Metrics and Evaluation (Global Burden of Disease (GBD) study). The Join Point Regression Program (version 4.9.1.0) was used to identify changes in trends in prevalence rates, mortality rates, and DALYs by sex, and the annual percent change (APC) over the entire study period with 95 % confidence intervals was calculated. The joinpoint regression model was used to analyse mortality and AADRs trends in IHD.

Results: Overall, the age-standardized mortality rate for IHD exhibited a declining trend during the observed period. The highest age-standardized mortality rate for IHD was recorded in Slovakia in 2010 241,6/100000 (CI 95 % 221,6; 253,4) for both genders, while the lowest mortality rate was in Poland in 2019 at 130,3/100000 (CI 95 % 110,0; 150,6). The most substantial percentage change in IHD mortality for both genders was observed in Slovakia from 2010 to 2014 (APC -3,8*; IS 95 % -4,8; -2,8; p< 0,001). DALYs due to IHD showed an

overall declining trend during the observed period. The highest age-standardized DALYs rate was recorded in Slovakia in 2000 at 5125,7/100000 (IS 95 % 4900,8; 5277,93), while the lowest rate was in Poland in 2019 at 2081,4/100000 (IS 95 % 1766,19; 2420,56). The most significant annual average decrease in the age-standardized DALYs rate for IHD was observed in Slovakia for both genders from 2010 to 2014 (APC $-4,6^*$; IS 95 % -6 ; $-3,2$; $p < 0,001$).

From 2010 to 2019, DALYs related IHD decreases in all selected variables in the V4 countries. Dietary factors and high systolic blood pressure were the most significant contributors to DALYs in all V4 countries, followed by high LDL cholesterol in mortality related IHD.

Conclusion: Most IHD risk factors are modifiable, which may be related to attributable risk factors and explain decreased IHD mortality and DALYs. It is therefore very important to control the possible risks for CHD within the constant health differences between V4 countries.

Keywords: ischemic heart disease, risk factors, health burden, epidemiology

Úvod

Kardiovaskulárne ochorenia (KVO) zostávajú hlavnou príčinou smrtí v Európe predstavuje 45 % všetkých úmrtí. Viac ako 4 milióny Európanov ročne zomiera predovšetkým na KVO z koronárnej choroby srdca (ICHS) a mŕtvice. KVO predstavujú pre Európu veľké ekonomické následky. ekonomické náklady, ktoré KVO predstavujú pre hospodárstvo EÚ, sa odhadujú na 210 miliárd eur ročne, čo zahŕňa priame náklady na zdravotnú starostlivosť a iné ako zdravotné náklady, ako sú straty produktivity a neformálna starostlivosť o ľudí s KVO. EÚ región vrátane strednej a východnej Európy má najvyšší počet úmrtí na kardiovaskulárne ochorenia vo svete (Roth, 2015). Hoci úmrtnosť na KVO v Európe v posledných desaťročiach klesla, tempo tohto poklesu v európskom regióne má určitú variabilitu v jednotlivých krajinách (Movsisyan, 2020). Podľa štúdie Global Burden of Disease (GBD) trend DALYs v dôsledku kardiovaskulárnych ochorení vykázal značný pokles z 8 477,91 v roku 1990 na 5 779,75 /100000 v roku 2019. Podobný trend vývoja niektorých ukazovateľov možno pozorovať aj v krajinách V4 (GBD, 2020).

Cieľ výskumu

Cieľom tohto príspevku je popísať najvýznamnejšie epidemiologické charakteristiky výskytu ICHS v krajinách V4 v rokoch 2010-2019 celkovo a podľa pohlavia.

Materiál a metodika

Charakteristika výskumnej vzorky

Študijnú populáciu tvorili osoby žijúce v krajinách V4 v rokoch 2010-2019 (bez žiadneho vylúčenia na základe niektorých atribútov, napr. rasy) podľa pohlavia. Medzi ďalšie kritéria okrem pohlavia a časového rozpätia boli zvolené nasledovné: prítomnosť hypertenznej

choroby, vrátane vysokého systolického krvného tlaku, vysoké BMI, fajčenie, nízka pohybová aktivita, výživové rizikové faktory a vysoký LDL.

Metodológia výskumu

Bol zvolený dizajn prierezovej epidemiologickej štúdie. Pre účely tejto štúdie boli použité údaje o výskyte ICHS a súvisiacich faktorov podľa pohlavia a vybraných metabolických a behaviorálnych rizikových faktorov za sledované obdobie rokov 2010-2019. Primárnym zdrojom údajov boli údaje získané z Inštitútu zdravotných metrík a hodnotenia (tzv. štúdia Global Burden of Disease (GBD)) Výsledky sú prezentované podľa pohlavia, ochorenia a zvoleného ukazovateľa podľa jednotlivých krajín V4. Na identifikáciu zmien v trendoch miery úmrtnosti a DALYs podľa pohlavia bol použitý program Join Point Regression Program (verzia 4.9.1.0) a bola vypočítaná priemerná ročná percentuálna zmena v celom sledovanom období s 95 % intervalmi spoľahlivosti.

Výsledky

Celkovo vekovo-štandardizovaná miera úmrtnosti na ICHS mala klesajúci trend vývoja v sledovanom období. Najvyššia vekovo-štandardizovaná miera úmrtnosti na ICHS bola zaznamenaná v roku 2010 na Slovensku 241,6/100000 (IS 95 % 221,6; 253,4) u oboch pohlaví a najnižšia hodnota úmrtnosti bola v roku 2019 v Poľsku 130,3/100000 (IS 95 % 110,0; 150,6). U žien bola zaznamenaná najvyššia hodnota úmrtnosti na ICHS v roku 2010 na Slovensku 197,2/100000 (IS 95 % 176,4; 209,1) a najnižšia hodnota v roku 2017 v Poľsku 98,8/100000 (IS 95 % 82,6; 113,2) U mužov bola najvyššia miera úmrtnosti v roku 2010 na Slovensku 305,2/100000 (IS 95 % 284,3; 319,2) a najnižšia hodnota úmrtnosti bola zaznamenaná v roku 2019 v Poľsku 174,7/100000 (IS 95 % 142,3; 211,2). (Graf 1; A1-A3).

Najvýraznejšia percentuálna zmena v úmrtnosti na ICHS u oboch pohlaví bola zaznamenaná v rokoch 2010-2014 v SR (APC $-3,8^*$; IS 95 % $-4,8$; $-2,8$; $p < 0,001$). U žien bola percentuálna zmena v úmrtnosti na ICHS opäť najvýznamnejšia v SR v rokoch 2010-2014 (APC $-3,7^*$; IS 95 % $-4,6$; $-2,8$; $p < 0,001$) a u mužov v rokoch 2010-2013 v SR (APC $-4,7^*$; IS 95 % $-6,7$; $-2,6$; $p = 0,002$) (Tab.1)

DALYs v dôsledku ICHS malo v sledovanom období celkovo klesajúci trend vývoja, najvyššia vekovo-štandardizovaná miera DALYs bola zaznamenaná v roku 2000 na Slovensku 5 125,7/100000 (IS 95 % 4 900,8; 5 277,93) a najnižšia vekovo-štandardizovaná miera DALYs bola zaznamenaná v roku 2019 v Poľsku 2081,4/100000 (IS 95 % 1 766,19; 2 420,56). U žien bola najvyššia miera DALYs v dôsledku ICHS zaznamenaná v roku 2001 na Slovensku 3 551,7/100000 (IS 95 % 3 326,66; 3 713,2) a najnižšia hodnota v roku 2019 v Poľsku 1 310,5/100000 (IS 95 % 1063,61; 1 599,36). U mužov bola najvyššia hodnota DALYs v roku 2000 na Slovensku 7 219,0/100000 (IS 95 % 6 943,41; 7 442,14) a najnižšia hodnota DALYs v roku 2019 v Poľsku 3 039,0/100000 (IS 95 % 2 440,52; 3 731,74). (Graf 1; B1-B3)

Najvýraznejší ročný priemerný pokles vo vekovo-štandardizovanej miere DALYs pre ICHS bol zaznamenaný v rokoch 2010-2014 na Slovensku u oboch pohlaví (APC $-4,6^*$; IS 95 % $-6; -3,2$; $p < 0,001$, u žien v rokoch 2010-2014 (AAPC $-4,5^*$; IS 95 % $-5,6; -3,3$) a u mužov v rokoch 2010-2013 (APC $-5,7^*$; IS 95 % $-8,1; -3,1$; $p = 0,002$. (Tab.1)



Graf 1. Vekovo-štandardizované miery pre ICHS podľa pohlavia v krajinách V4, 2010 – 2019. A. Úmrtnosť na ICHS podľa pohlavia; B. DALYs v dôsledku ICHS podľa pohlavia.

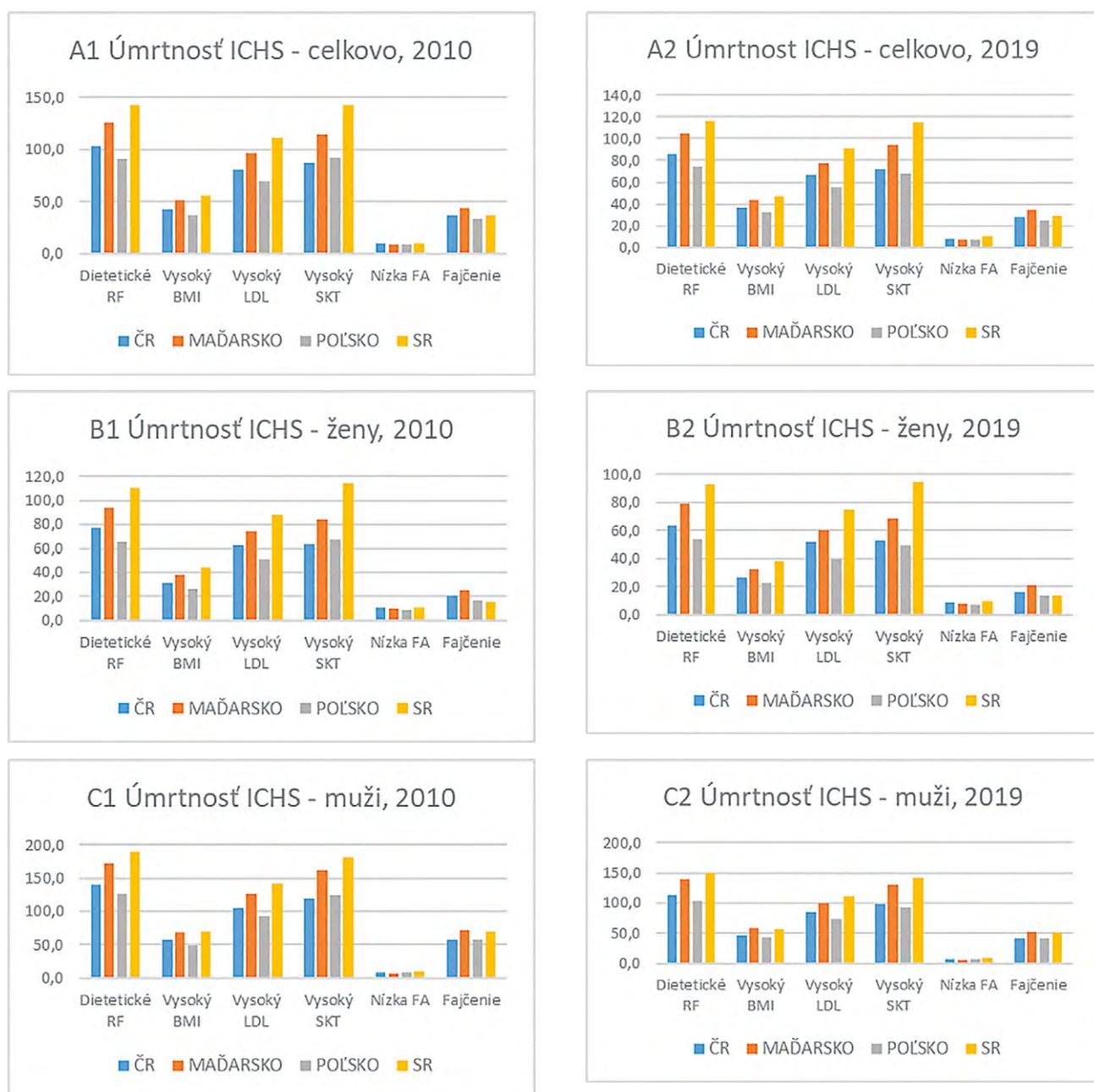
Tabuľka 1. Joinpoint analýza pre ICHS vo vekovo-štandardizovaných mierach, úmrtnosti a DALYs v krajinách V4, 2010 – 2019

Populácia	Pohlavie	Úmrtnosť			DALYs		
		Roky	APC (IS 95 %)	P hodnota	Roky	APC (IS 95 %)	P hodnota
ČR	Spolu	2010 – 2016	-2.7* (-3.2; -2.2)	< 0.001	2010 – 2016	-3.3* (-3.8; -2.7)	< 0.001
		2016 – 2019	-0.5 (-2.2; 1.2)	0.5	2016 – 2019	-0.5 (-2.3; 1.4)	0.542
Maďarsko	Spolu	2010 – 2013	-2.8* (-5.2; -0.4)	0.031	2010 – 2013	-3.1* (-5.3; -0.8)	0.017
		2013 – 2019	-1.4* (-2.3; -0.5)	0.009	2013 – 2019	-1.4* (-2.3; -0.6)	0.006
Poľsko	Spolu	2010 – 2016	-2.7* (-3.3; -2.1)	< 0.001	2010 – 2014	-3.9* (-4.8; -3)	< 0.001
		2016 – 2019	-0.5* (-2.3; 1.4)	0.548	2014 – 2019	-1.4* (-2.3; -0.6)	0.004
SR	Spolu	2010 – 2014	-3.8* (-4.8; -2.8)	< 0.001	2010 – 2014	-4.6* (-6; -3.2)	< 0.001
		2014 – 2019	-0.8* (-1.5; 0)	0.049	2014 – 2019	-0.8 (-1.9; 0.3)	0.113
ČR	Ženy	2010 – 2016	-2.7* (-3.3; -2.1)	< 0.001	2010 – 2016	-3.4* (-4; -2.7)	< 0.001
		2016 – 2019	-0.5 (-2.4; 1.4)	0.532	2016 – 2019	-0.5 (-2.7; 1.8)	0.583
Maďarsko	Ženy	2010 – 2016	-2.3* (-3.2; -1.4)	< 0.001	2010 – 2016	-2.3* (-3.3; -1.3)	< 0.002
		2016 – 2019	-0.6 (-3.3; 2.2)	0.615	2016 – 2019	-0.7 (-3.7; 2.5)	0.598
Poľsko	Ženy	2010 – 2016	-2.8* (-3.2; -2.3)	< 0.001	2010 – 2016	-3.3* (-3.7; -2.8)	< 0.001
		2016 – 2019	-0.4 (-1.8; 1)	0.496	2016 – 2019	-0.4 (-1.9; 1)	0.468
SR	Ženy	2010 – 2014	-3.7* (-4.6; -2.8)	< 0.001	2010 – 2014	-4.5* (-5.6; -3.3)	< 0.001
		2014 – 2019	-0.4 (-1.1; 0.3)	0.178	2014 – 2019	-0.3 (-1.2; 0.6)	0.409
ČR	Muži	2010 – 2016	-2.8* (-3.3; -2.4)	< 0.001	2010 – 2016	-3.4* (-3.8; -2.9)	< 0.001
		2016 – 2019	-0.6 (-2; 0.9)	0.334	2016 – 2019	-0.6 (-2.1; 1)	0.362
Maďarsko	Muži	2010 – 2013	-2.9* (-4.8; -0.9)	0.015	2010 – 2013	-3.3* (-5.2; -1.5)	0.006
		2013 – 2019	-1.4* (-2.1; -0.7)	0.004	2013 – 2019	-1.5* (-2.2; -0.9)	0.002
Poľsko	Muži	2010 – 2014	-3.1* (-4; -2.2)	< 0.001	2010 – 2014	-4.0* (-4.8; -3.2)	< 0.001
		2014 – 2019	-1.3* (-2; 0.7)	0.334	2014 – 2019	-1.5* (-2.1; -0.9)	0.002
SR	Muži	2010 – 2013	-4.7* (-6.7; -2.6)	0.002	2010 – 2013	-5.7* (-8.1; -3.1)	0.002
		2013 – 2019	-1.6* (-2.3; -0.8)	0.003	2013 – 2019	-1.7* (-2.7; -0.8)	0.006

V sledovanom období bol zaznamenaný pokles v úmrtnosti na ICHS vo všetkých zvolených premenných takmer vo všetkých krajinách V4. Spomedzi zvolených rizikových faktorov v najvyššej miere prispievali k úmrtnosti na ICHS dietetické faktory, vysoký systolický krvný tlak a vysoký LDL cholesterol. (Graf 3).

V roku 2010 bola úmrtnosť na ICHS pripisovaná k dietetickým faktorom najviac v SR (celkovo 142,8 na 100 000; IS 95 % 117,3; 168,3), v Maďarsku (celkovo 125,0 na 100 000; IS 95 % 103,9; 144,9) a v ČR (celkovo 103,4 na 100 000; IS 95 % 84,4; 122,5). Naopak v Poľsku k vysokému systolickému tlaku (celkovo 91,5 na 100 000; IS 95 % 72,0; 111,3). V roku 2019 je situácia jednoznačnejšia i napriek tomu že došlo k poklesu, dietetické faktory predstavovali najvýznamnejšiu premennú, ktorá prispievala k úmrtnosti a najviac v SR (celkovo 116,0 na 100 000; IS 95 % 86,8; 148,4) spomedzi V4 krajín. (Graf 2, A1-A2) U žien bola úmrtnosť na ICHS v roku 2010 najviac pripisovaná vysokému krvnému tlaku v SR (113,9 na 100 000; IS 95 % 81,5; 144,2) a taktiež v Poľsku (67,5 na 100 000; IS 95 % 49,0; 85,2). Naopak v ČR (77,2 na 100 000; IS 95 % 61,2; 93,4) a v Maďarsku (94,0 na 100 000; IS 95 % 76,2; 111,5) najviac dietetickým faktorom. V roku 2019 bol najviac k úmrtnosti pripisovaný vysoký systolický tlak v SR (94,3 na 100 000; IS 95 % 61,7; 126,3) a v ostatných krajinách boli významnejšie

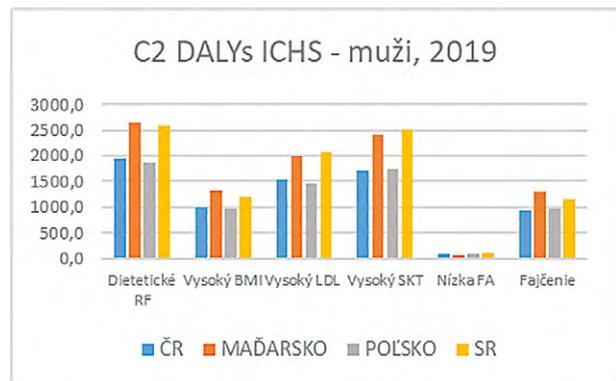
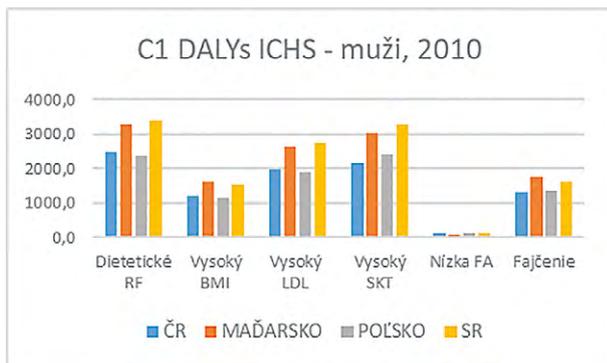
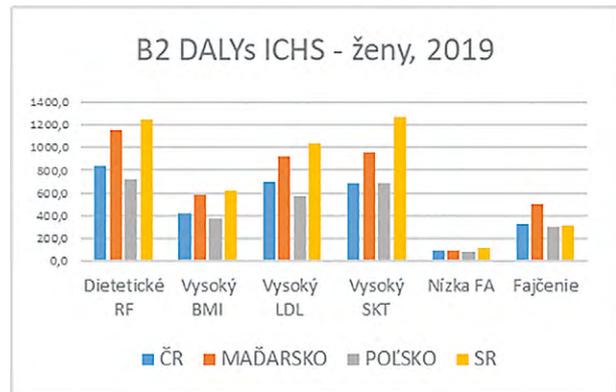
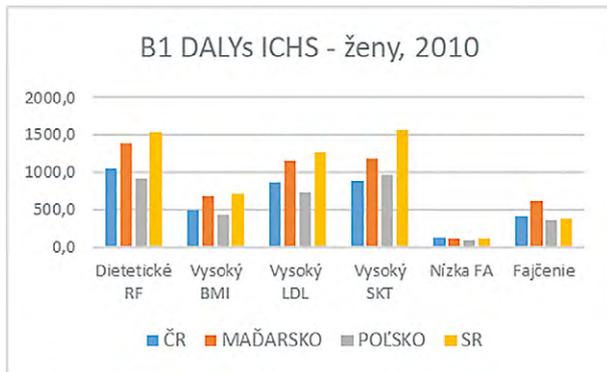
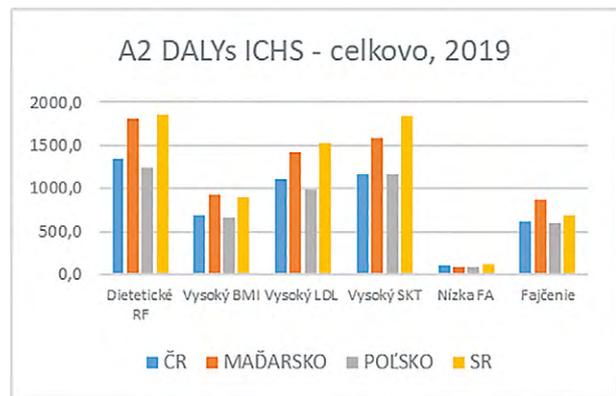
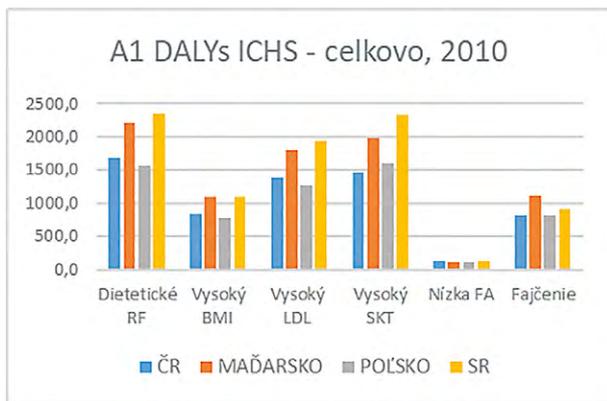
dietetické faktory, t. j. v Maďarsku (79,2 na 100 000; IS 95 % 60,6; 99,3), v ČR (63,7 na 100 000; IS 95 % 47,4; 80,7) a v Poľsku (53,6 na 100 000; IS 95 % 39,3; 68,5). (Graf 2, B1-B2) U mužov bola úmrtnosť na ICHS v roku 2010 najviac pripisovaná dietetickým faktorom vo všetkých V4 krajinách, t. j. v SR (189,4 na 100 000; IS 95 % 157,4; 219,0), v Maďarsku (171,4 na 100 000; IS 95 % 144,6; 196,4), v ČR (140,3 na 100 000; IS 95 % 116,9; 163,1) a v Poľsku (126,5 na 100 000; IS 95 % 105,4; 147,1). V porovnaní s rokom 2019 bola úmrtnosť na ICHS u mužov rovnako pripisovaná k dietetickým faktorom, t. j. najviac v SR (148,6 na 100 000; IS 95 % 113,8; 188,1), v Maďarsku (140,4 na 100 000; IS 95 % 111,4; 173,0), v ČR (114,1 na 100 000; IS 95 % 88,6; 141,5), a v Poľsku (103,5 na 100 000; IS 95 % 79,0; 131,1). (Graf 2, C1-C2).



Graf 2. Porovnanie vekovo-štandardizovanej miery pre ICHS podľa pohlavia a podľa pripisovaných rizikových faktoroch v krajinách V4 v rokoch 2010 a 2019. A. Úmrtnosť celkovo na ICHS; B. Úmrtnosť na ICHS u žien; C. Úmrtnosť na ICHS u mužov.

V sledovanom období podobne ako pri úmrtnosti bol zaznamenaný pokles aj v DALYs v dôsledku ICHS vo všetkých zvolených premenných v krajinách V4. K najvyšším hodnotám DALYs v dôsledku ICHS boli pripisované dietetické faktory a vysoký krvný tlak.

V roku 2010 boli DALYs v dôsledku ICHS pripisované k dietetickým faktorom najviac v SR (celkovo 2 342,5 na 100 000; IS 95 % 1950,0; 2 721,3) a naopak v Poľsku bolo najviac pripisované k vysokému systolickému tlaku (celkovo 1 557,7 na 100 000; IS 95 % 1 374,1; 1 846,0). V roku 2019 situácia bola podobná i napriek tomu že došlo k poklesu, dietetické faktory predstavovali najvýznamnejšiu premennú, ktorá prispievala k DALYs najviac v SR (1 848,9 na 100 000; IS 95 % 1 387,3; 2 377,5) a najmenej v Poľsku (celkovo 1 241,4 na 100 000; IS 95 % 961,9; 1 527,5). (Graf 3, A1-A2) U žien boli DALYs v dôsledku ICHS v roku 2010 najviac pripisované vysokému systolickému tlaku v SR (1 568,3 na 100 000; IS 95 % 1 195,8; 1 898,3) a v Poľsku (958,9 na 100 000; IS 95 % 770,8; 1 151,9) a v krajinách ČR (1049,4 na 100 000; IS 95 % 849,9; 1 250,0) a Maďarsko (1 383,2 na 100 000; IS 95 % 1 141,9; 1 610,2) najviac dietetickým faktorom. V porovnaní s rokom 2019 boli DALYs v dôsledku ICHS najviac pripisované k vysokému systolickému tlaku v SR (1 272,8 na 100 000; IS 95 % 870,8; 1 659,0) a naopak v krajinách v ČR (838,1 na 100 000; IS 95 % 631,3; 1053,2), Poľsku (727,7 na 100 000; IS 95 % 536,4; 932,9) a v Maďarsku (1 156,4 na 100 000; IS 95 % 893,1; 1 448,0) najviac pripisované k dietetickým faktorom. (Graf 3, B1-B2) U mužov boli DALYs v dôsledku ICHS v roku 2010 najviac pripisované dietetickým faktorom v SR (3 398,7 na 100 000; IS 95 % 2 830,5; 3 928,3), v Maďarsku (3 284,4 na 100 000; IS 95 % 2 824,7; 3 700,9) a v ČR (2 466,1 na 100 000; IS 95 % 2076,9; 2 835,6) a naopak v Poľsku boli najviac pripisované vysokému systolickému tlaku (2 407,3 na 100 000; IS 95 % 2071,0; 2 731,2). V porovnaní s rokom 2019 boli DALYs v dôsledku ICHS najviac pripisované u mužov jednoznačne k dietetickým faktorom v Maďarsku (2 633,3 na 100 000; IS 95 % 2091,1; 3 260,8), v SR (2 584,9 na 100 000; IS 95 % 1951,1; 3 306,8), v ČR (1949,1 na 100 000; IS 95 % 1 516,5; 2 446,0) a v Poľsku (1 875,5 na 100 000; IS 95 % 1 408,2; 2 389,6). (Graf 3, C1-C2).



Graf 3. Porovnanie vekovo-štandardizovanej miery pre ICHS podľa pohlavia a podľa pripisovaných rizikových faktoroch v krajinách V4 v rokoch 2010 a 2019. A. DALYs celkovo na ICHS; B. DALYs na ICHS u žien; C. DALYs na ICHS u mužov.

Diskusia

Kardiovaskulárne ochorenia, chronické respiračné ochorenia, nádorové ochorenia a diabetes patria celosvetovo medzi štyri hlavné chronicky neprenosné ochorenia (NCD), ktoré výrazne prispievajú k viac ako 80 % úmrtnosti a chorobnosti.

Táto štúdia ponúka prehľad o zdravotnej záťaži úmrtnosti a DALY v dôsledku ICHS v rámci krajín V4, s dôrazom na záťaž spôsobenú modifikovateľnými rizikovými faktormi.

Vzhľadom na to, že popisované ochorenia možno modifikovať na základe optimálneho príjmu potravín, fyzickej aktivity, vylúčeniu fajčenia a zníženiu výskytu niektorých metabolických rizikových faktorov, je stále úmrtnosť a DALY na ICHS relatívne vysoká. To môže mať dopad na plánovanie zdravotnej politiky, lekárov, zdravotníckych pracovníkov a verejnosť.

Na druhej strane je pozitívnym zistením, že úmrtnosť či DALYs v dôsledku ICHS majú klesajúci trend vývoja v sledovanom období, s niekoľkými menšími zakolísaniami podľa niektorých premenných. Hlavným prispievateľom k záťaži KVO v rámci krajín strednej a východnej Európy je hypertenzia a nezdravá strava (Townsend, 2016).

DALY je štandardná globálna metrika zdravia, ktorá sa bežne používa pri rozhodovaní o zdravotnej politike, môže poskytnúť komplexné meranie včasnej úmrtnosti a chorobnosti súvisiacej s liečbou a môže tiež odrážať rozdiely v rôznych regiónoch. Vysoký systolický krvný tlak (SBP) zostáva najkritickejším rizikovým faktorom pre DALY z ICHS, hoci pripisateľná hodnota sa od roku 1990 znížila. Predchádzajúce štúdie ukázali, že zvýšený SBP je spojený so zvýšeným rizikom KVO. Čo sa týka stravovacích faktorov, celosvetovo strava s nízkym obsahom semien a orechov a slabé zastúpenie celozrnných výrobkov predstavovali viac ako 25 % DALY medzi šiestimi najvyššími rizikovými faktormi a boli na treťom mieste najvýznamnejšieho rizika (Wang, 2021). Túto skutočnosť podporilo aj naše sledovanie, kde jedným z najvýznamnejších rizikových faktorov, ktoré prispievajú k úmrtnosti a DALYs v dôsledku ICHS sú dietetické rizikové faktory, vysoký krvný tlak. Jedným z ďalších rizikových faktorov, ktoré prispievajú k záťaži ICHS je fajčenie. Mnohé krajiny na celom svete však prijali opatrenia na kontrolu tabaku a dosiahli určitý pokrok, i napriek tomu tabak stále ohrozuje zdravie ľudí na celom svete. V našej štúdii sme zaznamenali významný pokles práve pri tomto rizikovom faktore.

Limitácie práce a odporúčania

Výsledky tejto štúdie ukazujú celkový vývoj trendu úmrtnosti na ICHS, ako aj trend vývoja DALYs v dôsledku ICHS v krajinách V4 počas rokov 2010-2019. Údaje v tejto štúdii vychádzajú z odhadov GBD a tým pádom aj obmedzenia GBD sa vzťahujú na tento príspevok. Je dôležité zobrať do úvahy, že medzi hlavné obmedzenia GBD analýzy záťaže ochorení a úrazov patrí aj dostupnosť primárnych zdrojov, to znamená, že v prípade nedostupných údajov sa výsledky opierajú o dostupné parametre a prediktívne modely (GBD, 2020) a to môže ovplyvňovať aj niektoré naše závery. Z tohto dôvodu by bolo vhodné pri ďalšom monitorovaní trendov vybraných charakteristík zvážiť aj ďalšie potenciálne faktory, ktoré môžu ovplyvňovať sledované zdravotné ukazovatele.

Záver

Zdravie jednotlivcov a populácie podlieha vplyvu viacerých faktorov. Väčšina rizikových faktorov ICHS sú modifikovateľné a môžu výrazne prispieť k zmene trendu ICHS a napomôcť zníženiu záťaže týmto ochorením. Je preto veľmi dôležité úspešne a efektívne kontrolovať možné riziká pre ICHS a neustále znižovať zdravotné rozdiely medzi krajinami nielen v rámci krajín V4. Celkovo na základe tejto analýzy môžeme konštatovať, že trend vývoja úmrtnosti a DALYs pre ICHS mal celkovo klesajúci charakter. ICHS predstavuje významnú záťaž v oblasti zdravia verejnosti a preto je potrebné neustále zvyšovať zdravotné uvedomenie v oblasti rizikových faktorov spôsobu života a zameriavať politiky na dominujúce rizikové faktory.

Rovnako dôležité je podporovať zdravý životný štýl a zlepšovať poskytovanie služieb v oblasti prevencie a liečby týchto ochorení.

PodĎakovanie: V tejto štúdii boli analyzované verejne dostupné údaje. Tieto údaje sú dostupné tu: <http://ghdx.healthdata.org/gbd-results-tool>. Rada by som týmto poďakovala tímu zo štúdie Global Burden of Disease za poskytnutie otvoreného prístupu k databáze.

Použité skratky: APC – ročná percentuálna zmena; BMI – body mass index; ČR – Česká Republika; DALYs – roky života štandardizované na invaliditu; FA – fyzická aktivita; ICHS – ischemická choroba srdca; IS – interval spoľahlivosti; SBP – systolický krvný tlak; SR – Slovenská Republika; V4 – krajiny Vyšehradskej skupiny/štvorky

Konflikt záujmu: Týmto prehlasujem, že nemám žiadny konflikt záujmu v súvislosti s obsahom spracovaného príspevku.

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DIGITISATION IN MEDICAL CARE IN GERMANY: AN INTERDISCIPLINARY APPROACH TO PUBLIC HEALTH

DIGITALISIERUNG IN DER MEDIZINISCHEN VERSORGUNG IN DEUTSCHLAND: EIN INTERDISZIPLINÄRER ANSATZ ZUR ÖFFENTLICHEN GESUNDHEIT

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Abstract

Introduction: Today, most people own smartphones, which fit into their pockets and are more powerful than the first supercomputers, and which they can use to communicate, stream music or measure their pulse. There is no end in sight to this rapid technological development. This also applies to the rapidly growing volume of health-related data.

Objectives: In doctor's practices, medical data, such as medical history, blood test results and diagnostic findings, are recorded directly in the computer system. In biomedical research entire genomes, for example those of malignant tumours, are sequenced almost routinely and are also stored and processed electronically. And more and more people are themselves using smartphone apps, wearables and in future perhaps also implanted biosensors for continuously measuring their blood pressure, blood sugar levels and pulse.

Methodology: In qualitative social research, there are only a few approaches that involve a detailed explanation and systematisation of the typology process. As the concept of type is of central importance for qualitative social research, it is crucial to clarify the concept and the process of typology, as presented by Kluge in her essay published in the FQM (Forum for Qualitative Social Research). In the evaluation of secondary data from the KBV (National Association of Statutory Health Insurance Physicians), the methodology of this approach is based on the procedure of typology development according to Kluge (2000), with the aim of demonstrating a systematic and transparent development of types and typologies in the digitisation process.

Results: How far has the digitisation process already progressed in medicine? Are there different types in relation to the level of digitisation, and what are the properties of these new types?

Conclusions: What does digitisation mean for health science? Is it possible to research such a wave of development objectively? What characteristics do the types of digitisation have, and what influences the level of digitisation?

Keywords: Typology. Wave of development. Digitisation process. Health-related data. Smartphone. Semantic connections.

Abstrakt

Einleitung: Die meisten Menschen besitzen heute Smartphones, die in ihre Hosentasche passen und leistungsfähiger sind als die ersten Supercomputer und mit denen sie kommunizieren, Musik streamen oder ihren Puls messen können. Ein Ende dieser rasanten technologischen Entwicklung ist nicht in Sicht. Dies gilt auch für die rasant wachsende Menge gesundheitsbezogener Daten.

Ziele: In Arztpraxen werden medizinische Daten wie Krankengeschichte, Blutuntersuchungsergebnisse und Diagnosebefunde direkt im Computersystem erfasst. In der biomedizinischen Forschung werden ganze Genome, beispielsweise von bösartigen Tumoren, nahezu routinemäßig sequenziert und auch elektronisch gespeichert und verarbeitet. Und immer mehr Menschen nutzen selbst Smartphone-Apps, Wearables und in Zukunft vielleicht auch implantierte Biosensoren, um kontinuierlich ihren Blutdruck, Blutzuckerspiegel und Puls zu messen.

Methodik: In der qualitativen Sozialforschung gibt es nur wenige Ansätze, die eine detaillierte Erläuterung und Systematisierung des Typologieprozesses beinhalten. Da der Typusbegriff für die qualitative Sozialforschung von zentraler Bedeutung ist, ist es von entscheidender Bedeutung, den Begriff und den Prozess der Typologie zu klären, wie sie Kluge in ihrem im FQM (Forum Qualitative Sozialforschung) veröffentlichten Aufsatz darlegt. Bei der Auswertung von Sekundärdaten der KBV orientiert sich die Methodik dieses Ansatzes an der Vorgehensweise der Typologieentwicklung nach Kluge (2000) mit dem Ziel, eine systematische und transparente Entwicklung aufzuzeigen Typen und Typologien im Digitalisierungsprozess.

Ergebnisse: Wie weit ist die Digitalisierung in der Medizin bereits fortgeschritten? Gibt es je nach Digitalisierungsgrad unterschiedliche Typen und welche Eigenschaften haben diese neuen Typen?

Schlussfolgerungen: Was bedeutet Digitalisierung für die Gesundheitswissenschaft? Lässt sich eine solche Entwicklungswelle objektiv erforschen? Welche Eigenschaften haben die Arten der Digitalisierung und was beeinflusst den Grad der Digitalisierung?

Schlüsselwörter: Typologie. Entwicklungswelle. Digitalisierungsprozess. Gesundheitsbezogene Daten. Smartphone. Semantische Zusammenhänge.

Introduction

The increasing digitisation of social life is changing the requirements that apply to modern healthcare while offering opportunities for a more efficient healthcare system. In future, the interlinking and processing of health data will make it increasingly possible to design better diagnostic procedures and treatments tailored to the needs of the individual patient (N. A. 2022, www.bmbf.de).

Analysis of semantic connections and typology

Table 1. Semantic connections (1)

Source: Author's own depiction, based on Kluge (2000)

Analysis of semantic connections and typology					
	Form of digitisation	Doctor-Doctor	Doctor-Hospital	Doctor-Patient	Doctor-KV
Level of digitisation		2019: 51%	2019: 85%	2019: 25%	2019: 52%
Type 1 very high	80–100%		Type 1 Doctor-Hospital		Type 3 Doctor-Doctor_Healthcare Data_Emergency Data Record_Doctor-KV
Type 2 high	60–80%				
Type 3 medium	40–60%	Type 3 Doctor-Doctor_Healthcare Data_Emergency Data Record_Doctor-KV			
Type 4 low	20–40%			Type 4 Doctor-Patient	
Type 5 very low	0–20%				

Table 2. Semantic connections (2)

Source: Author's own depiction, based on Kluge (2000)

Analysis of semantic connections and typology					
	Form of digitisation	Practice management	Healthcare Data	Emergency Data Reco	Medicines
Level of digitisation		2019: 60%	2019: 47%	2019: 40%	2019: 79%
Type 1 very high	80–100%				
Type 2 high	60–80%	Type 2 Practice Management_Medicines			Type 2 Practice Management_Medicines
Type 3 medium	40–60%		Type 3 Doctor-Doctor_Healthcare Data_Emergency Data Record_Doctor-KV	Type 3 Doctor-Doctor_Healthcare Data_Emergency Data Record_Doctor-KV	
Type 4 low	20–40%				
Type 5 very low	0–20%				

Graphic representation of developed types

Table 3. Graphic representation of the types (1)

Source: Author's own depiction, based on Kluge (2000)

Analysis of semantic connections and typology				
Form of digitisation	Practice Management	Healthcare Data	Emergency Data Record	Medicines
Level of digitisation	2019: 60%	2019: 47%	2019: 40%	2019: 79%
Type 1 very high	80–100%			
Type 2 high	60–80%	Type 2 Practice Management_Medicines		Type 2 Practice Management_Medicines
Type 3 medium	40–60%		Type 3 Doctor-Doctor_Healthcare Data_Emergency Data Record_Doctor-KV	Type 3 Doctor-Doctor_Healthcare Data_Emergency Data Record_Doctor-KV
Type 4 low	20–40%			
Type 5 very low	0–20%			

Table 4. Graphic representation of the types (2)

Source: Author's own depiction, based on Kluge (2000)

Analysis of semantic connections and typology				
Form of digitisation	Doctor-Doctor	Doctor-Hospital	Doctor-Patient	Doctor-KV
Level of digitisation	2019: 51%	2019: 85%	2019: 25%	2019: 52%
Type 1 very high	80–100%	Type 1 Doctor-Hospital		
Type 2 high	60–80%			
Type 3 medium	40–60%	Type 3 Doctor-Doctor_Healthcare Data_Emergency Data Record_Doctor-KV		Type 3 Doctor-Doctor_Healthcare Data_Emergency Data Record_Doctor-KV
Type 4 low	20–40%			Type 4 Doctor-Patient
Type 5 very low	0–20%			

Table 5. Types of Digitisation
 Source: Author's own depiction, based on Kluge (2000)

Types of Digitisation in Health Care in Germany								
Object / Level of Digitisation	Doctor - Doctor	Doctor - Hospital	Doctor - Patient	Doctor - Association	Practice management	Healthcare Data	Emergency Data Record	Medicines
Type 1 very high 80 - 100%		Type 1 85%		Type 3 52%				
Type 2 high 60 - 80%					Type 2 60%			Type 2 79%
Type 3 medium 40 - 60%	Type 3 51%					Type 3 47%	Type 3 40%	
Type 4 low 20 - 40 %			Type 4 25%					

Characterisation of the developed types

Type 1 Doctor-Hospital/digitisation very high

In general, communication with clinics is still largely analogue. The information most frequently exchanged between practices and hospitals continues to be discharge letters. The percentage of practices exchanging findings, surgery reports and other treatment-related information with hospitals digitally is still below 5 %.

Among the large practices, the percentage of practices that are digitally connected with hospitals (e.g. via referral portals) is higher (23 %) than in 2018 (16 %). The percentage among the large practices that carry out at least half of their communication with hospitals digitally was also considerably higher: while this was only 8 % of large practices in 2018, it is almost every fifth large practice in 2019 (N. A. 2022c).

Type 1 has a weighting of 1/8, corresponding to 12.5 %.

Type 2 Practice Management – Medicines / digitisation high

Level of digitisation in practice management

In practice organisation, a higher degree of use of digital applications can be observed in certain areas when comparing the two surveys (2018 and 2019). In certain subgroups, such as medium-sized practices and practices providing specialist medical care, an opposite trend can be observed. The greatest increase can be seen in hygiene and quality management, which is partially the result of examples being provided in the survey.

The larger and more specialised the practice, measured by the number of doctors working at the practice, the more digital applications for practice management are used (N. A. 2022b).

Cross-linking, interfaces and medication safety

79 % of doctor's practices are equipped with medical devices (ultrasound, electrocardiogram and the like) with digital interfaces to transmit measurement results. Across all practice groups, this represents a slight increase in comparison with the previous year.

Of these, 91 % have linked their devices entirely or predominantly with their EDP-based practice management systems (PMS) so that they can transfer data. This also represents a slight increase (N. A. 2022a).

Type 2 has a weighting of 2/8, corresponding to 25 %.

Type 3 Doctor-Doctor_Health Data_Emergency Data Record_Doctor-KV/digitisation medium

A year-on-year comparison of the use of digital transmission channels such as email/KV-Connect between doctor's practices and the content sent via digital channels does not reveal any clear pattern. Doctors and psychotherapists most commonly use email for digital communication with colleagues: 45 % of practices in 2018 and 51 % in 2019 make use of this digital medium. All other forms of digital communication, such as messenger services/text messages, video conferences or online chats, are used much less often, although a slight increase can be observed. The more specialised doctors are, the more often they communicate via email.

The doctor's practices most commonly receive laboratory data in digital form from other outpatient care facilities, provided they exchange data digitally. This still applies to more than two thirds of them. Above all, general practitioner practices are set up for this, followed by interdisciplinary practices. Much less common is the digital receipt of findings, discharge letters and image material for diagnostics in the doctor's practices. A considerable percentage of doctor's practices do not receive any digital data from outpatient facilities. Digital receipt of data is most common in larger practices – measured by the number of doctors working there (N. A. 2022d).

Practices were asked to provide an assessment of the benefit of various digital applications – both those already in use and those that could be used in future. In comparison with 2018, the electronic medication regimen is still considered as the application with the most benefit, closely followed as before by the digital emergency data record. The greatest increase was in relation to the provision of online diagnosis/treatment (with a rise from 11 % to 18 %) and in the creation and maintenance of a digital emergency data record (from 24 % to 40 %). In contrast, the number of practices willing to offer general online or video consultation has hardly increased in total – with the exception of psychotherapy practices.

Almost every second doctor's practice (which is an increase compared to 2018) considers digital prescriptions, transferrals and certifications (digital versions of maternity card, vaccination/allergy/implant card or examination records) to be very highly or somewhat highly beneficial for patient care. Psychotherapeutic practices were not included. Multiple answers could be given (N. A. 2022a).

Compared with the previous year, more practices communicate with their SHI-accredited doctors association (KV) digitally in most or almost all cases (2018 : 24 %; 2019 : 52 %).

Correspondence with public bodies other than the KVs and other healthcare facilities (e.g. statutory health insurance companies, pension insurance, employers' liability insurance associations) is still predominantly carried out in paper form in most practices (N. A. 2022e).

Type 3 has a weighting of 4/8, corresponding to 50 %.

Type 4 Doctor-Patient / digitisation low

The percentage of practices that communicate digitally with their patients outside the practice has more than doubled in comparison with the previous year, increasing from 12 % to 25 %. There was a particularly strong increase (relatively speaking) among the general and specialist practices and among larger practice units.

Among the potential forms of digital communication with patients outside the practice, email continues to dominate; messenger services or text messages are the second most widely used form, although the rates are much lower (2019 : 20 % vs. 2018 : 16 %). Psychotherapists make use of email and messenger services / text messages particularly often when communicating with patients (N. A. 2022f).

Type 4 has a weighting of 1/8, corresponding to 12.5 %.

Discussion

Communication between doctors and patients is the decisive factor when it comes to medical care, and is vital for correct diagnosis and optimal treatment. In the course of digitisation, new potential for communication is opening up for doctors and patients. Because of digitisation, patients – and their relatives – are more actively involved in the recovery process; doctors and pharmaceutical companies are now dealing with „smart“ patients. Patients who are not satisfied with trusting their doctors but who instead want to have more control over their treatment. Digitising this communication can help to increase the efficiency and quality of medical care. Patients can be provided with a competent contact person at an earlier stage, helping them to navigate the healthcare system better. The use of different communication and information channels (video telephony, VoIP, messaging, uploading photos and data) makes it possible for doctors and patients to communicate both easily and securely. This makes digital technology an opportunity to increase the quality of outpatient medical care. With this in mind, the question arises as to how digitisation may change doctor-patient communication and what professional requirements apply (Meier, et al., 2018).

Type 1 Doctor-Hospital has the highest level of digitisation and a weighting of 12.5 % of cases.

This is followed by type 2 Practice Management / Medicines with a high degree of digitisation (weighting 25 % of cases) and type 3 Doctor-Doctor / Health Data / Emergency Data Record / Doctor-KV with a still medium level of digitisation and a weighting of 50 % of cases. Type 4 Doctor-Patient has a low level of digitisation and a weighting of 12.5 % of cases.

Conclusions

It is clear that certain types have a substantially high level of digitisation and as can be established based on the reference years 2018 and 2019 the rates are set to increase in future. It will be very interesting to see what the future development of digitisation will mean for us. The types identified in the study are naturally subject to a range of factors that explain their frequency and their level of digitisation. It is nevertheless important to apply a typology here, to benefit the transfer of information.

Certain tendencies are not always apparent at first sight. Clusterings and typologies go one step further and can highlight tendencies and new aspects.

Further investigation of the types defined here and refining their features scientifically can be the object of future research. The reference to public health is plain to see.

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JAKOŚĆ ŻYCIA I JEJ ZWIĄZEK Z DEPRESJĄ U PACJENTÓW Z CHOROBAŁĄ NOWOTWOROWĄ

QUALITY OF LIFE AND ITS RELATION TO DEPRESSION IN CANCER PATIENTS

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Streszczenie

Wstęp: Nowotwór jest coraz bardziej powszechną chorobą. Przyczynia się do tego zanieczyszczone środowisko, chroniczny stres, stosowanie różnych leków oraz czynniki genetyczne. Wiąże się ona z szeregiem skutków ubocznych na płaszczyźnie fizycznej, psychicznej i społecznej.

Cel pracy: Celem pracy było określenie związku między jakością życia, a występowaniem depresji u pacjentów z chorobą nowotworową.

Materiał i metody: Badaniem zostało objętych 112 osób z rozpoznaniem nowotworu w aktywnej fazie choroby. Badania były prowadzone od grudnia 2022 roku do kwietnia 2023 roku. Metodą badań był sondaż diagnostyczny z wykorzystaniem techniki ankieta, natomiast narzędzia stanowiły: autorski kwestionariusz ankiety, skala oceny jakości życia – WHOQOL-BREF, Skala Depresji Becka oraz Numeryczna Skala Oceny Bólu (NRS).

Dla wszystkich obliczeń statystycznych przyjęto poziom istotności $p < 0,05$. Do obliczeń użyto testów: chi-kwadrat, współczynnika korelacji rang Spearmana oraz testu Kruskala-Wallisa. Do obliczeń statystycznych użyto programu Statistica 10.

Wyniki: Większość badanych 76 % stanowiły kobiety. Najmłodszy uczestnik badania był w wieku 18 lat, a najstarszy miał 82 lata. Najwięcej badanych zamieszkiwało miasto 60 %.

Stwierdzono, że mediana jakości życia – dziedzina psychologiczna (WHOQOL-bref) przyjmuje wyższe wartości w grupach osób z wykształceniem średnim oraz wyższym, a niższe w grupach osób z wykształceniem podstawowym, gimnazjalnym, zawodowym.

Stwierdzono, że występuje istotna statystycznie różnica w dziedzinie fizycznej, psychologicznej, społecznej i środowiskowej jakości życia (WHOQOL-bref) w zależności od skali depresji Becka. Zatem stwierdzono, że mediana wszystkich wymienionych dziedzin jakości życia (WHOQOL-bref) przyjmuje najwyższe wartości w grupie osób bez depresji, najniższe natomiast w grupie osób, które doświadczyły epizodu depresyjnego o umiarkowanym nasileniu.

Wnioski: Stwierdzono istotnie statystyczną zależność między jakością życia w dziedzinie psychologicznej a wykształceniem. Natomiast pozostałe dane socjodemograficzne takie jak: miejsce zamieszkania, płeć, wiek, nie wykazywały takiej zależności.

Stwierdzono istotnie statystyczną zależność między jakością życia we wszystkich dziedzinach a występowaniem bądź nasileniem depresji.

Słowa kluczowe: jakość życia, depresja, choroba nowotworowa.

Abstract

Introduction: Cancer is an increasingly common disease. It is caused by a polluted environment, chronic stress, the use of various drugs and genetic factors. It is associated with a number of side effects on the physical, psychological and social levels.

The aim: The aim of the study was to determine the relationship between the quality of life and the occurrence of depression in cancer patients.

Material and methods. The study included 112 people diagnosed with cancer in the active phase of the disease. The research was conducted from December 2022 to April 2023. The research method was a diagnostic survey using the survey technique, and the tools included: an original survey questionnaire, a quality of life assessment scale – WHOQOL-bref, the Beck Depression Scale, and the Numerical Pain Rating Scale (NRS).

The significance level of $p < 0.05$ was assumed for all statistical calculations. The following tests were used for calculations: chi-square, Spearman's rank correlation coefficient, and the Kruskal-Wallis test. Statistica 10 was used for statistical calculations.

Results. The majority of respondents (76 %) were women. The youngest study participant was 18 years old and the oldest was 82 years old. Most respondents lived in the city (60 %).

It was found that the median quality of life – psychological field (WHOQOL-bref) is higher in groups of people with secondary and higher education, and lower in groups of people with primary, lower secondary and vocational education.

It was found that there is a statistically significant difference in the physical, psychological, social and environmental quality of life (WHOQOL-bref) depending on the Beck Depression Scale. Therefore, it was found that the median of all the above-mentioned domains of quality of life (WHOQOL-bref) has the highest values in the group of people without depression, and the lowest values in the group of people who experienced a depressive episode of moderate intensity.

Conclusions. There was a significantly statistical relationship between quality of life in the psychological field and education. However, other sociodemographic data such as place of residence, gender, age, showed no such relationship.

A statistically significant relationship was found between the quality of life in all areas and the occurrence or severity of depression.

Keywords: quality of life, depression, cancer.

Wstęp

Nowotwory stanowią wyzwanie XXI wieku, są drugą, zaraz po chorobach układu krwionośnego, przyczynę zgonów na całym świecie. Choroba nowotworowa, nie była tak powszechna 100 lat temu, jednak z każdą dekadą liczba zachorowań wzrasta. Jak wskazują liczne badania spowodowane jest to najprawdopodobniej przez zmieniający się styl życia oraz wzrost średniej długości życia (Kim, 2018; Mattiuzzi, Lippi, 2019). Ryzyko wystąpienia raka jest zwiększone u osób z osłabioną odpornością w związku z różnymi czynnikami takimi jak: chroniczny stres, podeszły wiek, choroby przebiegające z wyniszczeniem organizmu, przebyta chemioterapia w przeszłości oraz nadużywanie środków farmakologicznych takich jak środki przeciwbólowe, antybiotyki i kortykosteroidy (Mattiuzzi, Lippi, 2019).

Dynamiczny rozwój medycyny jak i technik wykorzystywanych w celu diagnozowania oraz leczenia nowotworu pozwalają na wykrywanie tej choroby we wczesnym stadium rozwoju. Umożliwia to obniżenie liczby zgonów spowodowanych nowotworem. Jednak leczenie często wiąże się z agresywną chemioterapią, radioterapią i leczeniem chirurgicznym. Przyczynia się to do przeżywania silnych emocji przez pacjentów onkologicznych.

Choroba nowotworowa jest czynnikiem wpływającym na jakość życia. Osoby z chorobą nowotworową często zmagają się z objawami choroby takimi jak przewlekły ból, biegunki, wymioty, obniżoną tolerancją wysiłku i wiele innych. Zmiana dotychczasowego stylu życia, porzucenie obranej roli społecznej jak i utrata poczucia bezpieczeństwa i niezależności przyczyniają się do obniżenia nastroju, a nawet do występowania depresji wśród pacjentów onkologicznych. Czynniki te mają wpływ na ocenę jakości życia, która warunkuje proces leczenia. Wyzwaniem współczesnej medycyny jest utrzymanie jakości życia na możliwie najwyższym poziomie.

Nowotwór jest chorobą, która wiąże się z zaburzeniami w obrębie materiału genetycznego. Prowadzi to do wzrostu komórek o nieprawidłowej budowie. Nowotwór może powstać z komórek każdego organu bądź struktury w organizmie, które utraciły możliwość zatrzymania procesu wzrostu. Do przemiany zdrowych komórek w te nowotworowe dochodzi przez zmiany genetyczne i epigenetyczne. Zaburzenia genetyczne mogą nastąpić w dowolnym momencie życia człowieka. Wiążą się z nimi wpływ różnorodnych czynników, które są patogenne dla komórek. Zaburzenia epigenetyczne nie są związane ze strukturą materiału genetycznego. Ryzyko zachorowania na raka jest większe z wiekiem, a wśród czynników wspomagających powstawanie nieprawidłowych komórek wymienia się: czynniki zewnętrzne (egzogenne) – są to czynniki związane ze środowiskiem w jakim żyje człowiek, np. wirusy – jak wirus brodawczaka HPV, bakterie, promieniowanie nadfioletowe, zanieczyszczenia środowiska, dieta oraz używki; czynniki wewnętrzne (endogenne) – do których zalicza się wiek, dziedziczenie zmutowanych genów, hormony, osłabiony układ immunologiczny oraz chroniczny stres. Kancerogeny podzielić można na trzy grupy: czynniki fizyczne; substancje chemiczne; czynniki biologiczne (Koper, Koper, 2020).

Ostatnie dane dotyczące liczby nowych przypadków nowotworów, zostały wprowadzone w 2020 roku, co oznacza, iż dane pochodzą z 2018 i 2019 roku, jednak niektóre kraje szybciej aktualizują te dane i mogą być one wprowadzane na bieżąco w bazie. Baza GLOBOCAN jest międzynarodowym systemem, który służy do monitoringu i raportowania zachorowalności oraz śmiertelności na raka i obejmuje dane z całego świata. Zarządza nią Międzynarodowa Agencja do spraw Badań nad Rakiem (IARC), która stanowi część Światowej Organizacji Zdrowia (WHO). Informacje w tej bazie aktualizowane są co 5 lat (IARC, WHO 2023).

Statystyki z roku 2020 przedstawiają całkowitą liczbę nowych przypadków nowotworów, która wynosiła (19 292 789). Najbardziej powszechnym nowotworem jest nowotwór piersi (2 261 419). Kolejnym licznie rozpoznawalnym rakiem jest rak płuca, którego szacowana liczba zachorowań wynosiła 2 206 771. Trzecim, co do częstości rozpoznawanym rakiem na świecie, jest rak jelita grubego (1 931 590), a czwartym rak prostaty (1 414 259).

Wśród kobiet najczęstszym rozpoznawanym rakiem jest nowotwór piersi (24,5 %), kolejnym jest nowotwór jelita grubego, który stanowi 9,4 % wszystkich zachorowań, a następnie nowotwory płuc (8,4 %) oraz rak szyjki macicy (6,5 %) (IARC, WHO 2023). Wśród mężczyzn najczęstszym nowotworem jest rak płuc, który stanowi 14,3 % wszystkich zachorowań wśród mężczyzn (Rycina 3). Następnie częstym nowotworem jest rak prostaty (14,1 %), jelita grubego (10,6 %) i żołądka (7,1 %) (IARC, WHO, 2023).

Statystyki te pomagają opracować państwom świata program profilaktyki tych nowotworów, dzięki czemu liczba zgonów może ulec zmniejszeniu (La Vecchia, i wsp., 2022)

Najczęściej występującym rakiem na świecie jest rak piersi. W 2020 roku zarejestrowano (2 261 419) nowo wykrytych przypadków nowotworu piersi, co sprawia, iż jest to najczęstszy rak występujących u kobiet (Duda, Piekut, 2020). Ryzyko zachorowania na ten typ raka jest większe w związku z wydłużeniem okresu prokreacyjnego kobiety. Kluczowym jednak powodem rozwoju nowotworu jest mutacja genu BRCA1 i BRCA2. Istotnym czynnikiem, który ma wpływ na zachorowanie jest również wartość BMI (*Body Mass Index*) wskazująca otyłość. Możliwość zachorowania na nowotwór piersi u kobiet otyłych jest 3,5 razy większa niż u kobiet, które wartość BMI mają w normie. Pośród tych kobiet stężenie estrogenów jest większe, wynikiem czego ekspozycja gruczołów piersiowych na ten hormon jest dłuższa przez co zwiększa się ryzyko kancerogenezy (Alkabban, Ferguson, 2023).

Kolejnym najbardziej powszechnym nowotworem na świecie jest rak płuc (Chabowski, i wsp., 2017).

Rak jelita grubego to jeden z najczęściej występujących nowotworów złośliwych w 2020 roku odnotowano (1 931 590) zachorowań. Prawdopodobieństwo zachorowania na raka jelita grubego rośnie liniowo wraz ze wzrostem BMI. Zależność między zachorowaniem na raka jelita grubego a BMI powyżej 30 jest większa u mężczyzn. Znacznym czynnikiem ryzyka inicjacji procesu nowotworowego jest również mała aktywność fizyczna (Cipora, i wsp., 2018).

Z danych wynika, iż w 2020 roku z powodu nowotworu stwierdzono zgon u ponad 9,9 miliona osób, co stanowi ponad 16 % całkowitej liczby zgonów na całym świecie.

Najbardziej śmiertelnym nowotworem jest rak płuca, który przyczynia się aż do 18 % zgonów spowodowanych rakiem. Dużą śmiertelność odnotowuje się również w przypadku nowotworów raka jelita grubego, raka wątroby oraz żołądka (IARC, WHO, 2023).

Statystyki wskazują, że wzrost liczby zachorowań na nowotwór stanowi poważny problem dla budżetu państwa i funkcjonowania gospodarki, społeczeństwa jak i dla samej jednostki. Choroba nowotworowa często dotyczy osób w średnim wieku, które są aktywne zawodowo. Skutkuje to utratą zdolności produkcyjnej i absencją w miejscu zatrudnienia.

Choroba nowotworowa jest czynnikiem, który znacznie wpływa na jakość życia. Dolegliwość ta dotyczy sfery fizycznej, psychicznej, emocjonalnej i społecznej. Proces chorobowy zazwyczaj składa się z interwencji chirurgicznych, chemioterapii, radioterapii jak i terapii hormonalnej. Fizyczne skutki choroby takie jak: nudności, wymioty, osłabienie, utrata wagi, dolegliwości bólowe i zaburzenia snu, znacząco obniżają jakość życia, dlatego ważne jest zrozumienie pełnego zakresu doświadczeń osób dotkniętych chorobą nowotworową.

Badanie jakości życia w medycynie staje się standardem stale wykorzystywanym, który wskazuje skuteczność opieki medycznej. Dzięki opracowanym kwestionariuszom i skalom możliwa jest ocena jakości życia osób z różnych grup społecznych i regionów świata.

Cel pracy

Celem pracy było określenie związku między jakością życia, a występowaniem depresji u pacjentów z chorobą nowotworową.

Materiał i metody

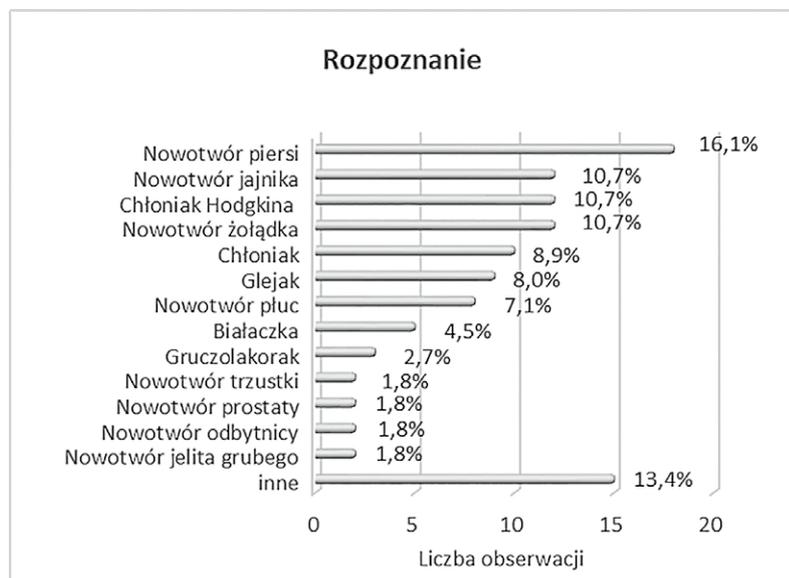
Badaniem zostało objętych 112 osób z rozpoznaniem nowotworu w aktywnej fazie choroby. Badania były prowadzone od grudnia 2022 roku do kwietnia 2023 roku. Metodą badań był sondaż diagnostyczny z wykorzystaniem techniki ankieta, natomiast narzędzia stanowiły: autorski kwestionariusz ankiety, skala oceny jakości życia – WHOQOL-BREF, Skala Depresji Becka oraz Numeryczna Skala Oceny Bólu (NRS).

Dla wszystkich obliczeń statystycznych przyjęto poziom istotności $p < 0,05$. Do obliczeń użyto testów: chi-kwadrat, współczynnika korelacji rang Spearmana oraz testu Kruskala-Wallisa. Do obliczeń statystycznych użyto programu Statistica 10.

Wyniki

Większość badanych osób 76 % stanowiły kobiety. Najmłodszy uczestnik badania miał 18 lat, a najstarszy 82 lata. Najliczniejszymi grupami wiekowymi badanych byli dorośli w wieku 30-40 lat oraz 40-50 lat stanowiącymi po 20,5 % osób. Wykształceniem wyższym legitymowało się 42,9 %, średnim 40,2 %, natomiast podstawowym 3,6 % a gimnazjalnym 0,9 %. W związku małżeńskim lub związku partnerskim było 67 %. Ponad połowa badanych mieszkała w mieście 60 %.

Najczęściej występującym nowotworem w badanej grupie był rak piersi i występował u kobiet 16,1 %, kolejno nowotwór jajnika, chłoniak Hodgkina, nowotwór żołądka 10,7 %, następnie chłoniak 8,9 %, glejak 8,0 %, nowotwór płuc 7,1 %. Pozostałe nowotwory występowały rzadziej.



Wykres 1. Nowotwory w badanej grupie

Większość badanych oceniła nasilenie bólu jako 0. Łagodny ból odczuwało: 43 % ankietowanych, natomiast ból o nasileniu średnim występował u 4,4 %. Najsilniejszy ból występował u 3 % respondentów.

Tabela 1. Nasilenie bólu w skali NRS

Liczba punktów	0	1	2	3	4	5	6	7	8	9	10
Odsetek	35 %	16 %	13 %	14 %	3 %	8 %	3,6 %	4,4 %	1 %	0 %	2 %

Analiza wskaźnika BMI wykazała, że w badanej grupie 47 % respondentów masa ciała była w normie, u 27 % badanych stwierdzono nadwagę, 19 % otyłość, a 7 % niedowagę.

Prawie połowa badanych 46,4 % deklaruwała otrzymywanie całkowicie wystarczającego wsparcia od rodziny, natomiast 1,8 % wskazało, że nie otrzymuje wsparcia od bliskich.

Na podstawie analizy zależność jakości życia od danych socjodemograficznych stwierdzono, że płeć badanych nie miała wpływu na poszczególne dziedziny jakości życia.

Tabela 2. Wynik testu U Manna – Whitneya jakości życia w zależności od płci

Jakość życia [WHOQOL]	Test U Manna-Whitneya Względem zmiennej: Płeć Zaznaczone wyniki są istotne z $p < ,05000$						
	Sum.rang kobieta	Sum.rang mężczyzna	U	Z	p	N ważn. kobieta	N ważn. mężczyzna
dziedzina fizyczna	4628,000	1700,000	973,00	-1,1836	0,23657	85	27
dziedzina psychologiczna	4582,500	1745,500	927,50	-1,4931	0,13541	85	27
relacje społeczne	4633,000	1695,000	978,00	-1,1496	0,25031	85	27
środowisko	4758,000	1570,000	1103,00	-0,2993	0,76471	85	27

Z kolei analiza dotycząca wieku za pomocą współczynnika rang Spearmana wskazuje na brak występowania istotnie statystycznej korelacji pomiędzy wiekiem a jakością życia w każdej dziedzinie, tzn. że nieprawdziwe jest stwierdzenie, że jakość życia rośnie bądź maleje wraz ze wzrostem wieku badanych.

Tabela 3. Wynik korelacji porządku rang Spearmana dla zmiennych jakość życia i wieku

Wiek [lata] & Jakość życia [WHOQOL]	Korelacja porządku rang Spearmana BD usuwane parami Oznaczone wsp. korelacji są istotne z $p < ,05000$			
	N Ważnych	R Spearman	t(N-2)	p
dziedzina fizyczna	112	-0,010851	-0,113814	0,909593
dziedzina psychologiczna	112	0,015556	0,163174	0,870681
relacje społeczne	112	0,037227	0,390713	0,696765
środowisko	112	-0,017021	-0,178540	0,858627

W analizie dotyczącej wykształcenia stwierdzono, że mediana jakości życia w dziedzinie fizycznej przyjmuje nieco wyższe wartości w grupach osób z wykształceniem średnim oraz wyższym, a nieco niższe w grupach osób z wykształceniem podstawowym, gimnazjalnym, zawodowym.

Mediana jakości życia w dziedzinie psychologicznej przyjmuje wyższe wartości w grupach osób z wykształceniem średnim oraz wyższym, a niższe w grupach osób z wykształceniem podstawowym, gimnazjalnym, zawodowym.

Stwierdzono, że poziom wykształcenia osób badanych nie miał wpływu na jakość życia w relacjach społecznych.

Natomiast mediana jakości życia w dziedzinie środowiskowej przyjmuje podobne wartości we wszystkich grupach badanych.

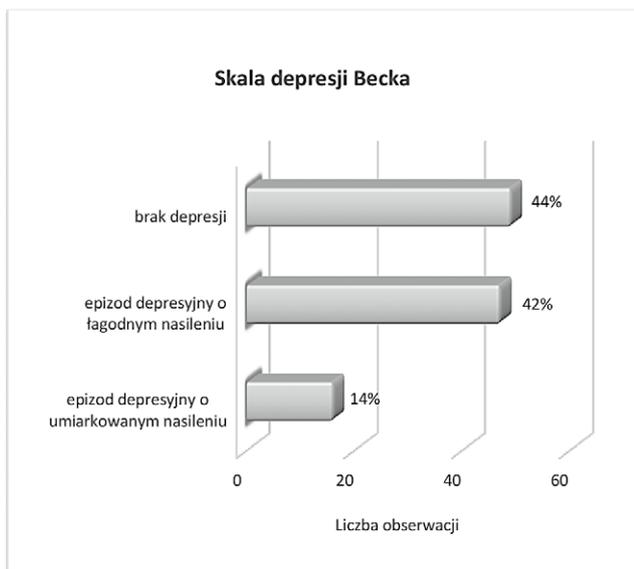
Stwierdzono, że miejsce zamieszkania osób badanych nie miało wpływu na poszczególne dziedziny jakości życia.

Tabela 4. Wynik testu U Manna – Whitneya jakości życia w zależności od miejsca zamieszkania

Jakość życia [WHOQOL]	Test U Manna-Whitneya (baza) Względem zmiennej: Miejsce zamieszkania Zaznaczone wyniki są istotne z $p < ,05000$						
	Sum.rang miasto	Sum.rang wieś	U	Z	p	N ważn. miasto	N ważn. wieś
dziedzina fizyczna	3603,500	2724,500	1325,500	-1,07717	0,281405	67	45
dziedzina psychologiczna	3782,000	2546,000	1504,000	-0,01780	0,985795	67	45
relacje społeczne	3462,000	2866,000	1184,000	-1,91695	0,055245	67	45
środowisko	3722,500	2605,500	1444,500	-0,37093	0,710693	67	45

Analizowano również wpływ danych socjodemograficznych na występowanie bądź nasilenie depresji.

Na podstawie skali depresji Becka, nie stwierdzono depresji w badanej grupie u 44 % osób. Natomiast epizod depresyjny o łagodnym nasileniu stwierdzono u 42 % badanych, z kolei epizod depresyjny o umiarkowanym nasileniu stwierdzono u 14 %.



Wykres 2. Występowanie depresji w badanej grupie

Stwierdzono, brak istotnej różnicy w wieku w zależności od skali depresji Becka. Mediana wieku badanych przyjmuje podobne wartości we wszystkich grupach badanych.

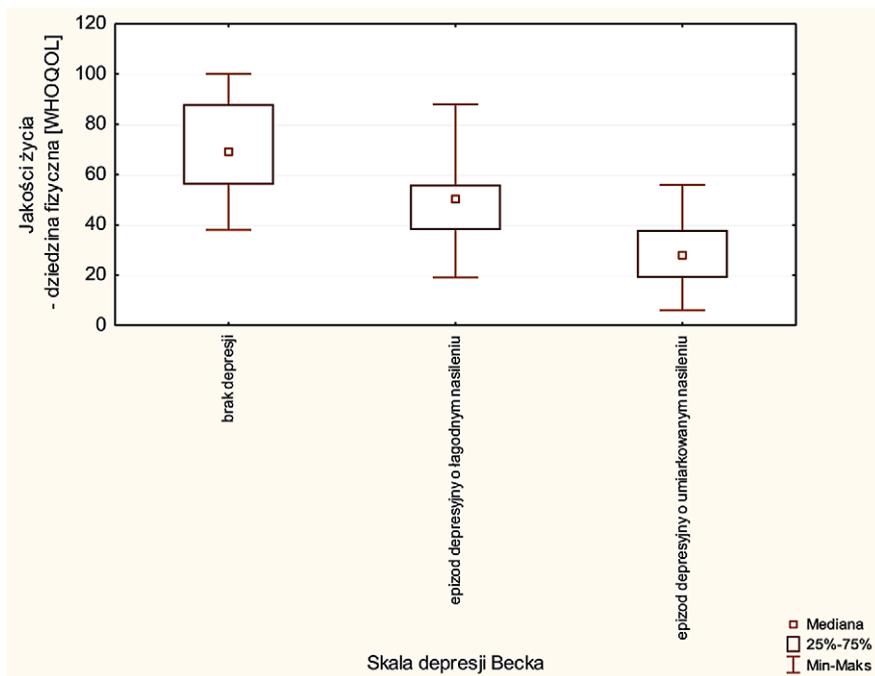
Tabela 5. Wynik testu rang Kruskala-Wallisa wieku w zależności od skali depresji Becka

Zależna: Wiek [lata]	ANOVA rang Kruskala-Wallisa; Wiek [lata] Zmienna niezależna (grupująca): Skala depresji Becka Test Kruskala-Wallisa: $H(2, N=112) = 2,198836$ $p = ,3331$			
	Kod	N ważnych	Suma Rang	Średnia Ranga
brak depresji	1	49	3017,000	61,57143
epizod depresyjny o łagodnym nasileniu	2	47	2500,500	53,20213
epizod depresyjny o umiarkowanym nasileniu	3	16	810,500	50,65625

Na podstawie analizy wykształcenia stwierdzono, że w grupie osób z wykształceniem podstawowym, 75 % badanych doświadczyło epizod depresyjny o łagodnym nasileniu zgodnie ze skalą depresji Becka. W grupie osób z wykształceniem gimnazjalnym, badani doświadczyli epizod depresyjny o umiarkowanym nasileniu. W grupie osób z wykształceniem zawodowym, badani najczęściej doświadczali epizod depresyjny o łagodnym lub umiarkowanym nasileniu. W grupach osób z wykształceniem średnim oraz wyższym badani w głównej mierze doświadczali epizod depresyjny o łagodnym nasileniu lub nie stwierdzono depresji na podstawie badania skalą depresji Becka.

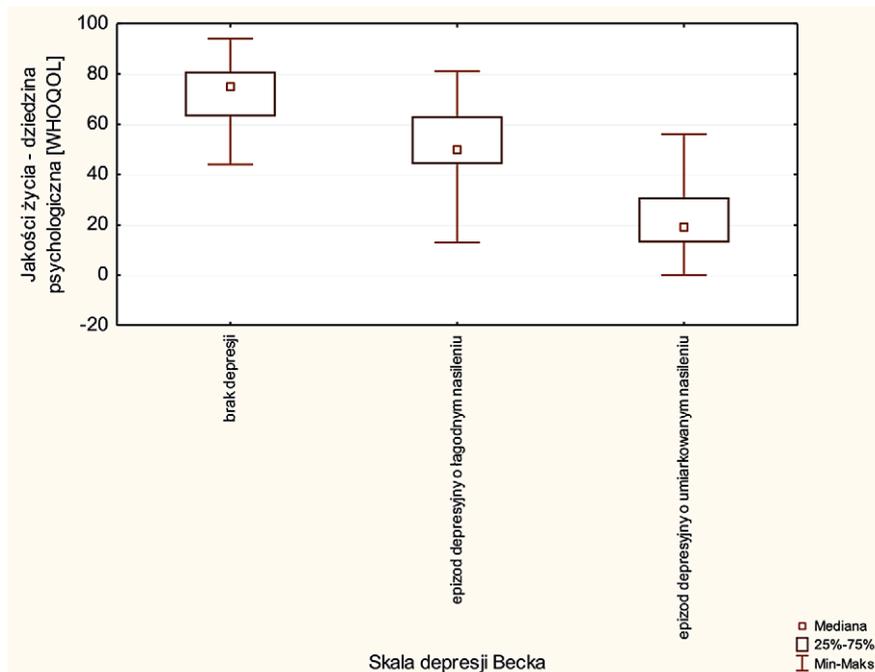
Wynik w skali depresji Becka nie jest istotnie statystycznie zależny od miejsca zamieszkania osób badanych. Stwierdzono, że miejsce zamieszkania badanych nie miało wpływu na wynik w skali depresji Becka.

Analizowano zależność stopnia jakości życia z wystąpieniem bądź nasileniem depresji. Stwierdzić można, że mediana dziedziny fizycznej jakości życia przyjmuje najwyższe wartości w grupie badanych, u których nie stwierdzono depresji, natomiast najniższe wartości stwierdzono w grupie osób, które doświadczyły epizod depresyjny o umiarkowanym nasileniu.



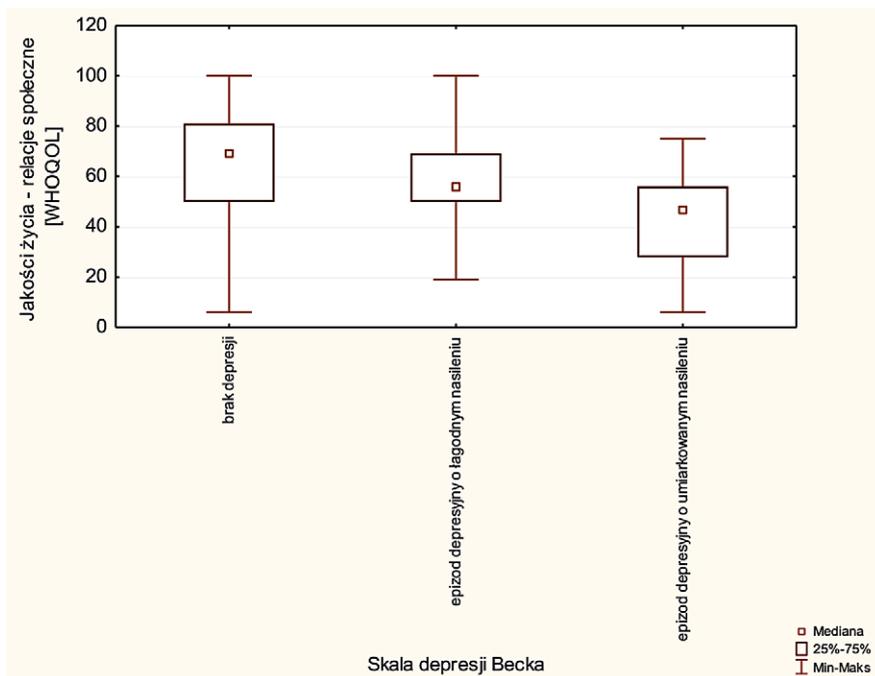
Wykres 3. Zależność pomiędzy dziedziną fizyczną jakości życia a skalą depresji Becka

Stwierdzono, że występuje istotnie statystycznie różnica w dziedzinie psychologicznej jakości życia w zależności od skali depresji Becka. Mediana dziedziny psychologicznej jakości życia przyjmuje najwyższe wartości w grupie osób bez depresji, najniższe natomiast w grupie osób, które doświadczyły epizod depresyjny o umiarkowanym nasileniu.



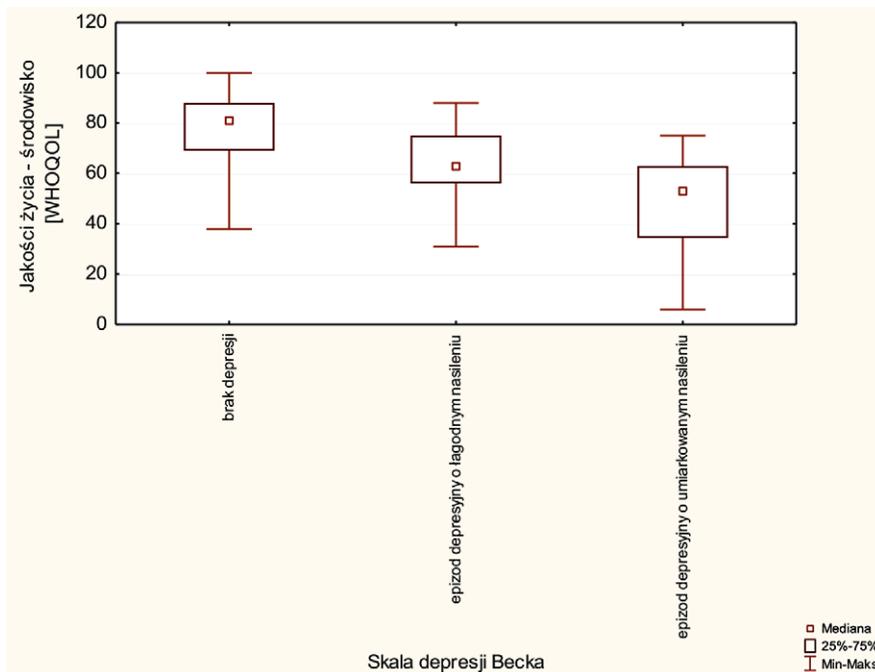
Wykres 4. Zależność pomiędzy dziedziną psychologiczną jakości życia a skalą depresji Becka

Występuje istotna statystycznie różnica w dziedzinie relacje społeczne jakości życia w zależności od skali depresji Becka. Mediana dziedziny relacje społeczne jakości życia przyjmuje najwyższe wartości w grupie osób bez depresji, najniższe natomiast w grupie osób, które doświadczyły epizod depresyjny o umiarkowanym nasileniu.



Wykres 5. Zależność pomiędzy dziedziną relacje społeczne jakości życia a skalą depresji Becka

Wykazano, że występuje istotna statystycznie różnica w dziedzinie środowiskowej jakości życia w zależności od skali depresji Becka. Stwierdzić można, że mediana dziedziny środowisko jakości życia przyjmuje najwyższe wartości w grupie osób bez depresji, najniższe natomiast w grupie osób, które doświadczyły epizod depresyjny o umiarkowanym nasileniu.



Wykres 6. Zależność pomiędzy dziedziną środowiskową jakości życia a skalą depresji Becka

Dyskusja

Choroby nowotworowe dotyczą coraz większej liczby społeczeństwa. Diagnoza często wiąże się z silnymi emocjami, zaburzeniami w codziennym funkcjonowaniu oraz zmianami w prowadzeniu dotychczasowych ról społecznych. Ocena jakości życia pacjentów

onkologicznych stanowi ważny element procesu terapeutycznego, przyczyniając się do zmniejszenia odczucia obniżonego nastroju.

Przeprowadzone badania przez Makar A. i Szlenk-Czyczerska E. na temat zależności między jakością życia a występowaniem lęku i depresji u pacjentów z chorobą nowotworową leczonych metodą radioterapii. Badaniami objęto 100 pacjentów, którzy byli w trakcie radioterapii. Wyniki badań czynników socjodemograficznych ukazały zależność między latami życia a jakością życia w domenie środowisko, natomiast w kolejnych trzech dziedzinach takiej zależności nie stwierdzono. Kolejną badaną zależnością była jakość życia a wykształcenie. Osoby posiadające wykształcenie średnie najlepiej oceniły jakość swojego życia w domenie psychologicznej, społecznej oraz środowiskowej. Następnym analizowanym aspektem był poziom jakości życia a stanem cywilnym. Respondenci będący w związku małżeńskim lepiej ocenili całościowo jakość życia niż rozwodnicy (Makar, Szlenk-Czyczerska, 2022). Badania własne wykazały brak wpływu miejsca zamieszkania na poszczególne dziedziny jakości życia. Wyższe wartości w dziedzinie fizycznej jakości życia wynosiły w grupie osób z wykształceniem średnim oraz wysokim, a niższe w grupie osób z wykształceniem podstawowym, gimnazjalnym oraz zawodowym. W dziedzinie psychologicznej wyższe wartości otrzymano w grupach z wykształceniem średnim i wyższym, a niższe w pozostałych grupach. Z kolei w dziedzinie relacje społeczne poziom wykształcenia nie miał wpływu, a w dziedzinie środowisko we wszystkich grupach podobnie. Nie wykazano korelacji między miejscem zamieszkania i wiekiem a jakością życia w każdej dziedzinie.

Pieniążek, Dugiel i Kucharska przeprowadziły badania dotyczące zależności danych socjodemograficznych na występowanie depresji. Objęto nimi 103 pacjentów z chorobą nowotworową układu moczowo-płciowego. Wyniki wykazały zależność miejsca zamieszkania na wystąpienie depresji. Wśród respondentów mieszkających w mieście 57 % osób nie miała depresji, z kolei u 8 % stwierdzono umiarkowanie ciężką depresję. Natomiast pacjentów mieszkających na wsi cechował mniejszy procent osób bez depresji – 36 %, a osób z depresją umiarkowaną wynosił 25 %. Badania te również wykazały brak zależności między wystąpieniem depresji, a stanem cywilnym. Ponadto zależność między rokiem życia i wykształceniem, a nasileniem depresji nie została wykazana (Pieniążek, i wsp., 2020). Z kolei badania przeprowadzone przez Makar A., Szlenk-Czyczerską E. wykazały związek między wykształceniem, a występowaniem depresji. Osoby posiadające wykształcenie podstawowe cechowały się mniejszym występowaniem depresji, natomiast stan cywilny jak i miejsce zamieszkania nie miały związku z nasileniem i występowaniem depresji (Makar, Szlenk-Czyczerska, 2022). Badania własne ukazały, brak statystycznej zależności między wiekiem, miejscem zamieszkania i stanem cywilnym a skalą depresji Becka. Natomiast wykazano korelację między poziomem wykształcenia, a depresją. Zdecydowana większość osób posiadających podstawowy stopień edukacji miała epizod depresyjny o łagodnym nasileniu, z kolei 25 % badanych z tej grupy doświadczyło depresji o umiarkowanym nasileniu. Grupa z wykształceniem zawodowym doświadczyła epizodu depresyjnego o łagodnym bądź

umiarkowanym nasileniu. Natomiast respondenci posiadający wykształcenie średnie jak i wyższe doznali depresji o łagodnym nasileniu lub nie doznali epizodu depresyjnego w ogóle.

Chorobie nowotworowej towarzyszą mniej lub bardziej nasilone lęki. Badania przeprowadzone przez Snarską, Dolińską wykazały, że 42 % pacjentów odczuwało niepokój i lęk związany ze swoim stanem zdrowia i leczeniem. Stosowane leczenie przeciwnowotworowe nasilało stany lękowe, zaburzenia snu a co za tym idzie spadała wydolność fizyczna i psychiczna pacjenta co potwierdzili ankietowani gdyż 39 % wskazało na brak energii życiowej. W/w badaniach, aż 39 % chorych pomimo choroby, obciążającego leczenia, zmagania się ze skutkami terapii, odczuwało spokój, a 23 % deklaroowało, że są szczęśliwi. Zastosowanego leczenia obawiało się 16 % i również u 16 % respondentów dominowało uczucie smutku i przygnębienie. Według badań pacjenci poddani leczeniu przeciwnowotworowemu, stają się bardziej wrażliwi na bodźce negatywne i silniej odczuwają dolegliwości fizyczne, co także wpływa na ogólne przygnębienie i stres (Snarska, Dolińska, 2021).

Badania Makar, Szlenk-Czyczerska, wykazały powiązanie jakości życia z wystąpieniem lub nasileniem depresji. Im wyższy poziom jakości życia tym mniejsze występowanie objawów depresji (Makar, Szlenk-Czyczerska, 2022). Badania własne również wykazały, iż jakość życia we wszystkich dziedzinach ma najwyższą wartość w grupie respondentów bez objawów depresji, natomiast najniższe u osób, które doświadczyły epizodu depresji.

Wnioski

1. Nie stwierdzono istotnie statystycznej zależności między jakością życia a danymi socjodemograficznymi takimi jak: miejsce zamieszkania, płeć, wiek, natomiast stwierdzono zależność od wykształcenia.
2. Stwierdzono zależność między wykształceniem a występowaniem bądź nasileniem depresji. Natomiast nie stwierdzono istotnie statystycznej zależności między stanem cywilnym, miejscem zamieszkania i wiekiem a wystąpieniem bądź nasileniem depresji.
3. Stwierdzono istotnie statystyczną zależność między jakością życia we wszystkich dziedzinach a występowaniem bądź nasileniem depresji.

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THE INFLUENCE OF INSTITUTIONAL CARE ON THE LIFE PERCEPTION AND WELL-BEING OF SENIORS

VPLYV INŠTITUCIONÁLNEJ STAROSTLIVOSTI NA VNÍMANIE ŽIVOTA A SPOKOJNOSTI SENIOROV

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Abstract

Introduction: To improve the quality of life of social it is important to do the analysis focused on the understanding of aspects of adaptation to the long-term care and different issues linked to residential care in relation with the well-being of elderly people.

Focus: The aim of the research paper is to analyse relation between well-being of seniors as the dimension of the quality of life and the long-term care of seniors providing out of home. In order to be able to effectively introduce quality standards into social services, we need to understand the aspects of measuring the quality of life and the dimension of well-being. Without the active participation of the senior in this process, it is not possible to achieve a satisfactory level on both sides.

Material and methods: We used the standardized questionnaire “WHOQOL-OLD” for data analysis that involved 23 research centers from four continents and took place in 2001 – 2004. The questionnaire has a total of 24 items, divided into six domains, while due to the scope of the research, we show only its partial part, which is related to life satisfaction. A sample of 182 seniors in a long-term care facility.

Results: The results showed a relationship between the degree of adaptability of the elderly and their psychological resilience and overall life satisfaction ($p = 0.024$). It has been shown that if the process of adaptation to life in a social institution is positive and shorter, the quality of life also increases. The majority of seniors assess life satisfaction more based on emotionality compared to the criteria of satisfying living conditions ($p = 0.041$). The level of functioning sense and physical effects of aging significantly determine the way of experiencing life satisfaction ($p = 0.035$), motivation for higher activity naturally decreases with age.

Conclusion: In conclusion, we recommend that measures to improve the well-being of seniors be introduced at several levels, not only formally with the help of quality standards, but especially by the appropriate composition of personnel, their financial evaluation, technical and material security, which will appropriately serve to saturate basic, but also social and spiritual needs of recipients of social services. In summary, this research underscores the multifaceted nature of life satisfaction among the elderly and the complex interplay of

adaptability, emotional well-being, physical health, and social engagement. These findings have important implications for policymakers, healthcare professionals, and caregivers, as they seek to improve the quality of life for the elderly population in social institutions. By understanding and addressing these factors, we can work towards enhancing the well-being and life satisfaction of our aging population, ultimately promoting a better quality of life for our elderly citizens.

Keyword: well-being, long-term care, social care facilities. Quality of life of seniors

Abstrakt

Úvod: Pre zlepšenie kvality sociálnych služieb je dôležité urobiť analýzu zameranú na pochopenie aspektov ich adaptácie na dlhodobú starostlivosť a rôznych problémov spojených s pobytovou starostlivosťou v prepojení na životnú spokojnosť starších ľudí.

Ciele: Cieľom výskumu je analyzovať vzťah medzi well-beingom seniorov ako dimenziou kvality života a dlhodobou starostlivosťou o seniorov poskytovanou mimo domova. Aby sme mohli efektívne zaviesť štandardy kvality do sociálnych služieb, musíme pochopiť aspekty merania kvality života a rozmer životnej spokojnosti. Bez aktívnej účasti seniora na tomto procese nie je možné dosiahnuť uspokojivú úroveň na oboch stranách.

Materiál a metódy: Na analýzu dát sme použili štandardizovaný dotazník „WHOQOL-OLD“, ktorý zahŕňal 23 výskumných centier zo štyroch kontinentov a prebiehal v rokoch 2001-2004. Dotazník má celkovo 24 položiek, rozdelených do šiestich domén, pričom vzhľadom na rozsah výskumu zobrazujeme len jeho čiastkovú časť, ktorá súvisí so životnou spokojnosťou. Vzorka bola 182 seniorov v zariadení sociálnych služieb pre dlhodobo chorých.

Výsledky: Výsledky ukázali vzťah medzi mierou adaptability seniorov a ich psychickou odolnosťou a celkovou životnou spokojnosťou ($p = 0,024$). Ukázalo sa, že ak je proces adaptácie na život v sociálnej inštitúcii pozitívny a kratší, zvyšuje sa aj kvalita života. Väčšina seniorov hodnotí životnú spokojnosť viac na základe emocionality v porovnaní s kritériami uspokojenia životných podmienok ($p = 0,041$). Úroveň fungujúceho zmyslu a fyzické vplyvy starnutia výrazne determinujú spôsob prežívania životnej spokojnosti ($p = 0,035$), motivácia k vyššej aktivite s vekom prirodzene klesá.

Záver: Na záver odporúčame zaviesť opatrenia na zlepšenie blahobytu seniorov na viacerých úrovniach, a to nielen formálne pomocou štandardov kvality, ale najmä vhodnou skladbou personálu, jeho finančným ohodnotením, technickým a materiálnym zabezpečením, ktoré bude vhodne slúžiť na saturáciu základných, ale aj sociálnych a duchovných potrieb prijímateľov sociálnej služby. Stručne povedané, tento výskum podčiarkuje mnohostrannú povahu životnej spokojnosti starších ľudí a komplexnú súhru prispôsobivosti, emocionálnej pohody, fyzického zdravia a sociálnej angažovanosti. Tieto zistenia majú dôležité dôsledky pre tvorcov politík, zdravotníckych pracovníkov a opatrovateľov, pretože sa snažia zlepšiť kvalitu života staršej populácie v sociálnych zariadeniach. Pochopením a riešením týchto

faktorov môžeme pracovať na zlepšení blahobytu a životnej spokojnosti starnúcej populácie, čo v konečnom dôsledku podporí lepšiu kvalitu života.

Kľúčové slová: pohoda, dlhodobá starostlivosť, zariadenia sociálnych služieb, kvalita života seniorov.

Introduction

Social services represent an important part of every society, playing a decisive role in supporting and improving the quality of life of those who find themselves in vulnerable life situations and cannot provide for their basic needs in old age. Recipients come to social service facilities in a difficult state of health, which is associated with chronic diseases, dementia and full dependency, which creates increased pressure to provide continuous care for social service recipients.

Social services play a significant role in the development of life satisfaction and adaptation of seniors in facilities. These methods include a range of approaches designed to address the physical, emotional, cognitive and social needs of clients and their goal is to improve the overall quality of life of seniors. Social services help wide groups of citizens in solving their problems and at the same time fulfil an important function, because they ensure the security of care for recipients in changing conditions and in the digital sphere. This was also confirmed by the long-term pandemic situation, which pointed to the need for the sustainability of social services for a wide group of citizens who are dependent on social and health care.

Impact social care on the well-being of seniors

When choosing a residential service for the elderly, the quality of the service provided plays a very important role care that can be mapped according to compliance with measurable criteria, the so-called quality standards of social services, which have an impact on his overall well-being. Homes for the elderly provide residential services to people who have reduced mobility self-sufficiency mainly due to age and whose situation requires regular help from others Individuals (Ludvigh Cintulová, et al., 2022). They provide accommodation, food, and help with routine care tasks about one's own person, help with personal hygiene or provision of conditions for personal hygiene, mediating contact with the social environment, social-therapeutic activities, activation activities, assistance in exercising rights, in procuring personal matters (Holmerová, et al., 2014).

The concept of quality of life includes physical experience, mental well-being, and one's attitude to other people and social status. Quality of life should be examined within holistic approach to the client. This means focusing on his bio-psycho-social-spiritual needs. The environment in which the individual moves, economic factors, health, social factors, these are important facts that in a significant way affect the quality of life of seniors (Sutipan, et al., 2017).

The need for the quality-of-life concept in gerontology and in social services it is very justified, because retirement, social isolation, loneliness, loss of a loved one have a very significant effect on the quality of life of seniors. The elderly's view of the quality of life should be a primary task for caregivers (Dvořáčková, 2012).

The concept of quality of life is very closely related to others concepts such as human needs, self-care, daily activities, health and existential dimension of human life (Gurková, 2011). Procházková (2014) states that population aging is a much-discussed phenomenon of today and is directly related to the changes taking place in the structure social and nursing care. He further points to the fact that they are in the whole society context, new forms of services and new trends in direct care for the elderly are sought.

When evaluating the quality of life, by objective indicators and subjective evaluation, it is need to come to terms with the fact that we cannot reliably express the quality of life with numbers, because everyone the individual evaluates the quality of life completely individually on the basis of different criteria which it attaches different meanings at different stages of its life (Heřmanová, 2012).

The transformation of social services introduced a greater emphasis on the protection of seniors from dehumanization and the human-legal dimension of the provision of social services, which can be specifically observed in the staff's approach to the performance of their profession, in the involvement of the client in the process of individual planning and rehabilitation, and in the management of social service facilities that create stimulating and safe environment to support life satisfaction even in old age, serious illness or immobility (Ludvigh Cintulová, Buzalová, 2021).

The transformation of social services began in 2004 – 2005 with a model study, when the first steps were taken to change the view of the client, the form of providing social services and to reduce the number of large-capacity facilities, these changes were brought about by the conviction that "...any form of residential care, in where residents are isolated from the wider community and/or lack sufficient control over their lives and the decisions that affect them; often more emphasis is placed on the needs of the organization itself than on the individualized needs of individual facility users" (Cintulová, Buzalová, 2018 : 12).

Development of quality standards and adoption of new legislation – Act no. 448/2008 Coll. about social services. The transformation of social services is being introduced by changing operations, approaches to the client, organization and management of social services, personnel and technical conditions, different methods of financing as well as the support of interest activities, work rehabilitation and the introduction of individual planning and therapies.

Slovák and Dužáková (In Mareš, 2014) declare that in facilities we continue to encounter the fact that seniors are aware of the help of helping professionals, but they cannot fully recognize the meaning and justification of the individual methods that are with them in social facilities carried out.

With the development of social services, increasing the level of quality, support for the expertise and competence of the staff, but also with higher education and information, the attitudes of dependent citizens towards residential services have changed. The authors (Šamanková, 2011; Malíková, 2020) confirm that although social services are still critically under fire as a result of the financial draining of resources for their provision, the view and opinion of the recipients of social service facilities are in a more positive sides. Prejudices against institutional care have broken down, and families are increasingly seeking help from non-public providers as well.

Methods and sample

The WHOQOL-OLD (World Health Organization Quality of Life Assessment) questionnaire was used in the research investigation, which was created by representatives of 15 research centers from around the world. The result is the WHOQOL-100 questionnaire, which has 100 items. For the needs of clinical practice, a shortened version called WHOQOL-BREF was created, which contains 26 items. The WHOQOL-OLD questionnaire was followed specially created for measuring the quality of life in old age based on these existing questionnaires and the international project “Measuring the quality of life of the elderly and its relationship to healthy aging. WHOQOL-OLD” involved 23 research centres from four continents and took place in 2001 – 2004. The questionnaire has a total of 24 items, divided into six domains (functioning of the senses, fulfilment, social involvement, independence, death and dying, close relationships). In the presented research, we focused on the component of life satisfaction, the results of the research in this paper are presented only in relation to these dimensions, as it was very extensive research, its results could not be included in a limited scope.

Sample

The research sample consisted of recipients of social services that provide care in facilities. The questionnaire data collection took place at the end of 2022. Residential facilities that provide long-term care in 5 districts were involved in the research, while we did not differentiate between public and non-public providers. Respondents were clients of selected social facilities who met the selected criteria. The criterion for including respondents in the research was:

- age over 65 years,
- the level of cognitive functions according to the MMSE test 21 – 30 points
- clients were not in the adaptation period, i.e. there was an adaptation of the client, which you each the device defines at its discretion, the most common time is according to my findings in the duration of 3 months.

The total sample consisted of 67 % of women and 33 % of men in the age up to 75 years old.

Table 1. The sample characteristics Source: own research

Sample category	% women	% men	Total N
Gender	67	33	182
Age			182
65 – 70	27	18	
70 – 75	53	12	
SS care Less than 1 year	38	26	182
1 – 2 year	62	24	

Research aims

A: To find out whether the functioning of the senses of the elderly has an effect on daily life and the level of life satisfaction.

Research Q1: How do seniors rate the influence of functioning senses on their daily life and life satisfaction?

1. To what extent does the deterioration of your senses (e.g. hearing, taste, touch, sight or smell) affect your life satisfaction?
2. To what extent does the loss, for example of hearing, sight, taste, smell or touch, affect your ability to engage in various activities?
3. To what extent do sensory difficulties (e.g. hearing, taste, touch, sight, smell) affect your communication with other people?
4. How would you rate the use of your senses (hearing, sight, taste, smell, touch)?

B. Aim: To find out whether seniors are satisfied with what they have achieved in life.

ResearchQ2: Are seniors satisfied with what they have achieved in life?

1. Are you satisfied with your possibilities to continue to achieve something in life?
2. Do you think you are getting the recognition you deserve in life?
3. Are you satisfied with what you have achieved in life?
4. How satisfied are you with the things you can look forward to?

Results

We analysed the research results based on open coding, we divided the data into three dimensions, which we describe below:

Dimension: functioning senses of daily-life and life-satisfaction

Functioning senses have a fundamental influence on the daily life of seniors and their life satisfaction. Perception of the world around you and communication with the world are significantly influenced by these senses. This research question was assessed from the domain of sensory functioning and includes mean values of WHOQOL-OLD questionnaire items 1, 2, 10 and 20 (table 2).

Table 2. Functioning senses of seniors

Statements	V
1. To what extent does the impairment affect your senses (smell) Your daily life?	2,47
2. To what extent does the loss of, for example, hearing, sight, taste, smell or sense of your ability to engage in various activities?	2,84
10. To what extent do difficulties with the senses (e.g. hearing, taste, touch, sight, smell) your communication with other people?	2,42
20. How would you rate how your senses serve you?	3,20

Table 3. To what extent does the deterioration of your senses affect your

Answers in scale (hearing, taste, touch, sight, smell)	(F25.1) Daily activities	(F 25.3) Different activities	(F25.4) Communication
Totally no	1,2 %	5,56 %	6,2
A little	52,7 %	40,01 %	53,07
Medium impact	26,5 %	27,35 %	28,31
A very much	16,9 %	24,7 %	11,4
Maximum	2,7 %	2,4 %	1,3

The results show that for 5.56 % of respondents, the loss of sensory functions does not affect involvement in various activities. On the contrary, this loss affects a maximum of 2.4 % of seniors. Respondents most often chose answer 2 – a little, which was indicated by 41.0 % of seniors. The results show that 6.2 % respondents do not have difficulties with the senses in their communication with other people. 53.07 % of the respondents answered that sensory difficulties affect them in communication only a little and 11.4 %) of the respondents a lot (table 3).

Table 4. (F25.2) How would you rate how your senses serve you?

Answers in scale	Hearing	Taste and smell	Sight and touch
Totally no	1,2 %	5,56 %	6,2 %
A little	26,5 %	40,01 %	53,07 %
Medium impact	52,7 %	27,35 %	28,31 %
A very much	16,9 %	24,7 %	11,4 %
Maximum	2,7 %	2,4 %	1,3 %

Functioning senses have a huge impact on the life of seniors and their life satisfaction. The loss or impairment of these senses can cause a variety of challenges and limitations that affect the daily life and well-being of older persons. It is therefore important to pay attention to the protection and strengthening of these senses, as well as to provide support and help seniors manage the problems associated with their eventual loss. 52.7 % of seniors consider the greatest barrier to life satisfaction to be hearing loss, which limits them in normal activities and especially in communication with others. 19.6 % of seniors reported a high degree of

impact on hearing, justifying it as follows: Hearing loss limits seniors' ability to communicate with others. This can lead to frustration and communication problems, which can have a negative impact on relationships and understanding. Hearing loss can be associated with poor mental health, including feelings of depression, anxiety and social isolation. Insufficient communication is supposed to result in loneliness and reduced life satisfaction (table 4).

40.1 % of seniors confirmed that tastes and smells are limited only a little. Loss of taste and smell can make food less appealing and palatable. Seniors can lose their appetite, leading to malnutrition and weight loss. Loss of taste and smell can lead to impaired eating and an increased risk of malnutrition. This can result in a weakened immune system and an increased risk of disease. A high degree of influence in this area was shown in 24.7 % of seniors.

Moderate impact was reported by 53 % of seniors and medium impact was expressed by 28.3 % of seniors for whom sight and touch are important. Vision loss has a significant impact on seniors' ability to navigate the environment and move independently. They may have difficulty navigating and depend on help from others or assistive devices. Visual and tactile loss can lead to social isolation, as seniors can feel cut off from family, friends and community. A lack of ability to engage in social activities can have a negative impact on psychological health. Overall, the loss of sight and touch can lead to a significant reduction in the quality of life of seniors and affect their overall life satisfaction (table 4).

Table 5. Factos and senses determinanted by aging

Answers in scale	Level 1-2	Level 3	Level 4-5
perception of the environment around you	21,2 %	39,3 %	%
Physical health and safety	19,3 %	43,7 %	
Mental health	17,4 %		46,8 %
Social interaction	35,3 %		31,7 %
Well-being	39,0 %	32,5 %	28,5 %
Active approach	29,1 %	53,7 %	

1-2 less-a little, 3-medium, 4-very much and much

Table 5 showed perception of **surouding environment** is impacted on medium level at 39,3 % seniors. Sight and hearing are the senses that allow seniors to perceive their surroundings. Sight is important for orientation, reading and recognizing faces, while hearing enables communication and understanding of other people. The loss of these senses leads to a feeling of isolation and a limited ability to perform normal tasks. Taste and smell are the senses that influence the experience of food. Loss of these senses causes loss of interest in food and malnutrition.

The **physical health** of seniors is affected at a medium level, which was expressed by 43.7 % of them. In addition to health problems, slowed coordination, immobility and chronic diseases, this dimension is also related to a sense of security. The senses help seniors identify risky situations. Good vision and hearing can ensure a quick perception of danger and enable the

elderly to react to it. Perception of the surroundings and orientation in the environment are important for the independence and mobility of seniors. Sensory loss can limit the ability to perform normal tasks and activities that a senior does with great effort.

The level of **mental health** reaches the highest level, which was confirmed by 46.8 % of seniors. Most seniors do not consider their mental health to be functional. Working senses can contribute to better mental health. The ability to perceive the beauty of the surroundings, listen to music or communicate with others has a positive effect on mood and life satisfaction. Functioning senses can contribute to a sense of safety and security in everyday life.

The impact of old age on **social interaction** had the smallest impact, which was confirmed by more than 35 % of respondents. The ability to communicate with other people is crucial for social interaction. Hearing or sight loss can cause isolation and limit opportunities to interact with family and friends. 53.7 % of seniors said that **the quality of life** affects their approach to life and their active attitude, whether they are more involved in the operation of the facility also depends on the extent to which their senses are negatively affected, on the other hand, they do not consider it a serious obstacle to so that the senior becomes active and participates in activities that are of interest or in therapies at a social service facility. 39.1 % of seniors reported **life satisfaction** at a low level compared to seniors who recorded a high level – 28.5 %. Functioning senses can contribute to a sense of safety and security in everyday life. The ability to perceive your surroundings and communicate with others is important for confidence in your own abilities (table 5).

Dimension: Satisfaction and life-fulfilment

The table below shows the data of the filling domain. Contains questions 12, 13, 15 and 19. In this area is evaluated satisfaction with what a person has achieved in life and with the things for which he was looking forward to it.

Table 6. Results of satisfaction statements

Statements	V
12. You are satisfied with your options in life achieve?	2,93
13. Do you think you get the recognition you deserve in life?	3,80
15. Are you satisfied with what you have achieved in life?	5,20
19. How satisfied are you with the things you can look forward to?	4,10

The research results showed the areas that seniors feel have a low or strong influence on their life satisfaction. 40.3 % of seniors said that they consider it important to be able to lead an active life even in view of deteriorating physical health. 23.4 % of seniors do not attach a high priority to it. Seniors in social services facilities (40.6 %) said that participating in activities in the facility does not represent an increased risk of life dissatisfaction. 26.8 % of seniors said that it is important for them to pursue a hobby even in institutional care, which they attributed a high value to. 37.7 % of seniors said that the way a person experienced his success in life before he was dependent on social services had an impact

on his life satisfaction in old age. For 30.0 % of seniors, we noted a high value in the area of recognition and appreciation, even seniors at an older age need to feel that someone takes them seriously, that they are heard or have opportunities to express themselves, which also increases their level of life satisfaction. 40.5 % of seniors to a moderate degree and 20.5 % of seniors to a high degree said that memories of happy moments in life keep them in a positive mood and give them a good feeling. They support their well-being, especially in terms of emotional and psychological aspects (table 7).

Table 7. Satisfaction scale of seniors in domains

Answers in scale	Level 1 – 2	Level 3	Level 4 – 5
Posibility to be active in daily life	23,4 %	40,3 %	36,3 %
Posibilitiy to join activities	40,6 %	24,7 %	34,7 %
Posibilities for hobbies	37,4 %	35,8 %	26,8 %
Success in personal life	31,8 %	30,5 %	37,7 %
recognition and appreciation	38,9 %	31,1 %	30,0 %
Happy moments	39,5 %	40,0 %	20,5 %

Discussion

Aging is a natural and inevitable part of human life, regardless of where and how one lives. Every age has its own unique challenges and joys, and for seniors who find their home in social service facilities, life satisfaction can blossom in a new light. These facilities represent an important part of elderly care and provide a wide range of services aimed at ensuring a comfortable, dignified and fulfilling life for seniors in their mature years (Bundzelová, et al., 2023).

The life satisfaction of seniors living in social service facilities is a topic that is gaining more and more attention, not only from professionals in the field of elder care, but also from society as a whole. Older people who find themselves in social service facilities are often going through a change in their life circumstances that can be challenging and emotionally demanding. It is therefore important to focus on how these devices can contribute to increasing the life satisfaction of dependent persons on others help (Hauke, 2017).

In this context, it is important to realize that life satisfaction is not simply a measurable quantity, but a complex set of feelings, needs and values that differ from one person to another. For seniors living in social care facilities, life satisfaction can mean different things, so it is important to understand their individual needs and preferences (Tománek, 2019b).

The research revealed an analysis of the factors that influence the life satisfaction of seniors in social service facilities. We will investigate how the quality of services provided, social interaction, personal independence, physical and mental health, as well as other aspects of seniors' lives affect their overall satisfaction. At the same time, we will analyze what are the challenges and opportunities in the area of improving the quality of life of seniors in these facilities.

Older people have a right to a dignified and fulfilling life at the end of their lives, and social service facilities have an important role to play in providing them with support and an environment in which they can fulfill their needs and life goals. It is therefore necessary to review and constantly improve the approach to care for the elderly in order to ensure maximum life satisfaction and quality of life (Tománek, 2019).

Research has revealed that these dimensions of well-being and healthy mental functioning are shaped by socio-demographic characteristics (e.g. age, gender, socio-demographic status, ethnicity, and culture), as well as by individual experiences, including both unexpected life stresses and planned, normative transitions (Brim, 2018). Hedonic well-being generally shows gains with age; that is, older adults tend to show increments in positive affect and decrements in negative affect, at least until very old age. In contrast, eudemonic well-being, reflecting a sense of purpose, is more inclined to reflect decrements in the later years, especially in terms of assessment of purpose in life and personal growth (Ryff, 2018). In-depth measures across multiple domains as well as longitudinal follow-ups have been conducted since Ryff (2016) first introduced the successful aging model.

In gaining a sense of direction and a realistic view of identity and self-image, the seniors are enabled to discuss their priorities, and personal and independent decisions, before planning and setting goals to maintain or increase their well-being. It is important to teach them to use the adaptive mechanisms of selection, optimization, and compensation to promote continued maximization of their chosen activities in life, especially as they grow older and their resources decline (Jopp, et al., 2006).

The study's findings provide valuable insights into the well-being of the elderly and the various factors influencing their life satisfaction. One notable discovery was the existence of a significant relationship between the degree of adaptability among the elderly and their psychological resilience, as well as their overall life satisfaction ($p = 0.024$). This implies that seniors who exhibit greater adaptability tend to experience higher levels of psychological resilience and, consequently, report greater life satisfaction.

The research also shed light on the impact of the adaptation process to life in a social institution. It revealed that when this process is characterized by a positive and shorter duration, the overall quality of life among the elderly residents tends to be higher. This suggests that the way in which seniors transition into social institutions plays a pivotal role in shaping their subsequent life satisfaction. It underscores the importance of providing supportive environments and resources for seniors during this crucial adaptation phase.

Furthermore, the study highlighted an interesting aspect of how the elderly evaluate their life satisfaction. A significant proportion of seniors prioritize their emotional well-being when assessing life satisfaction, often placing more weight on their emotional experiences rather than the objective criteria related to their living conditions ($p = 0.041$). This insight suggests that interventions aimed at improving the emotional health and social connections of the

elderly could lead to enhanced life satisfaction, even in cases where living conditions may not be optimal.

Another key finding from the research was the influence of sensory and physical effects of aging on seniors' perceptions of life satisfaction ($p = 0.035$). This underscores the importance of addressing the sensory and physical challenges that older individuals face, as these factors can significantly impact their overall well-being. Strategies that promote better physical health and sensory support can play a crucial role in enhancing the life satisfaction of elderly individuals.

Seniors who exhibit a higher degree of adaptability tend to experience greater psychological resilience and report higher levels of life satisfaction. This underscores the importance of focusing on interventions and strategies that support and enhance the adaptability of elderly individuals as they transition into social institutions (Cintulová, Buzalová, 2018).

Finally, the study observed a natural decline in motivation for increased activity with advancing age. This finding highlights the importance of encouraging physical and mental activities among seniors, as these activities are closely linked to their sense of purpose and overall life satisfaction. Implementing programs and support systems that enable the elderly to remain active and engaged can be beneficial in maintaining their quality of life as they age.

In conclusion, this research emphasizes the multifaceted nature of life satisfaction among the elderly. It underscores the significance of adaptability, emotional well-being, physical health, and social engagement in shaping the overall well-being of seniors in social institutions. These findings offer valuable guidance for policymakers, healthcare professionals, and caregivers working to enhance the lives of the elderly.

Conclusion

The demographic development of citizens, the social situation, the increase in economic and social problems as well as poverty has a fundamental impact on the types, form and scope of social services that are provided. Various social trends can affect the needs and expectations of residents and lead to changes in the provision of social services. The growing share of elderly citizens in the population results in an increased need for social services. This includes home care, nursing services, services in the community/home environment and long-term care in the fields of social work and healthcare. The need for social services can also increase for those groups of individuals who do not have family support, have been excluded by their family or remain on the fringes of society. Longer life expectancy and advances in medicine may lead to the need for more care for people with more complex health needs, including provision of rehabilitation, long-term nursing and palliative care.

Given these demographic trends and challenges, governments and social service providers must respond to changes in citizens' needs and adapt the types and forms of services available to ensure adequate care and support for different populations. The key is their mutual connection and support of community services. There must not be an isolated

approach to service delivery, but rather it is essential that these services are interwoven and complementary, ensuring a comprehensive coverage of citizens' needs. In addition, it is important to support community services that can be flexible and adaptable to local needs and cultural contexts, especially in relation to marginalized communities.

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ZWIĄZEK JAKOŚCI ŻYCIA Z POZIOMEM SPRAWNOŚCI MOTORYCZNEJ I RYZYKIEM UPADKU OSÓB W PODESZŁYM WIEKU W POLSCE I NA SŁOWACJI

THE RELATIONSHIP BETWEEN THE QUALITY OF LIFE AND THE LEVEL OF MOTOR SKILLS AND THE RISK OF FALLS IN ELDERLY PEOPLE IN POLAND AND SLOVAKIA

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Streszczenie

Wstęp: Długość życia mieszkańców krajów UE systematycznie wydłużała się. W 2022 r. ponad jedna piąta (21,1 %) ludności UE była w wieku 65 lat i starsza. Tendencja starzenia się społeczeństwa jest również widoczna w Polsce i na Słowacji. Obecnie zamiast poszukiwać sposobów na przedłużenie życia, coraz częściej przedstawiciele nauki starają się znaleźć sposoby pozwalające na podniesienie jego jakości. W związku z tym, że ocena jakości życia może posłużyć pośrednio do badania jakości opieki medycznej i stanowić kryterium oceny procesów terapeutycznych autorki podjęły ten temat porównując jakość życia osób w kontekście poziomu sprawności motorycznej osób w wieku 60 lat i więcej zamieszkujących w Polsce i na Słowacji.

Cel pracy: Celem badań było poznanie, jak osoby powyżej 60 roku życia w Polsce i na Słowacji oceniają swoją globalną percepcję jakości życia, ogólną percepcję własnego stanu zdrowia oraz inne sfery życia w odniesieniu do poziomu sprawności fizycznej i ryzyka upadku.

Materiał i metody: Badanie przeprowadzono w grupie 1 534 osób w wieku powyżej 60 roku życia zamieszkujących w środowisku domowym. Z Polski z województwa małopolskiego objęto badaniami 831 osób a ze Słowacji z województwa preszowskiego pochodziły 703 osoby. Badanie wykonano w okresie od kwietnia do listopada 2022 roku. Do oceny sprawności fizycznej użyto dwóch testów. Pierwszym z nich był dwukrotnie wykonywany test "wstań i idź", w którym wynikiem był lepszy czas wykonania. Jako drugi test użyto test wstawania z krzesła, którego wynikiem była ilość powtórzeń wstawania i siadania z krzesła wykonana w czasie trwania 30 sekund. Do badania oceny jakości życia użyto standaryzowanego kwestionariusza jakości życia WHOQOL-bref. W badaniach wykorzystano również ankietę własną. Analizę statystyczną wykonano za pomocą programu SPSS 20. We wszystkich testach przyjęto poziom istotności 0,05.

Wyniki: Po wykonaniu obliczeń i dokonania analizy uzyskanych wyników zasadne jest stwierdzenie, że istnieje zależność między poziomem sprawności fizycznej, a jakością życia

wśród polskich i słowackich seniorów. Średnia wartość dotycząca zadowolenia z własnego życia oraz średnia wartość dotycząca zadowolenia z własnego zdrowia w grupie polskich seniorów ukształtowała się istotnie wyżej niż w grupie słowackich seniorów. Średnia wartość jakości życia dla sfery psychologicznej i środowiskowej ukształtowała się istotnie wyżej w grupie słowackich seniorów, natomiast w sferze fizycznej była ona istotnie wyższa w grupie polskich seniorów.

Wnioski: Im wyższy poziom sprawności fizycznej tym lepsza jakość życia polskich i słowackich seniorów w każdej sferze życia.

Słowa kluczowe: sprawność fizyczna, jakość życia, osoby w wieku 60 lat i więcej, ryzyko upadku

Abstract

Introduction: The life expectancy of the population of EU countries has steadily increased. In 2022, more than one-fifth (21.1 %) of the EU population was aged 65 and older. The aging trend is also evident in Poland and Slovakia. Nowadays, instead of looking for ways to prolong life, representatives of science are increasingly trying to find ways to increase its quality. Due to the fact that the assessment of the quality of life can be used indirectly to examine the quality of medical care and constitute a criterion for the assessment of therapeutic processes, the authors took up this topic by comparing the quality of life of people in the context of the level of motor skills of people aged 60 and over living in Poland and Slovakia.

The aim: The aim of the study was to find out how seniors living in Poland and seniors living in Slovakia evaluate their global perception of quality of life, overall perception of their own health status, and other spheres of life in the context of the level of motor fitness.

Material and methods: The study was conducted in a group of 1 534 people over 60 years of age living in a home environment. From Poland, 831 people were included in the study from the Małopolska province and 703 people were from Slovakia, from the Prešov province. The study was performed between April and November 2022. Two tests were used to assess physical fitness. The first was a twice-performed “stand and walk” test, in which the result was a better performance time. The second test used was the stand-up test (30 Second Chair Stand), the result of which was the number of repetitions of standing up and sitting down from a chair performed in a duration of 30 seconds. The WHOQOL-BREF standardized quality of life questionnaire was used to assess quality of life. The research also used its own survey. Statistical analysis was performed using SPSS 20. The significance level of 0.05 was adopted for all tests.

Results: After analyzing the results obtained, it is reasonable to conclude that there is a relationship between the level of physical fitness and the quality of life among Polish and Slovak seniors. The average value for satisfaction with one’s own life and the average value for satisfaction with one’s own health in the group of Polish seniors was significantly higher than in the group of Slovak seniors. The average value of quality of life for the psychological and environmental spheres was significantly higher in the group of Slovak seniors, while in the physical sphere it was significantly higher in the group of Polish seniors.

Conclusions: The higher the level of physical fitness, the better the quality of life of Polish and Slovak seniors in every sphere of life.

Keywords: physical fitness, quality of life, people aged 60 and over

Wstęp

Na całym świecie, również w Polsce i na Słowacji rośnie liczba ludzi starych (Zdrodowska, et al., 2012). Ludzie żyją dłużej i dlatego dążymy do tzw. „pomyślnego starzenia się” czyli wydłużenia okresu fizycznej sprawności, niezależności i zdrowia, które mają najsilniejszy wpływ na poziom odczuwanej jakości życia (Zdrodowska, et al., 2012; Evans, 1999). Poprawa zdrowia starszej populacji jest zadaniem priorytetowym a regularny wysiłek fizyczny może pomagać w zmianie stereotypowych perspektyw wieku podeszłego, zmniejszeniu kosztów opieki zdrowotnej i promocji pozytywnego i aktywnego obrazu osób starszych (Zdrodowska, et al., 2012; Evans, 1999). Wiele czynników socjodemograficznych czy medycznych może mieć wpływ na podejmowanie lub zaprzestanie regularnej aktywności ruchowej przez osoby dorosłe (Seefeldt, et al., 2002). Do tych najczęściej wymienianych należą: obawa przed pogorszeniem się dolegliwości bólowych ze strony układu ruchu, stereotypowy obraz starzenia się, małe wsparcie społeczne czy negatywne nastawienie do uprawiania ćwiczeń (Satariano, et al., 2000). W związku z wydłużaniem się średniej długości życia obecnie niezbędne jest podejmowanie działań sprzyjających poprawie jakości życia osób w wieku podeszłym, gdyż jakości życia ujmowana jako dobrostan fizyczny i psychiczny, szczęście, satysfakcja z życia i spełnienie pragnień jest podstawą do pełniejszego poznania pacjenta w wieku podeszłym i udoskonalenia prowadzonego u niego np. procesu leczenia. Dla potrzeb współczesnej medycyny jakości życia należy analizować w wymiarze subiektywnym i obiektywnym (Szewczyczak, et al., 2012; Rottermund, et al., 2015).

Celem pracy była ocena jakości życia u osób starszych z Polski i Słowacji w środowisku zamieszkania w oparciu o wydolność funkcjonalną i stopień narażenia na upadki.

Materiał i metody

Materiał badany stanowiły osoby powyżej 60 roku życia z Polski i ze Słowacji. Próba badana składała się z 831 osób powyżej 60 roku życia z Polski i 703 osób w wieku podeszłym ze Słowacji. Badanie wykonano w okresie od kwietnia do listopada 2022 roku.

Oceny jakości życia badanej grupy dokonano według kwestionariusza WHOQOL-bref, który zawiera 26 pytań zamkniętych o punktacji 1 – 5 pkt i umożliwia otrzymanie profilu jakości życia w zakresie czterech dziedzin: ruchowej, psychologicznej, społecznej i środowiskowej. Dwa z tych pytań dotyczą samooceny globalnej percepcji jakości życia i ogólnej percepcji własnego stanu zdrowia i są poddawane indywidualnej analizie. Punktacja dziedzin ma kierunek pozytywny – im więcej punktów, tym lepsza jakość życia. Wyniki surowe zostały przekształcone do przedziału 0-100 (Gnacińska-Szymańska, et al., 2012).

Test równowagi „wstań i idź” wykorzystano do oceny ryzyka upadków wśród osób w podeszłym wieku. Zadaniem badanego było wstanie z krzesła o wysokości siedziska 46 cm z pozycji siedzącej z opartymi plecami i pokonanie po płaskim terenie odcinka drogi o długości 3 metrów następnie wykonanie obrotu o 180°, powrót do krzesła i ponowne przyjęcie pozycji siedzącej. Po opisie słownym i praktycznej próbie pacjent powtarzał test 2-krotnie. Do analizy użyto próbę, podczas której senior uzyskał lepszy wynik. Badany został poproszony o wykonanie zadania możliwie szybko ale w bezpiecznym dla niego tempie. Osoby, które wykonały zadanie w czasie powyżej 20 sekund stwierdzamy duże lub średnie ryzyko upadków. Jest to zależne od tego czy osoba musiała korzystać z pomocy drugiej osoby czy z pomocy technicznych jak laska, kula lub balkonik. U osób, które wykonały zadanie w czasie mniejszym niż 20 sekund stwierdzamy małe ryzyko upadku (Podsiadlo, Richardson, 1991).

Do oceny poziomu ogólnej sprawności wykorzystano test wstawanie z krzesła w ciągu 30 sekund. Badany senior z krzesła o wysokości 43 cm bez podłokietników z rękami krzyżującymi się i opierającymi się o klatkę piersiową miał za zadanie na sygnał prowadzącego wstać z krzesła, a następnie wrócić do pozycji wyjściowej. Badany ma za zadanie wykonać możliwie jak najwięcej powtórzeń wstawania w czasie 30 sekund. Uzyskaną ilość powtórzeń przeliczono wg norm dla płci i wieku badanego (Mętel, et al., 2012).

Analizę statystyczną wykonano za pomocą programu SPSS 20. Do opracowania danych wykorzystano elementy statystyki opisowej (średnia, odchylenie standardowe, rozkład procentowy). Analiza danych uwzględniała porównanie wyników w różnych grupach badanych w zależności od typu zmiennych. We wszystkich testach przyjęto poziom istotności 0,05. Wartości powyżej uznano za nieistotne statystycznie. Badanie zostało przeprowadzone zgodnie z Deklaracją Helsińską.

Wyniki

W Polsce przebadano 831 osób powyżej 60 roku życia, na Słowacji 703. Wśród uczestników, wg podziału przyjętego za Światową Organizacją Zdrowia, najliczniejszą grupę z oby krajów stanowili seniorzy w okresie wczesnej starości (60 – 74 lat), natomiast najmniej liczną byli seniorzy w starości późnej (>90 lat). Średni wiek badanych seniorów z Polski wyniósł $70 \pm 7,3$ a słowackich $73 \pm 6,6$. W badanej grupie z Polski było 534 kobiet (64,26 %) i mężczyzn 297 (35,74 %). W badanej grupie ze Słowacji było 423 kobiet (60,17 %), 280 mężczyzn (39,83 %). Ze względu na wykształcenie można było wyróżnić najliczniejszą grupę wśród seniorów polskich z wykształceniem zawodowym 355 osób (42,72 %), a wśród Słowaków z wykształceniem średnim 280 osób (39,83 %). Średni BMI dla grupy z Polski ustalono na poziomie 27,33 a dla grupy ze Słowacji na poziomie 27,59. Wskaźnik masy ciała był prawidłowy ($BMI = 18,5 - 24,9 \text{ kg/m}^2$) u 31,29 % polskich seniorów i 24,75 % słowackich badanych, natomiast nadwagę ($BMI = 25 - 29,9 \text{ kg/m}^2$) odnotowano u 363 osób (43,68 %) z Polski i 360 osób (51,21 %) ze Słowacji. Analizując sprawność motoryczną z użyciem testu up&go wśród polskich seniorów 39,83 % a słowackich 22,76 % wykonało test w czasie < 10 sekund co wskazuje na niższy poziom wśród Słowaków. Średni czas w jakim seniorzy z Polski wykonali

test „wstań i idź” wyniósł 17,21, a średni czas seniorów ze Słowacji wyniósł 16,30. Analizując ryzyko upadku testem wstawania z krzesła stwierdzono, iż ryzyko powyżej średniej dotyczyło 409 osób (58,18 %) u słowackich seniorów i u polskich – 393 polskich seniorów (47,29 %) (tabela 1).

Tabela 1. Socjodemograficzna charakterystyka badanej grupy

Dane socjodemograficzne		Polska		Słowacja	
		n	%	n	%
Płeć	mężczyźni	297	35,74	280	39,83
	kobiety	534	64,26	423	60,17
Wykształcenie	podstawowe	141	16,97	107	15,22
	zawodowe	355	42,72	225	32,01
	średnie	244	29,36	280	39,83
	wyższe	91	10,95	91	12,94
Miejsce zamieszkania	miasto	429	51,69	325	46,23
	wieś	401	48,31	378	53,77
Wiek	60-74	617	74,25	435	61,88
	75-89	209	25,15	256	36,42
	>90	5	0,60	12	1,71
Stan cywilny	wolny	52	6,26	34	4,84
	w związku	486	58,48	397	56,47
	rozwódziany	128	15,40	31	4,41
	owdowiały	165	19,86	241	34,28
Prowadzenie gospodarstwa domowego	samotnie	154	18,53	185	26,17
	tylko z partnerem	278	33,45	281	39,97
	z rodziną	368	44,28	101	14,37
	z partnerem i dziećmi	31	3,73	137	19,49
BMI	niedowaga	7	0,84	5	0,71
	prawidłowa	260	31,29	174	24,75
	nadwaga	363	43,68	360	51,21
	otyłość I st.	148	17,81	115	16,36
	otyłość II st.	53	6,38	49	6,97
Poziom ogólnej sprawności mierzony testem up&go	nie wykonał	9	1,08	8	1,14
	< 10 sek.	346	39,83	160	22,76
	10-19 sek.	314	37,79	380	54,05
	20-29 sek.	71	8,54	86	12,23
	≥ 30 sek.	91	10,95	69	9,82
Ryzyko upadku	powyżej średniej	393	47,29	409	58,18
	przeciętnie	372	44,77	234	33,29
	poniżej średniej	66	7,94	60	8,53

n – liczba badanych; % – procent ogółu badanej grupy

Analizie poddano relacje pomiędzy jakością życia polskich i słowackich seniorów uwzględniając poziom sprawności motorycznej mierzonej testem „wstań i idź”. Analiza korelacji rang Spearmana ujawniła występowanie istotnych ujemnych zależności pomiędzy poziomem sprawności motorycznej badanych w polskiej i słowackiej grupie w zakresie zadowolenia z jakości swojego życia ($p = 0,000$) i zadowolenia ze swojego zdrowia ($p = 0,000$) a także w zakresie wszystkich sfer jakości życia ($p = 0,000$). Wraz z wzrostem czasu do wykonania testu „wstań i idź” oceniającego poziom sprawności motorycznej respondentów, spadał wynik uzyskiwany przez nich w wyżej wymienionych sferach jakości życia (tabela 2).

Tabela 2. Ocena jakości życia z uwzględnieniem poziomu sprawności motorycznej

Jakość życia	Poziom sprawności motorycznej badanych mierzony testem „wstań i idź”											
	Badani w Polsce						Badani na Słowacji					
	nie wykonał	<10 s	10-19 s	20-29 s	>30 s	rho/p	nie wykonał	<10 s	10-19 s	20-29 s	>30 s	rho/p
Zadowolenie z jakości swojego życia	2,33 ±0,86	3,93 ±0,72	3,79 ±0,75	3,59 ±0,87	3,65 ±0,83	-0,172/0,000	3,00 ±0,75	3,77 ±0,76	3,66 ±0,75	3,31 ±0,92	3,49 ±0,72	-0,171/0,000
Zadowolenia ze swojego zdrowia	1,78 ±0,44	3,53 ±0,85	3,17 ±0,85	3,04 ±0,90	3,05 ±0,98	-0,241/0,000	1,63 ±0,51	3,35 ±0,84	3,18 ±0,90	2,83 ±0,99	2,99 ±0,86	-0,188/0,000
Sfera fizyczna	27,22 ±10,58	71,32 ±14,53	63,65 ±15,68	55,72 ±19,42	55,66 ±18,98	-0,351/0,000	22,88 ±13,80	67,83 ±17,04	62 ±17,28	52,98 ±18,33	55,07 ±18,83	-0,281/0,000
Sfera psychologiczna	34,89 ±14,76	65,28 ±14,33	62,04 ±15,49	58,06 ±18,06	55,59 ±17,32	-0,200/0,000	38,38 ±23,59	71,11 ±14,84	66,40 ±16,02	61,28 ±16,04	61,75 ±16,53	-0,233/0,000
Sfera społeczna	48,67 ±20,46	67,84 ±16,28	65,45 ±17,27	60,04 ±16,94	61,07 ±18,75	-0,146/0,000	51,63 ±15,90	68,50 ±15,91	64,82 ±18,11	62,38 ±15,97	60,14 ±18,42	-0,161/0,000
Sfera środowiskowa	48,78 ±10,53	70,48 ±11,93	69,33 ±12,22	65,00 ±15,38	62,89 ±15,54	-0,177/0,000	57,25 ±20,04	72,78 ±15,74	70,23 ±15,92	66,21 ±14,69	67,99 ±16,38	-0,135/0,000

M- średnia; ±SD-odchylenie standardowe; rho – współczynnik korelacji rang Spearmana

Zadowolenie z jakości swojego życia było wyższe w grupach polskich seniorów, ale różnice były istotne tylko w grupach w których zadanie zostało wykonane w czasie poniżej 29 sekund. Zadowolenia ze swojego zdrowia również było wyższe w grupach polskich seniorów, jednak różnica była istotna tylko w grupie gdzie zadanie zostało wykonane w czasie poniżej 10 sekund. W sferze psychologicznej odnotowano wyższą jakość życia w grupach słowackich seniorów, różnice były istotne tylko w grupach w których zadanie zostało wykonane w czasie poniżej 19 sekund. W sferze środowiskowej również odnotowano wyższą jakość życia w grupach słowackich seniorów. Różnica była istotna w grupie w której zadanie zostało wykonane w czasie powyżej 30 sekund (tabela 2 – 3).

Tabela 3. Jakość życia WHOQOL-bref – wynik testu up&go

Jakość życia	Polska vs. Słowacja				
	Wynik testu „wstań i idź”				
	<10 sek	10 – 19 sek	20 – 29 sek	>30 sek	nie wykonał
	U/p	U/p	U/p	U/p	U/p
Zadowolenie z jakości swojego życia	24 501,0/0,017	53 543,0/0,010	2 444,5/0,021	2 767,5/0,162	20,0/0,101
Zadowolenia ze swojego zdrowia	24 232,5/0,015	59 643,5/0,995	2 669,5/0,155	2 961,5/0,518	30,5/0,503
Sfera somatyczna	24 775,0/0,055	57 282,0/0,362	2 797,5/0,365	3 082,5/0,843	25,5/0,303
Sfera psychologiczna	21 211,0/0,000	50 347,5/0,000	2 874,0/0,523	2 585,0/0,054	33,0/0,771
Sfera socjalna	26 472,5/0,422	58 718,5/0,717	2 792,0/0,350	2 958,5/0,529	34,0/0,846
Sfera środowiskowa	24 831,0/0,059	56 273,0/0,193	2 990,0/0,822	2 563,5/0,045	29,0/0,489

U – test U-Manna Whitneyja; p – poziom istotności

Wyniki badań wykazują statystycznie istotną dodatnią zależność pomiędzy ryzykiem upadku badanych a jakością ich życia. Zależność liniowa pomiędzy ryzykiem upadku badanych a jakością ich życia jest wyraźna. Poziom istotności zależności pomiędzy zmiennymi w zakresie zadowolenia z jakości swojego życia, zadowolenia ze swojego zdrowia a także w zakresie wszystkich sfer jakości życia wyniósł $p = 0,000$ (tabela 4).

Tabela 4. Ocena jakości życia z uwzględnieniem ryzyka upadku badanych

WHOQOL-BREF Jakość życia	Ryzyko upadku badanych mierzone testem wstawania z krzesła							
	Badani w Polsce				Badani na Słowacji			
	poniżej średniej	przeciętne	powyżej średniej	rho p	poniżej średniej	przeciętne	powyżej średniej	rho p
Zadowolenie z jakości swojego życia	3,62 ±0,85	3,97 ±0,68	3,95 ±0,73	0,211 p =0,000	3,50 ±0,80	3,75 ±0,75	3,88 ±0,76	0,175 p =0,000
Zadowolenia ze swojego zdrowia	3,04 ±0,93	3,49 ±0,82	3,52 ±0,92	0,233 p =0,000	2,96 ±0,92	3,34 ±0,83	3,60 ±1,01	0,245 p =0,000
Sfera fizyczna	58,66 ±18,10	70,43 ±14,25	70,83 ±16,79	0,322 p =0,000	56,71 ±18,18	66,19 ±17,32	73,90 ±14,71	0,313 p =0,000
Sfera psychologiczna	58,25 ±17,21	65,19 ±13,93	66,97 ±14,54	0,204 p =0,000	63,20 ±16,71	69,38 ±15,32	72,77 ±14,88	0,204 p =0,000
Sfera społeczna	62,36 ±18,40	67,72 ±15,25	69,44 ±18,68	0,14 /p =0,000	62,96 ±17,53	66,82 ±17,75	68,83 ±15,78	0,138 p =0,000
Sfera środowiskowa	65,36 ±14,48	71,21 ±10,69	72,05 ±13,50	0,195 p =0,000	67,67 ±16,07	72,03 ±15,24	77,40 ±14,87	0,173 p =0,000

M – średnia; ±SD-odchylenie standardowe; rho – współczynnik korelacji rang Spearmana

Badanie istotności dla zadowolenie z jakości swojego życia i zmiennej jaką jest wynik testu wstawania z krzesła, wykazało, że grupy ze stanem funkcjonalnym poniżej średniej i przeciętnym różnią się istotnie statystycznie. Zatem badane osoby w podeszłym wieku z Polski mają wyższy poziom deklarowanego zadowolenie z jakości swojego życia niż badane osoby powyżej 60 roku życia ze Słowacji. Zadowolenia ze swojego zdrowia było istotnie wyższe w grupie polskich seniorów ze stanem funkcjonalnym na poziomie przeciętnym. Odnotowano wyższą jakość życia w sferze somatycznej w grupie polskich seniorów, którzy w teście wstawania z krzesła uzyskali przeciętny poziom sprawności funkcjonalnej. Natomiast istotnie statystyczną wyższą jakość życia w grupie słowackich seniorów odnotowano w sferze psychologicznej niezależnie od poziomu sprawności funkcjonalnej oraz w sferze środowiskowej w grupach ze stanem funkcjonalnym poniżej i powyżej średniej (tabela 4 – 5).

Tabela 5. Jakość życia WHOQOL-bref – wynik testu wstawiania z krzesła

Jakość życia	Polska vs. Słowacja		
	wynik testu wstawiania z krzesła		
	poniżej średniej	przeciętny	powyżej średniej
	U/p	U/p	U/p
Zadowolenie z jakości swojego życia	73 281,0/ 0,019	36 386,0/ 0,000	1 860,0/0,514
Zadowolenia ze swojego zdrowia	75 936,5/0,156	38 819,5/ 0,016	1 847,0/0,491
Sfera somatyczna	75 704,0/0,152	38 018,5/ 0,008	1 803,5/0,384
Sfera psychologiczna	67 366,0/ 0,000	36 998,0/ 0,002	1 485,5/ 0,015
Sfera socjalna	79 663,5/0,828	43 496,5/0,989	1 975,5/0,982
Sfera środowiskowa	72 905,0/ 0,022	41 502,5/0,329	1 526,5/ 0,025

U – test U-Manna Whitney; p – poziom istotności

Dyskusja

Starzenie się ludności świata jest procesem powszechnym i nieodwracalny. Jakość życia jest czynnikiem bezpośrednio związanym w kontekście starzenia się i jest jednym z czynników odpowiedzialnych za wzrost lub spadek długości życia populacji. Opracowanie strategii niefarmakologicznej jest ważne dla utrzymania zdrowia fizycznego i psychicznego w sukcesywnie wzrastającej liczbie osób starszych w ogóle populacji zarówno w Polsce jak i na terenie Słowacji (Marcos-Pardo, et al., 2019).

Jak czytamy w pracy Marcos-Pardo, i wsp. potrzeba utrzymania aktywności fizycznej jest zalecana w szczególności w okresie, w którym starzenie się uwydatnia obniżenie sprawności układów odpowiedzialnych za funkcjonowanie organizmu, wpływając na zdolność osób starszych do uczestniczenia w codziennych czynnościach, co w konsekwencji wpływa na wzrost ryzyka ostrych problemów z powodu upadków i urazów oraz przewlekłych chorób (Marcos-Pardo, et al., 2019). Wyniki badań Dinesh i wsp. pokazują, iż utrata siły mięśni wiąże się z gorszą zdolnością funkcjonalną i obie są związane ze zmniejszoną jakością życia (Dinesh, et al., 2012). Badania Dinesh i wsp. wykazały istotną korelację między siłą mięśni a poziomem jakości życia. Wyniki testu wstawiania z krzesła znacząco korelowały nie tylko z funkcjonowaniem fizycznym ale również z funkcjonowaniem społecznym i zdrowiem psychicznym (Dinesh, et al., 2012). W badaniach przeprowadzonych przez Buckley i wsp. na 29 zdrowych, aktywnych kobietach w wieku 65-80 lat z klubów golfowych wskazano, iż siła mięśnia czworogłowego była ściśle związana z wytrzymałością funkcjonalną (Buckley, et al., 2018). Concannon i wsp. porównując osoby prowadzące siedzący tryb życia z tymi, które regularnie uczestniczą w niewielkiej ilości aktywności fizycznej, zaobserwowali duże przyrosty funkcjonalne (Concannon, et al., 2012).

W naszym badaniu sprawność motoryczna została zmierzona za pomocą testu „up & go” Wyniki badań w tym zakresie wskazują na występowanie zależności pomiędzy poziomem sprawności motorycznej badanych w polskiej i słowackiej grupie a jakością ich życia we wszystkich jej sferach.

Upadki bardzo rzadko powodowane są pojedynczym czynnikiem ryzyka dlatego też prewencja upadków osób starszych należy do jednych z trudniejszych obszarów w geriatric (Lewko, et al., 2014). Niniejsze badanie dostarcza danych na temat zależności między jakością życia a ryzykiem upadku badanych. Wykazują one niezależnie od pochodzenia istotną zależność pomiędzy badanymi zmiennymi.

Ocenę jakości życia osób w podeszłym wieku w podobnych pod względem socjodemograficznym krajach jest uzasadniona, gdyż uzyskane informacje mogą zostać wykorzystane w danym kraju w celu minimalizowania niekorzystnych konsekwencji medycznych, psychospołecznych i ekonomicznych w naszym kraju poprzez wprowadzenie działań naprawczych, które przyczynią się do poprawy sprawności i podniesienia jakości życia osób w podeszłym wieku.

Wnioski

1. Osoby powyżej 60 roku życia na Słowacji wykazały się lepszą jakością życia w porównaniu z osobami z Polski w sferze psychologicznej. W Polsce dla osób w podeszłym wieku należy przeanalizować czynniki i wprowadzić działania, które przyczynią się do poprawy jakości życia w zakresie zdrowia psychicznego wzorując się na działaniach zastosowanych na Słowacji.
2. Im wyższy poziom sprawności fizycznej i mniejsze ryzyko upadku tym lepsza jakość życia polskich i słowackich seniorów w każdej sferze ich życia. Starsi ludzie potrzebują więcej informacji na temat korzyści zdrowotnych (fizycznych, psychicznych i społecznych) wynikających z wyższego poziomu sprawności fizycznej.
3. Wyższą sprawnością motoryczną i mniejszym ryzykiem upadku wykazały się osoby w podeszłym wieku mieszkające w Polsce w porównaniu z osobami na Słowacji.
4. Testy: „wstań i idź” oraz wstawania z krzesła mogą stanowić użyteczne wskaźniki sprawności dla osób w podeszłym wieku mieszkających samodzielnie. Ich regularne wykonywanie daje informację zwrotną na temat stanu funkcjonalnego seniora, który jest związany z poziomem odczuwanej jakości życia.

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RYZYKO UPADKÓW A POZIOM AKCEPTACJI CHOROBY ORAZ KINEZJOFOBII U PACJENTÓW Z CHOROBA PARKINSONA

RISK OF FALLS VS. LEVEL OF DISEASE ACCEPTANCE AND KINESIOPHOBIA IN PATIENTS WITH PARKINSON'S DISEASE

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Streszczenie

Wstęp: Choroba Parkinsona jest neurodegeneracyjną chorobą ośrodkowego układu nerwowego prowadzącą do obniżenia sprawności motorycznej- ograniczeń związanych z niepełnosprawnością prowadzącą do zaburzeń lękowych czy depresyjnych, kinezjofobii.

Cel pracy: Celem pracy było zbadanie występowania zjawiska upadków oraz określenie jego związku z poziomem akceptacji choroby oraz strachem przed ruchem u pacjentów z chorobą Parkinsona.

Materiał i metody: W badaniu udział wzięło 44 chorych ze zdiagnozowaną chorobą Parkinsona (K n =13; M n =31). Grupę badaną stanowili pacjenci PD ze stopniem zaawansowania choroby I (n =1 : 2,27 %), II (n =14 : 32 %), III (n =24 : 55 %), IV (n = 5:11 %).

Wyniki: 75 % badanych potwierdziło że boryka się z problem zaburzeń równowagi ciała. Zaburzenia te, były silnym predyktorem ryzyka występowania upadków. Analiza wykazała, iż upadki występowały u 48 % badanych (n = 21); a ryzyko ich wystąpienia było wysokie zarówno w domu jak i poza nim. Porównanie osób dotyczące stadium choroby według skali Hoehn&Yahra wykazało istotnie statystycznie różnice w grupie, u których nie występują zaburzenia równowagi z osobami z zaburzeniami: p = 0,0102, jak i w grupie upadków (p = 0,0011) u chorych PD. Porównanie grup osób z zaburzeniami równowagi i bez zaburzeń oraz osób, u których zdarzają się upadki oraz u których nie występują, wykazało różnice istotne statystycznie, odpowiednio p = 0,0461 i p = 0,0001. Analiza TSK wykazała, że 17 osób (38,64 %) nie miało kinezjofobii. Natomiast 27 osób (61,36 %) cechowało się strachem przed ruchem.

Wnioski: Występowanie zaburzeń równowagi i upadków jest związane ze stopniem zaawansowania choroby Parkinsona. Zaburzenia i ograniczenia związane z PD mogą silnie

rzutować na akceptację choroby. Zaburzenia równowagi oraz występowanie upadków są silnym predyktorem do strachu przed ruchem, kinezjofobii.

Słowa kluczowe: choroba Parkinsona, upadek, lęk, akceptacja

Abstract

Introduction: Parkinson's disease is a neurodegenerative disease of the central nervous system leading to decreased motor skills- limitations associated with disability leading to anxiety or depressive disorders, kinesiophobia.

Purpose of the work: The purpose of this study was to investigate the incidence of falls and to determine its relationship with the level of acceptance of the disease and fear of movement in patients with Parkinson's disease.

Material and methods: The study included 44 patients diagnosed with Parkinson's disease (K n = 13; M n = 31). The study group consisted of PD patients with disease stage I (n = 1; 2.27 %), II (n = 14; 32 %), III (n = 55 %), IV (n = 11 %).

Results: 75 % of the respondents confirmed that they faced the problem of body imbalance. These disorders, were a strong predictor of the risk of falls. The analysis showed that falls occurred in 48 % of the subjects (n = 21); and the risk of falls was high both inside and outside the home. Disease severity according to the Hoehn&Yahr scale affects balance disorders (p = 0.0102) and the occurrence of falls (p = 0.0011), correlates negatively with acceptance of the disease (R = -0.451), positively with kinesiophobia (R = 0.509).

Conclusions: The occurrence of balance disorders and falls was associated with the severity of Parkinson's disease. PD-related disorders and limitations can strongly affect disease acceptance. Balance disorders and the occurrence of falls are strong predictors for fear of movement, kinesiophobia.

Key words: Parkinson's disease, falls, anxiety, acceptance

Wstęp

Choroba Parkinsona (*ang. Parkinson's disease – PD*) jest drugą po chorobie Alzheimera najczęściej występującą neurodegeneracyjną chorobą mózgu (Skalska- Dulińska, et al., 2014; Reuter, et al., 2018). PD występuje u około 2 % populacji, czyli u ok. 120/100000 osób. Dane epidemiologiczne wskazują, iż częściej chorują mężczyźni niż kobiety, a stosunek ten w zależności od opracowania waha się pomiędzy 1,3:1 a 2:1 (Quinn, et al., 1995; Taylor, et al., 2007; Baldereschi, et al., 2000).

Etiologia PD jest wieloczynnikowa, a za powstanie choroby odpowiadają nakładające się zarówno czynniki środowiskowe, jak i genetyczne. PD może być uwarunkowana genetycznie i dziedziczona autosomalnie dominująco lub recesywnie (Hardy, et al., 2009). Mutacje w genie GBA są najczęstszą znaną genetyczną przyczyną PD, rzadziej występują mutacje w

genie LRRK2, a z kolei mutacje w genach PINK1 czy PRKN związane są z PD o początku w młodym wieku (Simon, et al., 2020).

Pojawienie się objawów klinicznych choroby jest związane ze zniszczeniem ponad 70 % neuronów dopaminergicznych w istocie czarnej śródmózgowia oraz obecnością ciał Lewy'ego (Balestrino, et al., 2020).

Aktualnie rozpoznanie kliniczne PD stawiane jest na podstawie kryteriów z 2015r. opracowanych przez Towarzystwo Zaburzeń Ruchowych (ang. Movement Disorders Society, MDS) na które składa się potwierdzenie obecności spowolnienia ruchowe tzw. bradykinezji oraz dodatkowo przynajmniej jednego z objawów: sztywność mięśniowa lub drżenie spoczynkowe. Zaburzenia odruchów posturalnych wraz z zaburzeniami równowagi i upadkami to dodatkowy z objawów PD, ale pojawiający się późno, z reguły na zaawansowanym etapie choroby.

Występujące objawy motoryczne wraz z zaawansowaniem choroby nasilają się i w coraz większym stopniu powodują szereg zaburzeń i ograniczeń w codziennym funkcjonowaniu pacjentów PD.

Narastająca sztywność mięśniowa, spowolnienie ruchowe czy zmieniona, pochylona postawa ciała powodują przesunięcie środka ciężkości do przodu. W związku z tym pojawia się przymusowe ustawienie zgięciowe kończyn dolnych, powodując problemy ze wstawaniem, przemieszczaniem się oraz zmianą kierunku ruchu. Chód również zmienia się wraz z zaawansowaniem choroby. Staje się wolniejszy, pacjenci zaczynają szurać stopami o podłoże, zmniejsza się wysokość kroków, następuje ograniczenie lub całkowity brak kontrrotacji obręczy barkowej. Zaburzenia te predysponują do łatwiejszej utraty równowagi oraz zwiększają ryzyko upadków (Manickam, et al., 2021; Raccagni, et al., 2020).

Upadki są zatem częstą konsekwencją choroby Parkinsona. Statystycznie, dwie trzecie chorych PD upada co najmniej raz w roku (Latt, et al., 2009; Paul, et al., 2013), a 50 procent doznaje kolejnych upadków (Allen, et al., 2013). Wraz z postępującymi objawami motorycznymi chorzy z PD bardziej narażeni są na urazy i związane z nimi hospitalizacje (Swanson, et al., 2020; Hely, et al., 1999; Soh, et al., 2013; Temlett, Thompson, 2006). Często zaburzenia równowagi i upadki prowadzą do zmniejszenia pewności siebie chorych; stają się oni przez to ostrożniejsi, zmniejszają poziom aktywności, co ma bezpośredni wpływ na obniżenie jakości życia i sposób postrzegania własnej choroby (Michałowska, et al., 2005; Pickering, et al., 2007; Rahman, et al., 2008; Soh, et al., 2013).

Zmiany postawy i lokomocji prowadzące do częstych upadków mogą wywoływać strach przed ruchem i kolejnym upadkiem (Bryant, et al., 2015), mają więc przełożenie na codzienne funkcjonowanie ograniczając je (Adkin, et al., 2003; Chaudhuri, et al., 2011; Rahman, et al., 2011).

Konsekwencją obniżenia sprawności motorycznej jest pojawienie się ograniczeń związanych z niepełnosprawnością prowadzącą do zaburzeń lękowych, depresyjnych, czy kinezjofobii.

Cel pracy

Celem niniejszej pracy było zbadanie występowania zjawiska upadków i określenie jego wpływu na poziom akceptacji choroby oraz kinezjofobii u pacjentów z chorobą Parkinsona.

Materiał i metody

W badaniu udział wzięło 44 chorych ze zdiagnozowaną chorobą Parkinsona; 13 kobiet i 31 mężczyzn. Grupę badaną stanowili pacjenci, których stopień zaawansowania choroby według Skali Hoehn & Yahr'a był następujący: I: n = 1 : 2,27 %; II: n = 14 : 32 %; III: n = 24 : 55 %; IV: n = 5 : 11 %. Wiek badanych od 36 do 77 lat (średnia 58,16). Czas trwania choroby od 2 do 21 lat (średnia 8,5).

Narzędziem jakie zostało wykorzystane do badania był kwestionariusz, w którym zapytano chorych o zaburzenia równowagi, występowanie upadków – ogólnie, o występowanie upadków w ostatnim miesiącu, a także miejsce występowania upadków i okoliczności ich występowania. Ze względu na znaczenie czynników psychologicznych podczas występowania upadków użyto w badaniu dwóch standaryzowanych kwestionariuszy: Skali Akceptacji Choroby (ang. Acceptance of Illness Scale, AIS) oraz Skali Kinezjofobii Tampa (ang. Tampa Scale for Kinesiophobia, TSK).

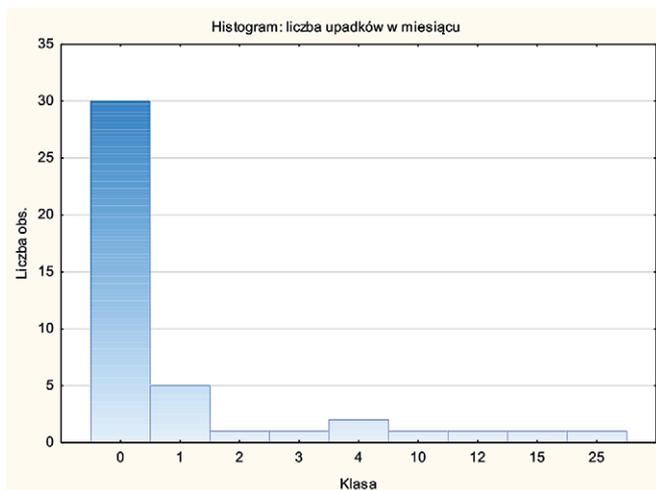
AIS składa się z ośmiu stwierdzeń uwzględniających trudności i ograniczenia związane z chorobą oraz ich akceptacji przez badanego. Odpowiedzi punktowane są w zakresie 1 – 5. Końcowy wynik mieści się w przedziale 8 – 40 punktów. Interpretacja wyników: 8 – 18 niski poziom akceptacji; 19 – 29 średni poziom akceptacji; 30 – 40 wysoki poziom akceptacji (Juczyński, et al., 2001; Felton, et al., 1984).

TSK zawiera siedemnaście stwierdzeń, z przypisanymi odpowiedziami. Wszystkie odpowiedzi są punktowane według skali Likerta od 1 (zdecydowanie się nie zgadzam) do 4 (zdecydowanie się zgadzam). Punktacja pytań 4, 8, 12 i 16 jest odwrócona. Całkowity wynik mieści się w przedziale od 17 do 68 punktów – im wyższy poziom kinezjofobii tym więcej punktów. Wynik powyżej 37 punktów przyjęty jest jako wysoki poziom kinezjofobii (Kori, et al., 1990; Vlaeyen, et al., 1995; Ulug, et al., 2016).

Wyniki

Problem zaburzeń równowagi jest znaczący wśród osób z PD. Na pytanie dotyczące tego problemu tylko 25 % stwierdziło, że ich ten problem nie dotyczy, natomiast 75 % badanych potwierdziło, że boryka się z problemem zaburzeń równowagi. Zaburzenia te, są silnym predyktorem ryzyka występowania upadków. Analiza wyników badania wykazała, iż upadki występowały u 48 % ogółu badanych (n = 21).

Na pytanie o liczbę upadków w ostatnim miesiącu 30 osób (69,77 %) odpowiedziało, że nie miało upadków, 3 osoby (13,99 %) zadeklarowały że miały 1 bądź 2 upadki, natomiast pozostałe 11 osób twierdziło że miały powyżej 3 upadków – rycina numer 1.



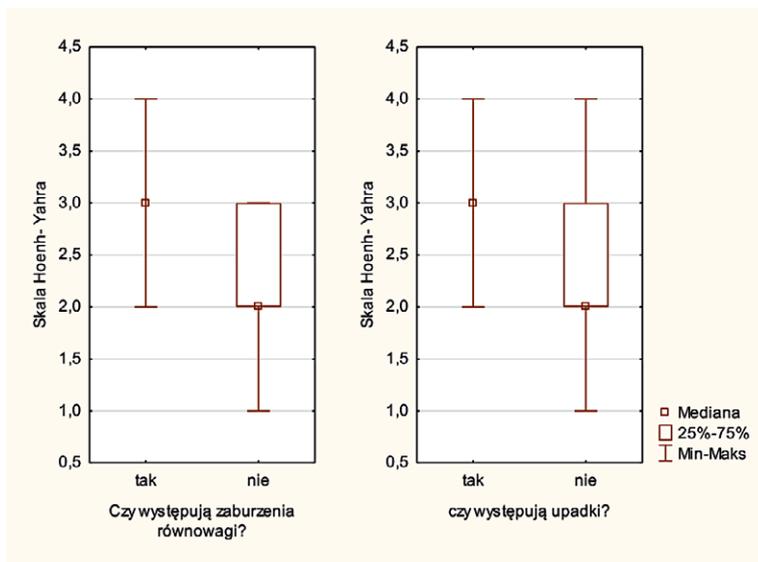
Rycina 1. Liczba upadków w miesiącu

Ryzyko pojawienia się upadków występuje zarówno w domu ($n = 27; 61,36\%$), jak i po za nim ($n = 39; 77,55\%$). Najczęściej respondenci podawali jako okoliczności upadków: potknięcie o przeszkodę, zmianę kierunku ruchu oraz poślizgnięcie się – tabela 1.

Tabela 1. Okoliczności (przyczyny) upadków

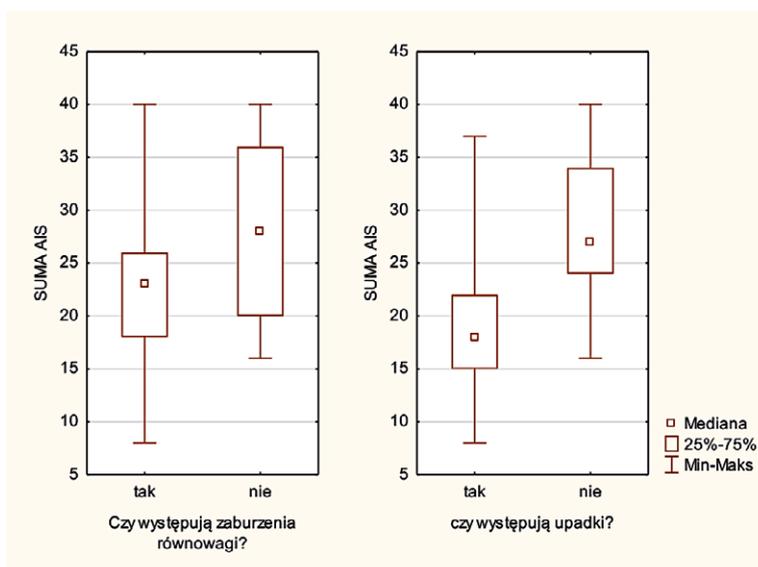
Okoliczności	n	%
Wstawanie	4	9
Zmiana kierunku ruchu	10	22,72
Chód na wprost	4	9
Potknięcie o przeszkodę	12	27,27
Poślizgnięcie się	5	11,36
Pokonywanie przeszkody	3	6,8
Nierówna powierzchnia	3	6,8
Inna przyczyna	2	4,5

Występowanie zaburzeń równowagi związane było ze stopniem zaawansowania choroby Parkinsona. Porównanie osób u których nie występują zaburzenia równowagi z osobami z zaburzeniami równowagi wykazało istotnie statystycznie różnice: $p = 0,0102$ dotyczące stadium choroby według skali Hoehn & Yahr'a. Wykazano również zależność między zaawansowaniem choroby według skali Hoehn & Yahr'a a występowaniem upadków u chorych z PD ($p = 0,0034$).



Rycina 2. Stopień zaawansowania choroby a występowanie zaburzeń równowagi i upadków

Zaburzenia i ograniczenia związane z PD mogą silnie rzutować na akceptację choroby. Średnia punktów w skali AIS- dotyczącej akceptacji choroby wynosiła 24,07. Rozrzut wyników był dosyć duży- wahał się od 8 do 40 pkt (SD = 8,42). Stopień zaawansowania choroby silnie różnicował poziom akceptacji choroby. Porównanie wyników AIS w odniesieniu do skali Hoehn&Yahr’a wykazało różnice istotne statystycznie: $p = 0,0270$. Również porównanie grup osób z zaburzeniami równowagi i osób bez tych zaburzeń oraz osób u których zdarzają się upadki z osobami, które ich nie doświadczały wykazało różnice istotnie statystycznie, odpowiednio $p = 0,0461$ i $p = 0,0001$ – rycina numer 3.

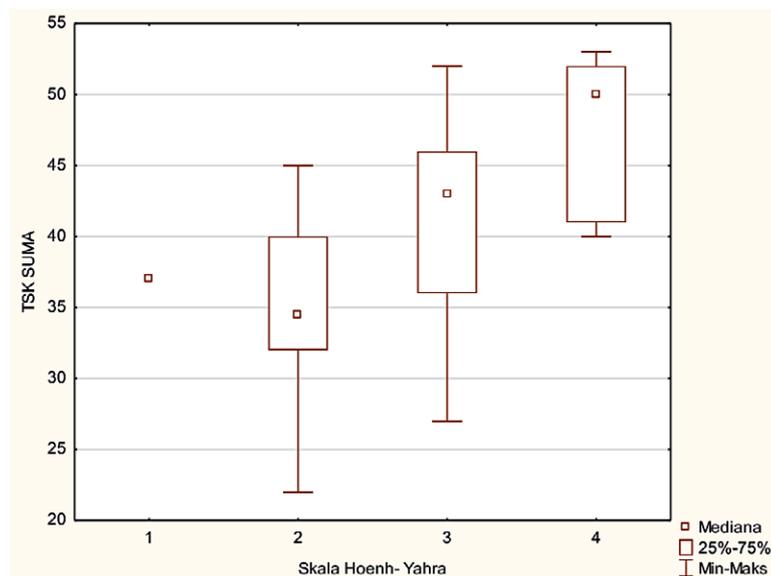


Rycina 3. Porównania akceptacji choroby ze względu na występowanie zaburzeń równowagi i upadków

Stopień zaawansowania choroby, zaburzenia równowagi oraz występowanie upadków mogą być silnym predyktorem do strachu przed ruchem, aktywnością – kinezyfobii. Statystyki opisowe TSK potwierdziły tę hipotezę. Zarówno średnia, jak i mediana wynosiły ponad 40pkt (średnia: 40,04; mediana 40,50). Również ocena jakościowa kinezyfobii zgodnie z przyjętym

jej kryterium występowania – 37pkt wykazała, że problem ten dotyczy większości badanych. Według przyjętego kryterium 17 osób (38,64 %) nie miało kinezjofobii. Natomiast 27 osób (61,36 %) cechowało się strachem przed ruchem.

Porównanie wyników TSK – ze względu na zaawansowanie choroby (skala Hoehn&Yahr'a wykazało różnice: $p = 0,0096$.



Rycina 4. Stopień zaawansowania choroby PD a kinezjofobia

Ostatnim etapem analizy było zbadanie zależności zmiennych: liczba upadków, stopień zaawansowania choroby, poziom jej akceptacji oraz kinezjofobii (tabela 2).

Tabela 2. Korelacje: liczba upadków w ciągu miesiąca, zaawansowanie PD, AIS, TSK

Zmienna	liczba upadków w miesiącu	Skala Hoehn- Yahr'a	TSK SUMA
Skala Hoehn- Yahr'a	0,303*		
TSK SUMA	0,174	0,509*	
SUMA AIS	-0,331*	-0,451*	-0,569*

Dyskusja

Liczne badania potwierdzają, iż występujące zaburzenia równowagi są silnym predyktorem występowania upadków (Bloem, et al., 1996; Maarit, et al., 2007). Potwierdzają to również wyniki badań własnych, gdzie wykazaliśmy, że większość pacjentów z PD zmaga się z problemem zaburzeń równowagi i upadkami. Gray i wsp. wykazali, że czas trwania choroby, powikłań związanych z zaburzeniami motorycznymi oraz występowanie zaburzeń ortostatycznych są istotnym czynnikiem ryzyka upadków w PD (Gray, et al., 2000). Dodatkowo Matinolli i wsp. wykazali, że większe odchylenia postawy zwłaszcza w kierunku bocznym podczas badania mogą również zwiększać ryzyko upadków (Matinolli, et al., 2007). Podobnie Wood i wsp. wskazywali utratę balansu kończyn górnych jako ważny klinicznie objaw powiązany z upadkami (Wood, et al., 2002).

Wyniki badań własnych pokazały również, że występowanie zaburzeń równowagi jest powiązane ze stopniem zaawansowania choroby, wykazano także zależność między zaawansowaniem choroby, a występowaniem upadków u chorych z PD. Prawidłowości te zostały potwierdzone w licznych badaniach (Viitasalo, et al., 2002; Lord, et al., 1994; Maki, et al., 1994; Stalenhoef, et al., 2002; Lajoie, et al., 2004). Badania własne, potwierdziły istotną korelację między grupą osób z zaburzeniami równowagi i osobami bez zaburzeń oraz osobami, u których zdarzają się upadki a osobami u których nie występują upadki.

Wielu autorów podkreśla również wpływ zewnętrznego środowiska fizycznego jako ważną przyczynę upadków. Najczęściej są to: mokre nierówne podłoże, wysokie przeszkody czy niewystarczające oświetlenie lub inne czynniki zewnętrzne (wcześnie poranne godziny) (Grimbergen, et al., 2004; Hely, et al., 2005; Olanow, et al., 2009; Gazibara, et al., 2014). Obserwacje te potwierdzają również badania własne. Ryzyko występowania upadków występowało zarówno w domu jak i po za nim. Najczęściej respondenci jako przyczynę upadku podawali: potknięcie się o przeszkodę, zmianę kierunku ruchu oraz poślizgnięcie się. Czynniki wskazywane przez naszych respondentów stanowią ograniczenia mobilności a zarazem sprawności każdego człowieka podczas codziennego funkcjonowania. Problemy wynikające z braku stabilności i poczucie utraty bezpieczeństwa stanowią czynniki predysponujące do pojawienia się różnego rodzaju zaburzeń w sferze emocjonalnej. Liczni autorzy potwierdzają, że pacjenci z chorobą Parkinsona wykazują większe predyspozycje do zaburzeń emocjonalnych (Hadjistavropoulos, et al., 2011; Trollor, et al., 2006). Jak podaje Broen i wsp. około jedna trzecia badanych przez nich chorych cierpiała na zaburzenia lękowe (Broen, et al., 2016). Upadek jest jednym z czynników wywołujących lęk. Literatura podaje, że poziom lęku u osób upadających często jest wyższy niż u osób doświadczających sporadycznych upadków (Mak, Pang, 2010; Rahman, et al., 2011; Thomas, et al., 2010). To może doprowadzić do spadku zdolności funkcjonalnych (Adkin, et al., 2003; Haertner, et al., 2018; Mak, et al., 2012).

Semra i wsp. potwierdzają, że strach przed upadkiem powoduje unikanie aktywności fizycznej i zwiększa problemy z równowagą u pacjentów z PD, dodatkowo zwiększa ograniczenia w czynnościach dnia codziennego (Semra, et al., 2023; Bryant, et al., 2015; Debû, et al., 2018). Upośledzenie motoryczne- zmiany w chodzie zwiększające ryzyko upadków, prowadzące do kinezjofobii opisali badacze hiszpańscy, gdzie w badanej grupie osób z PD, aż 77,3 % wykazało wysoki poziom strachu przez ruchem (Jiménez-Cebrián, et al., 2021). Wasiuk- Zowada i wsp. zauważają w swoich badaniach, że problem kinezjofobii dotyczy większości pacjentów obciążonych chorobami neurologicznymi, gdzie wynik TSK był na wysokim poziomie u prawie 67 % respondentów (Wasiuk- Zowada, et al., 2022).

Ograniczenie i unikanie aktywności fizycznej wywołane kinezjofobią może doprowadzić do unieruchomienia, a w konsekwencji nasilić niepełnosprawność pacjentów z PD. Potrzebne są badania w celu określenia sposobów zapobiegania strachowi przed ruchem, w tym

wpływu leków, a podczas wdrażania programów terapeutycznych należy wspierać pacjenta i zmniejszać negatywne skutki kinezyfobii.

Wszystkie te zaburzenia i ograniczenia mogą silnie rzutować na akceptację choroby. Dane AIS wykazały średni poziom akceptacji choroby w grupie badanej. Podobny poziom uzyskała Rosińczuk i wsp. wśród pacjentów ze zdiagnozowaną chorobą Parkinsona (Rosińczuk, et al., 2017), Wasiuk Zowada i wsp. wśród pacjentów ze Stwardnieniem Rozsianym (Wasiuk-Zowada, et al., 2022).

Wnioski

Występowanie zaburzeń równowagi i upadków jest związane ze stopniem zaawansowania choroby Parkinsona.

Zaburzenia i ograniczenia związane z PD mogą silnie rzutować na akceptację choroby. Zaburzenia równowagi oraz występowanie upadków są silnym predyktorem kinezyfobii..

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CHOROBA PARKINSONA A WYSTĘPOWANIE I OCENA ZABURZEŃ AFEKTYWNYCH

PARKINSON'S DISEASE AND THE OCCURRENCE AND ASSESSMENT OF AFFECTIVE DISORDERS

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Streszczenie

Wstęp: Depresja i stany lękowe należą do najczęściej wymienianych niemotorycznych objawów choroby Parkinsona. Przyczyniają się one do obniżenia sprawności motorycznej oraz ograniczają pełnienie ról społecznych. Ponadto prowadzą do pogorszenia jakości życia oraz zwiększenia obciążenia opiekunów niemedycznych. Istotna jest zatem wczesna diagnostyka zaburzeń afektywnych oraz ich optymalne leczenie.

Celem badań była ocena występowania i nasilenia lęku oraz depresji wśród osób z chorobą Parkinsona oraz ich związki z wybranymi danymi socjodemograficznymi.

Materiał i metodyka: Do badań zakwalifikowano łącznie 271 osób. Grupę badaną stanowiły osoby ze zdiagnozowaną chorobą Parkinsona (*ang. Parkinson's Disease, PD*), która liczyła 121 osób – 60 kobiet (49,59 %) oraz 61 mężczyzn (50,41 %). Grupę kontrolną (GK) tworzyło 150 osób – 106 kobiet (70,67 %) oraz 44 mężczyzn (29,33 %), były to osoby niechorujące neurologicznie w wieku zbliżonym do badanych z grupy PD. Kwestionariusz ankiety składał się z metryczki służącej do zebrania podstawowych danych socjodemograficznych oraz ze Szpitalnej Skali Lęku i Depresji (*ang. Hospital Anxiety and Depression Scale – HADS*).

Wyniki: Porównanie oceny ilościowej występowania lęku i depresji wśród osób z PD oraz w GK wykazało różnice: $p=0,0000$. Dalsze porównania międzygrupowe wykazały istotne różnice pośród poszczególnymi stadiami PD a GK dla obu domen. Ocena jakościowa również wykazała różnice – w grupie PD odnotowano istotnie więcej osób z wartościami granicznymi oraz z występującymi zaburzeniami ($p<0,05$). Sposób zamieszkania, status cywilny oraz wykształcenie nie różnicowały zaburzeń afektywnych wśród osób z chorobą Parkinsona. Nie odnotowano także zależności między czasem jaki minął od diagnozy a nasileniem lęku $r=-0,027$ oraz depresji $r=-0,067$.

Wnioski: Wśród osób z chorobą Parkinsona zaburzenia afektywne występują znacznie częściej niż u osób niechorujących neurologicznie. Stadium zaawansowania, dane socjodemograficzne oraz długość chorowania nie warunkują występowania zaburzeń afektywnych w grupie osób z PD.

Słowa kluczowe: choroba Parkinsona, zaburzenia afektywne, Szpitalna Skala Lęku i Depresji (HADS)

Abstract

Introduction: Depression and anxiety are among the most commonly cited non-motor symptoms of Parkinson's disease. They contribute to decreased motor skills and limit the performance of social roles. In addition, they lead to a reduced quality of life and an increased burden on non-medical caregivers. Early diagnosis of affective disorders and their optimal treatment is therefore important. The aim of the study was to assess the incidence and severity of anxiety and depression among people with Parkinson's disease and their associations with certain sociodemographic data.

Material and methods: A total of 271 people were included in the study. The study group consisted of people diagnosed with Parkinson's Disease (PD), which included 121 subjects – 60 women (49.59 %) and 61 men (50.41 %). The control group (CG) consisted of 150 people – 106 women (70.67 %) and 44 men (29.33 %), these were non-neurologically ill people of similar age to the PD subjects. The survey questionnaire consisted of a metric used to collect basic sociodemographic data and the Hospital Anxiety and Depression Scale (HADS).

Results: A comparison of the quantitative assessment of the occurrence of anxiety and depression among people with PD and in the CG showed differences: $p=0.0000$. Further between-group comparisons showed significant differences between the stages of PD and the CG for both domains. Qualitative assessment also showed differences, with significantly more people in the PD group with cut-off values and disorders present ($p<0.05$). Residence, marital status and education did not differentiate affective disorders among people with Parkinson's disease. There was also no relationship between time since diagnosis and severity of anxiety $r=-0.027$ and depression $r=-0.067$.

Conclusion: Among people with Parkinson's disease, affective disorders are much more common than in non-neurologically ill people. The stage of progression, sociodemographic data and length of illness do not determine the prevalence of affective disorders among people with PD.

Keywords: Parkinson's disease, affective disorders, Hospital Anxiety and Depression Scale.

Wstęp

Depresja i stany lękowe należą do najczęściej wymienianych niemotorycznych objawów choroby Parkinsona (*ang. Parkinson Disease, PD*), które przyczyniają się do obniżenia sprawności fizycznej oraz ograniczają pełnienie ról społecznych. Ponadto prowadzą do pogorszenia jakości życia oraz zwiększenia obciążenia opiekunów niemedycznych. Istotna jest zatem wczesna diagnostyka zaburzeń afektywnych oraz ich optymalne leczenie. Zaburzenia nastroju są niedostatecznie rozpoznawane, ponieważ przeplatają się z zaburzeniami motorycznymi i poznawczymi. Szacuje się, że objawy depresji występują u około 20 – 30 %

osób z chorobą Parkinsona, choć niektóre źródła wskazują nawet 70 % (Ray, Agarwal, 2020; Su, et al., 2021). Co więcej, zauważalny jest brak dobrej odpowiedzi na leki z grupy antydepresantów. Zauważono, że pacjenci już w początkowych stadiach choroby odznaczają się wysokim poziomem depresji, co można tłumaczyć stresem związanym z samą diagnozą choroby o postępującym charakterze. Niemniej jednak, podkreśla się dalsze nasilenie depresji wraz z czasem trwania choroby oraz zwiększeniem zaburzeń motorycznych. Osoby z PD cechują się obniżeniem nastroju, stanami smutku, zniechęcenia, przygnębienia i apatii. Wśród zmiennych psychologicznych mogących modyfikować reakcję emocjonalną związaną z chorobą Parkinsona wymienia się osobowość pacjenta, otoczenie społeczne, strategie radzenia sobie z chorobą oraz sytuację rodzinną ((Ray, Agarwal, 2020; Su, et al., 2021; Kwok, et al., 2022; Kupryjaniuk, et al., 2020).

W ostatnim czasie pojawia się coraz więcej doniesień na temat korzystnego wpływu aktywności fizycznej (AF) na obniżenie objawów wśród pacjentów z PD. Wymienia się tu takie formy jak joga, tai chi, czy taniec, ale również ćwiczenia aerobowe, oporowe i trening na bieżni. Wśród mechanizmów działania AF na obniżenie zaburzeń nastroju należy wyszczególnić regenerację neuronów hipokampa, uwalnianie dopaminy, zwiększenie poziomu noradrenaliny oraz przepływu mózgowy krwi (Gamborg, et al., 2022). Stąd zalecenia dotyczące aktywności fizycznej będą miały bezpośredni wpływ na sferę motoryczną pacjenta, ale także pośrednio wpłyną na łagodzenie zaburzeń afektywnych. Należy mieć na uwadze, że niezdiagnozowane zaburzenia nastroju mogą przyczynić się do braku podejmowania aktywności fizycznej, która jest wymieniana jako podstawowy element leczenia niefarmakologicznego w chorobie Parkinsona (Tian, et al., 2022).

Znaczenie występowania symptomów zaburzeń afektywnych u chorych na PD oraz rozbieżne dane dotyczące częstości ich występowania skłaniają do badania tego problemu. Postanowiono zbadać występowanie i nasilenie lęku oraz depresji wśród osób z chorobą Parkinsona oraz ich związki z wybranymi danymi socjodemograficznymi. Ponadto oceniono występowanie zaburzeń afektywnych między osobami z PD a osobami zdrowymi (bez choroby neurologicznej) w zbliżonym wieku.

Materiał

Badaniem objęto łącznie 271 osób. Grupa składająca się z osób chorujących na PD (*ang. Parkinson's disease*) liczyła 121 osób – 60 kobiet (49,59 %) oraz 61 mężczyzn (50,41 %). Grupę kontrolną (GK) tworzyło 150 osób – 106 kobiet (70,67 %) oraz 44 mężczyzn (29,33 %), były to osoby zdrowe w wieku zbliżonym do badanych z grupy PD. Wiek respondentów grupy PD: średnia: 63.15, SD = 11.03, (± 95 CI: 61.16–65.13) lat. Wiek badanych z GK: średnia: 63.19, SD = 12.18, (± 95 CI: 61.22–65.15) lat. Wszyscy badani byli mieszkańcami województwa śląskiego (południowa Polska). Ponadto osoby należące do grupy kontrolnej nie chorowały neurologicznie.

Metodyka

Kwestionariusz ankiety składał się z metryczki służącej do zebrania takich informacji jak: wiek, wykształcenie, status cywilny, miejsce zamieszkania, sposób zamieszkania oraz główne informacje dotyczące choroby Parkinsona (wypełniały tylko osoby z grupy PD) (tabela 1). Stopień nasilenia choroby został oceniony za pomocą skali Hoehn– Yahr:

- I: n =37; średni czas od diagnozy: 6.66, SD = 5.78, (± 95 CI: 4,74-8,59) lat
- II: n =46; średni czas od diagnozy: 7.68, SD = 4.10, (± 95 CI: 6,47-8,90) lat
- III: n =38; średni czas od diagnozy: 9.51, SD = 5.66, (± 95 CI: 7,65-11,38) lat.

Tabela 1. Charakterystyka socjodemograficzna badanych grup

Zmienna		PD	GK
		N (%)	N (%)
Wykształcenie	Zawodowe	23 (19,01)	14 (9,33)
	Średnie	57 (47,11)	86 (57,33)
	Wyższe	41 (33,88)	50 (33,33)
Status cywilny	Osoba samotna	33 (27,27)	61 (40,67)
	W związku	88 (72,73)	89 (59,33)
Miejsce zamieszkania	Wieś	9 (7,44)	20 (13,33)
	Miasto do 10 tys.	8 (6,61)	12 (8,00)
	Miasto 10-100 tys.	38 (31,40)	82 (54,67)
	Miasto powyżej 100 tys.	66 (54,55)	36 (24,00)
Sposób zamieszkania	Samotnie	22 (18,18)	51 (34,00)
	Tylko ze współmałżonkiem	42 (34,71)	58 (38,67)
	Z rodziną	57 (47,11)	41 (27,33)

Występowanie oraz nasilenie zaburzeń afektywnych zbadano za pomocą Szpitalnej Skali Lęku i Depresji (*ang. Hospital Anxiety and Depression Scale – HADS*) wprowadzonej przez Zigmunda i Snaitha w 1983 (Rodrigue-Blasquez, et al., 2009). Narzędzie to składa się z 14 stwierdzeń, z których siedem dotyczy objawów lękowych, a kolejnych siedem – objawów depresji. Osoba badana zaznacza jedną z czterech odpowiedzi przypisanych do każdego stwierdzenia – tę, która najbardziej odpowiada opisowi jej stanu emocjonalnego w ciągu 7 ostatnich dni (odpowiedzi punktowane są w zakresie 0–3). Każda z podskal (lęk/depresja) jest punktowana w przedziale 0 – 21 punktów. Przyjęto stosowaną według piśmiennictwa, następującą interpretację wyników: 0 – 7 pkt. – brak zaburzeń, 8–10 pkt. – stany graniczne, 11–21 pkt. – stwierdza się zaburzenia (Rodriguez-Blazquez, et al, 2009).

Badania uzyskały zgodę Komisji Bioetycznej Śląskiego Uniwersytetu Medycznego w Katowicach (KNW/0022/KB/119/18).

Baza danych została utworzona w arkuszu kalkulacyjnym Microsoft Excel. Zebrane zmienne poddano analizie statystycznej. Wykonano statystyki opisowe dotyczące: średnich,

wartości minimalnych i maksymalnych, odchyłeń standardowych oraz przedziałów ufności. Dla porównań międzygrupowych wykorzystano statystyki parametryczne (ANOVA), jak i nieparametryczne (Test U Manna-Whitneya oraz ANOVA Kruskala-Wallis). Przyjęty poziom istotności statystycznej $p < 0,05$. Do obliczeń wykorzystano program TIBCO Statistica 13.3.

Wyniki

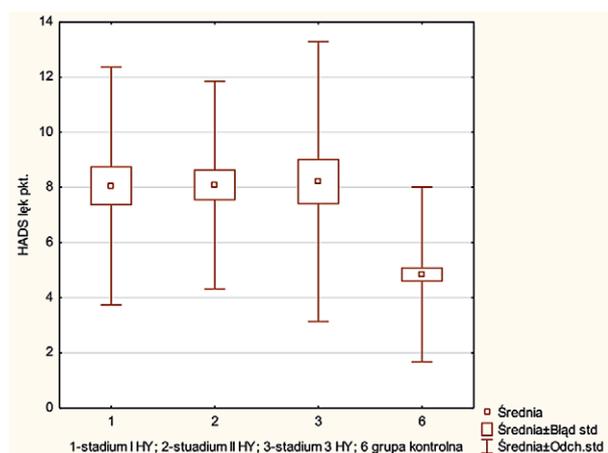
Wykonano statystyki opisowe lęku i depresji wśród osób z PD oraz w GK (tabela 2). Porównanie tych grup wykazały, że istnieją znaczące różnice między poziomami obu zmiennych w badanych grupach.

Tabela 2. Statystyki opisowe skali HADS w obu grupach

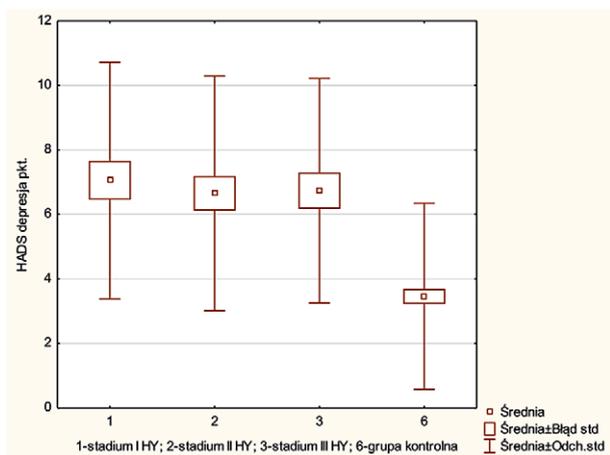
Zmienna	Grupa	Średnia [pkt.]	SD	Min-Max	±95 % CI	<i>p</i>
HADS depresja	PD	6,80	3,57	0-19,00	6,16-7,44	0.0000*
	Grupa kontrolna	3,46	2,88	0-14,00	2,99-3,93	
HADS lęk	PD	8,12	4,34	0-17,00	7,34-8,90	0.0000*
	Grupa kontrolna	4,85	3,17	0-14,00	4,34-5,36	

* $p < 0,05$

Dalsze porównania między grupowe wykazały istotne różnice między poszczególnymi stadiami PD a GK zarówno dla domeny lęku jak i depresji. Natomiast nie odnotowano różnic między samymi stadiami PD (rycina 1-2).



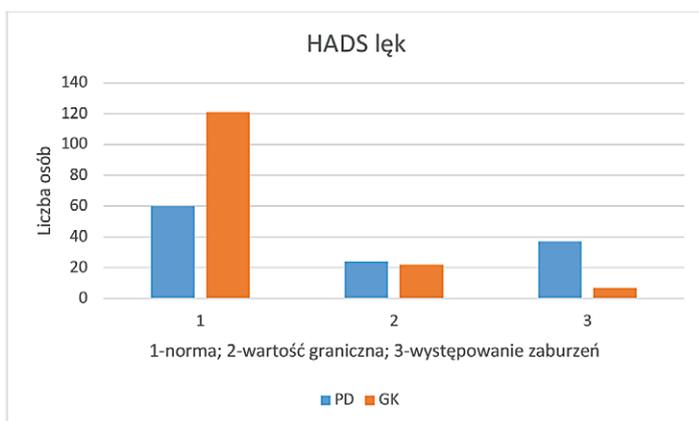
Rycina 1. Lęk: porównanie badanych grup z uwzględnieniem zaawansowania choroby Parkinsona



1–6: $p < 0,0001$; 2–6: $p < 0,0001$; 3–6: $p < 0,0001$

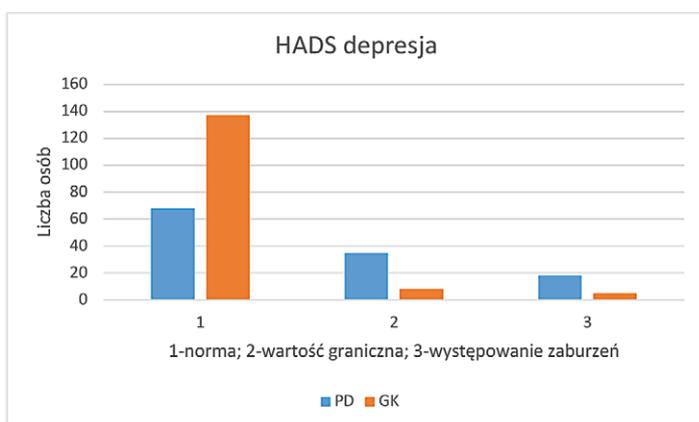
Rycina 2. Depresja: porównanie badanych grup z uwzględnieniem zaawansowania choroby Parkinsona

Następnie dokonano oceny jakościowej lęku i depresji w obu grupach. Porównanie wykazało istotne różnice w pierwszej (norma) oraz trzeciej grupie (występowanie zaburzeń) dla lęku (rycina 3). W przypadku depresji uzyskano znaczące różnice dla każdej podgrupy (rycina 4).



Grupa 1 PD-GK $p = 0,0000$; Grupa 2 PD-GK $p = 0,2606$; Grupa 3 PD-GK $p = 0,0070$

Rycina 3. Porównanie występowania lęku w ujęciu jakościowym w badanych grupach



Grupa 1 PD-GK $p = 0,0000$; Grupa 2 PD-GK $p = 0,0001$; Grupa 3 PD-GK $p = 0,0005$

Rycina 4. Porównanie występowania depresji w ujęciu jakościowym w badanych grupach

Badane grupy były względnie homogeniczne biorąc pod uwagę liczbę występujących chorób współistniejących ($p = 0,4751$). Stąd można uznać, że liczba osób współistniejących nie różnicuje poziomu lęku i depresji.

Analizując dane socjodemograficzne stwierdzono, że sposób zamieszkania, status cywilny oraz wykształcenie nie różnicują lęku i depresji (skala HADS) wśród osób z chorobą Parkinsona (tabela 3).

Tabela 3. Zróżnicowanie lęku i depresji wśród osób z chorobą Parkinsona – zamienne socjodemograficzne jako zmienna grupująca

Zmienna grupująca	Lęk	Depresja
	p	p
Status cywilny	0,2260	0,3858
Sposób zamieszkania	0,1816	0,4298
Wykształcenie	0,4918	0,7307

Nie odnotowano także zależności między czasem jaki minął od diagnozy a nasileniem lęku. Współczynniki korelacji wynosiły: $r = -0,027$ dla lęku oraz dla depresji: $r = -0,067$.

Dyskusja

W badaniach własnych oceniono występowanie lęku i depresji wśród osób z chorobą Parkinsona. Analiza wartości średnich wskazuje, że osoby te uzyskały istotnie wyższe wyniki dla obu domen w porównaniu do osób z grupy kontrolnej. Daje to informacje, że zaburzenia afektywne są związane z chorobą Parkinsona, co potwierdzają inni autorzy i jest to zgodne z najnowszymi doniesieniami (Nègre-Pagès, et al., 2010).

Przyjęta ocena jakościowa lęku i depresji wyróżnia trzy podgrupy: brak zaburzeń, wartość graniczną oraz występowanie zaburzeń. W badaniach własnych autorzy odnotowali istotną różnicę w liczbie osób badanych z poszczególnych podgrup. W przypadku depresji osoby z chorobą Parkinsona stanowiły znaczną większość w grupie o wartościach granicznych oraz z występowaniem zaburzeń. Z kolei dla lęku była to wyłącznie grupa z zaburzeniami.

Autorzy nie wykazali różnic istotnych statystycznie między poszczególnymi stadiami choroby Parkinsona określonych z użyciem skali Hoehn i Yahr oraz nie stwierdzono korelacji czasu jaki upłynął od diagnozy z nasileniem objawów depresyjno–lękowych. Potwierdza to wcześniejsze obserwacje, że już od początku chory osoby te są narażone na ich występowanie, z powodu otrzymania samej diagnozy. Zespół badawczy z Kanady przeprowadził badania wśród osób zdrowych oraz ze zdiagnozowaną chorobą Parkinsona. Autorzy oceniali przede wszystkim zaburzenia snu, ale także lęk i depresję oraz dolegliwości bólowe. Najwyższe wyniki zaburzeń afektywnych wykazano u osób z PD zakwalifikowanych do grupy pacjentów źle śpiących z użyciem *The Pittsburgh Sleep Quality Index* (PSQI). Brak zaburzeń wykazano u osób dobrze śpiących oraz z grupy kontrolnej. Należy podkreślić fakt, że zaburzenia snu oraz bezsenność

są również wymieniane jako częste objawy pozaruchowe w chorobie Parkinsona (Grabowski, et al., 2013; Rana, et al., 2018).

W odniesieniu do czynników demograficznych autorzy nie stwierdzili związków między poziomem zaburzeń afektywnych a statusem cywilnym, sposobem zamieszkania oraz wykształceniem wśród osób z PD. Natomiast Grabowski i Łoza zaobserwowali wyższe wyniki zaburzeń o charakterze depresyjno–lękowym wśród osób hospitalizowanych, mieszkających samotnie, rozwiedzionych oraz z niższym wykształceniem (Grabowski, et al., 2013). Jarczyk i wsp. w ocenie lęku i depresji wśród osób chorujących na Reumatoidalne Zapalenie Stawów (RZS) także nie wykazali związku między poziomem wykształcenia a zaburzeniami afektywnymi (Jarczyk, et al., 2021). Starczewska i wsp. dokonali oceny występowania depresji wśród seniorów i dowiedli odmienne wyniki, co do poziomu wykształcenia. Ich zdaniem osoby z wykształceniem wyższym cechowały się mniejszym ryzykiem występowania depresji. Autorzy udowodnili także większe narażenie na depresję u osób mieszkających samotnie, jak również niebędących w związkach (Starczewska, et al., 2019). Fidacki i wsp. w badaniach nad seniorami z obszaru wiejskiego dowiedli, że osoby nie posiadające partnera, z niższym wykształceniem oraz mieszkające samotnie posiadają skłonności do depresji (Fidacki, et al., 2019).

Podsumowując, wśród osób z chorobą Parkinsona częściej diagnozuje się stany granicznie oraz występowanie lęku i depresji w porównaniu do osób z grupy kontrolnej. Choć w badaniach własnych nie wykazano związku ze zmiennymi demograficznymi, to część autorów prezentuje odmienne stanowisko. W związku z tym należy prowadzić dalsze badania, które pozwolą na rzetelną i jednoznaczną ocenę badanego problemu.

Wnioski

1. Wśród osób z chorobą Parkinsona zaburzenia afektywne występują znacznie częściej niż u osób niechorujących neurologicznie.
2. Stadium zaawansowania choroby nie ma wpływu poziomu lęku i depresji.
3. Dane socjodemograficzne nie warunkują występowania zaburzeń afektywnych w grupie osób z PD.

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Topics 5

Nursing and Healthcare

SUBJECTIVE PERCEPTION OF PSYCHOLOGICAL BURDEN IN THE NURSING PROFESSION

SUBJEKTÍVNE VNÍMANIE PSYCHICKEJ ZÁŤAŽE V POVOLANÍ SESTRY

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Abstract

Introduction: The fast pace of life, demands from patients and family are a source of higher pressure of external environmental factors. This pressure can manifest itself as increased psychological burden. Nurses are daily exposed to the risk of psychological burden.

Methodology: The study population consisted of 122 nurses in standard shift work. Nurses from the internal medicine ward (n =32), surgical ward (n =31), gynaecology ward (n =28), and longitudinal ward (n =31) were included in the sample. We used a questionnaire according to Meister for data collection. We assessed the relationship between length of practice and psychological burden using Student's t-test at 5 % significance level, ($p \leq 0.05$) and the relationship between department and psychological burden at 1 % significance level, ($p \leq 0.01$). Significant correlation relationship between the occurrence of psychological strain and occupational performance as a nurse was determined using the correlation coefficient.

Results: Data analysis showed that in our set of nurses (n =122) in the five sub-categories of length of experience, the test criterion (p) value did not exceed the significance level ≤ 0.05 . We conclude that in our sample, the length of experience in the nursing profession does not affect the experience of psychological distress. On the contrary, the clinical workplace as a place of practice has an effect on experiencing psychological distress. Gross scores were high for nurses at all clinical sites. This is confirmed by the result in surgical ward ($p =0.015$), internal medicine ward ($p =0.034$), longitudinal ward ($p =0.007$) and gynaecology ward ($p =0.001$).

Conclusion: The results of the surveys in the topic are both heterogeneous and specific. We can agree on the statement that the demanding profession of nursing requires early prevention of all forms of stress. Early elimination of factors causing stress means early intervention for the benefit of nurses' health.

Keywords: Stress. Nurse. Profession. Department. Age.

Abstrakt

Úvod: Rýchle životné tempo, nároky pacientov a rodiny sú zdrojom vyššieho tlaku vonkajších faktorov prostredia. Tento tlak sa môže prejavovať ako zvýšená psychická záťaž. Sestry sú denne vystavené riziku psychickej záťaže.

Metodológia. Študovanú populáciu tvorilo 122 sestier v štandardnej práci na zmeny. Do súboru boli zaradené sestry z interného oddelenia (n =32), chirurgického oddelenia (n =31), gynekologického oddelenia (n =28) a pozdĺžneho oddelenia (n =31). Na zber dát sme použili dotazník podľa Meistera. Vzťah medzi dĺžkou praxe a psychickou záťažou sme hodnotili pomocou Studentovho t-testu na 5 % hladine významnosti ($p \leq 0,05$) a vzťah medzi odborom a psychickou záťažou na 1 % hladine významnosti ($p \leq 0,01$). Významný korelačný vzťah medzi výskytom psychickej záťaže a výkonom povolania sestry bol stanovený pomocou korelačného koeficientu.

Výsledky: Analýza údajov ukázala, že v našom súbore sestier (n =122) v piatich podkategóriách dĺžky praxe hodnota testového kritéria (p) neprekročila hladinu významnosti $\leq 0,05$. Dospeli sme k záveru, že v našej vzorke dĺžka praxe v profesii sestry neovplyvňuje prežívanie psychickej tiesne. Naopak, klinické pracovisko ako miesto praxe má vplyv na prežívanie psychickej tiesne. Hrubé skóre bolo vysoké pre sestry na všetkých klinických pracoviskách. Potvrďuje to výsledok na chirurgickom oddelení ($p =0,015$), internom oddelení ($p =0,034$), pozdĺžnom oddelení ($p =0,007$) a gynekologickom oddelení ($p =0,001$).

Záver: Výsledky prieskumov v danej téme sú heterogénne aj špecifické. Zhodneme sa na tvrdení, že náročné povolanie sestry si vyžaduje včasnú prevenciu všetkých foriem stresu. Včasná eliminácia faktorov spôsobujúcich stres znamená včasnú intervenciu v prospech zdravia sestier.

Kľúčové slová: Stres. Zdravotná sestra. Profesia. Oddelenie. Vek.

Introduction

Psychological distress can be characterized as a challenging life situation that can vary in duration and can be a source of harm to nurses' health. Voroblova (2019) described psychological burden as a factor of work and the work environment that is a source of stress at work. It is a wide range of influences of working conditions, acting on the cognitive, sensory and emotional processes of a person. They induce states of increased psychological strain and consequent burden. Nurses are vulnerable to stress to which they may react actively in the form of anger, flight, attack or passively in the form of experiencing anxiety to depression. In a situation where normal adaptation mechanisms are insufficient to cope with the psychological stress, the risk of depleting the body's energy reserves and seriously damaging it increases. The absence of a solution to such a condition can lead to a complex exhaustion of the organism. Dimunova, et al. (2013) classifies the symptoms of psychological stress in nurses as somatic and physiological. Among somatic manifestations they include foot stamping, nail biting, mood changes (feelings of hopelessness, anxiety, dissatisfaction and behavioural changes (inability to rest, aggressiveness). Physiological symptoms include heart palpitations, clenching sensations behind the sternum, headaches, and increased muscle tension in the cervical and lumbar spine. Physiological symptoms also include diarrhoea, skin changes, changes in breathing, stomach upset and menstrual disturbances. Objectives

of the survey. The aim of the survey was to conduct a screening assessment of subjective perceptions of psychological distress in the nursing profession.

Set and methodology

The sample consisted of 122 nurses. In the sample (n =122) of respondents, 31 (25.4 %) nurses practiced the nursing profession in the surgical ward, 32 (26.2 %) in the internal medicine ward, 31 (25.4 %) in the nursing ward, and 28 (23.0 %) in the gynecology ward. We conducted the survey from April 2019 to May 2019. Meister questionnaire was used for data collection. It contained ten items: time pressure, low satisfaction, high responsibility, numbing work, problems and conflicts, monotony, nervousness, oversaturation, fatigue, and long term carrying capacity. The responses of the respondents were rated on a 5-point Likert scale. Score 5 – yes, strongly agree, 4 – rather agree, 3 – neither yes nor no 2 – rather no, 1 – no, not at all. Factor analysis of the data was performed. The independent variable was the length of experience in the nursing profession and the department (gynecology, internal medicine, internal medicine, and surgery). The results were processed with the statistical program SPSS 21.0 using descriptive and inductive statistics methods. We used Student's t-test to identify the dependence of psychological strain on the place of occupation (workplace) at the significance level of 1 %, $p \leq 0.01$ and 5 %, $p \leq 0.05$ for the dependence of subjective perception of psychological strain on the length of work experience.

Results

Nurses with a length of experience of 21-30 years were the largest group (n =33). In this group, 14 (42.4 %) were working in the finishing ward. Nurses with length of experience from 11 – 20 years, were 30 (24.6 %). Out of these, 10 (33.3 %) were working in the longitudinal ward. 27 (22.1 %) nurses with length of experience from 6 – 10 years, Most of them (n =10.37 %) were practicing their profession in the gynaecology ward. The fourth group was nurses with length of experience ranging from 1 – 5 years, in which with the highest number of 10, representing 55.6 % of the total 18 (14.8 %) nurses were nurses from the gynecology department. The last group was nurses with > 30 years of experience, in which 6 (42.9 %) nurses from the internal medicine ward formed the largest group with a total of 14 (11.5 %) nurses out of a total of 14 (11.5 %).

Table 1. Results of perceived psychological distress by place of work – department

Department	Factor	\bar{x}	xm	\pm sd	n	p
Surgical Department	Congestion I.	10,81	11	1,89	31	0,006
	Monotony II.	7,06	7	1,61	31	0,002
	Nonspecific factor III.	13,58	13	2,47	31	0,013
	Gross score	25,94	25	3,56	31	0,015
Internal department	Congestion I.	11,66	12	1,51	32	0,013
	Monotony II.	9,06	8,5	2,29	32	0,014
	Nonspecific factor III.	14,56	15	2,87	32	0,009
	Gross score	25,38	29	6,07	32	0,034
Nursing department	Congestion I.	12,16	12	1,27	31	0,007
	Monotony II.	9,55	9	1,79	31	0,017
	Nonspecific factor III.	15,81	16	2,04	31	0,005
	Gross score	29,77	29	4,55	31	0,009
Department of Gynaecology	Congestion I.	11,18	11	11,26	28	0,001
	Monotony II.	7,14	7	1,83	28	0,004
	Nonspecific factor III.	15,18	16	1,71	28	0,025
	Gross score	27,04	27	3,49	28	0,001

Legend: \bar{x} – arithmetic mean, xm – median, sd – standard deviation, n =absolute frequency, p =value of Student’s t-test criterion

The results of the data analysis showed that psychological distress is experienced by nurses at all clinical sites. In the surgical department, we found that non-specific factors (III) were the source of subjective perception of psychological burden ($p = 0.013$). The raw score ($p = 0.0034$) indicates subjective perception of psychological burden also in nurses in the internal medicine ward. In the finishing ward, the source of burden ($p = 0.017$) was monotony factors (II). For nurses in the gynaecology ward, we identified non-specific factors ($p = 0.025$) as the source of the perceived psychological burden. We note that the subjective perception of workload in the nursing profession is conditioned by the place of practice.

Table 2. Subjective perception of psychological workload depending on the length of experience

Length of practice	\bar{x}	xm	\pm sd	n	p
1 – 5	24,97	25,00	2,71	18	0,024
6 – 10 years	28,54	28,50	3,90	27	0,003
11 – 20 years	29,16	29,00	4,25	30	0,010
21 – 30 years	26,82	27,00	4,60	33	0,011
>30 years	29,39	29,50	4,78	14	0,004

Legend: \bar{x} – arithmetic mean, xm – median, sd – standard deviation, n =absolute frequency, p =value of Student’s t-test criterion

The data analysis shows that in our set of nurses in the five subcategories of length of practice, the value of the test criterion ($p \leq 0.05$) did not exceed the level of significance. We conclude that the length of experience in the nursing profession does not affect the subjective experience of psychological distress.

Discussion

In our set of respondents ($n = 122$), the place of practice as a nurse has an impact on the subjective experience of psychological distress. Similar results have been published by Šeríková (2015). In her set, psychological burden was felt by nurses in the long-stay ward (65 %), whereas in Chorba's (2013) study it was nurses in the surgical ward (46 %). The results of Šeríková's (2015) survey indicate that monotony is a factor of psychological burden in 40 % of nurses and can cause harm to health. Keresztes (2012) reported that up to 83 % of nurses were overloaded and 42 % of nurses were classified as Factor 1 and Stress Level 2. The place of practice exposes nurses to a wide range of psychological stress factors. It can be a source of nervousness, reduced performance, attention and faster onset of fatigue. Škorpíková (2014) revealed such a situation in nurses in an internal medicine ward. The factor of psychological burden was time pressure. This is a phenomenon that dominated our set of respondents in the internal medicine, nursing and gynaecology wards (74.6 %). Another variable that is considered as a factor of subjective perception of psychological strain is years of experience in the profession. In our sample, the largest group was nurses with a length of experience between 21 – 30 years (27 %) and the smallest group was nurses with a length of experience > 30 years (11.5 %). The sample of respondents with length of experience from 11 – 20 years in the ward (33.3 %) indicated subjective perception of psychological burden across all burden factors. Kadučáková (2011) identified psychological burden in nurses with a length of experience of 21 – 30 years. The burden factor was time pressure. Our findings are different. Nurses with a length of experience of 11 – 20 years and nurses with more > 31 years of experience subjectively experienced psychological burden. In the age category of 11 – 20 years of experience, it is possible to agree with Šmírová and Franeková (2017). They are of the opinion that nurses with short professional experience have not had time to adapt to the workplace, which has led to increased psychological burden in them. Others are the published results of Šanta, Šuličová, Derňárová (2016). In their research, they found that there is no statistically significant difference in nurses' perceived psychological burden in terms of age ($p = 0.671 > \alpha = 0.05$), which implies the fact that the perception of psychological burden is not influenced by age.

Conclusion

The provision of nursing care implies high demands on psycho-physical preparedness and responsibility, which can be managed differently. A low level of burden tolerance may result in erroneous decisions. The management of psychological burden also depends on the overall readiness of nurses to work with the subject. We therefore appeal to the need

for early prevention. Employers can also participate in the integration of different forms of prevention. The issue of harmonisation of social relations, interaction and interdisciplinary cooperation deserves special attention.

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PROBLÉMY INTERAKCE LÉKAŘŮ A SESTER

PROBLEMS OF THE INTERACTION OF DOCTORS AND NURSES

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Abstrakt

Tato práce se zaměřuje na problematiku interakce mezi lékaři a sestrami v kontextu zdravotnického prostředí. Vzájemná spolupráce lékařů a sester hraje klíčovou roli při poskytování kvalitní péče pacientům a má významný vliv na efektivitu zdravotnických zařízení. Jsou zde hodnoceny různé aspekty této interakce, definovány hlavní problémy a je zde nabídnuto možné řešení.

První část je věnována rozboru hlavních překážek, které mohou bránit efektivní komunikaci a spolupráci mezi lékaři a sestrami. Mezi tyto překážky patří nedostatečná komunikace, stereotypy a hierarchie v pracovním prostředí, nedostatečné porozumění a respekt k rolím a povinnostem druhé strany a nedostatečné začlenění zdravotních sester do rozhodovacího procesu.

Druhá část obsahuje analýzu důsledků těchto problémů. Neadekvátní interakce mezi lékaři a sestrami může vést ke snížené kvalitě péče, zvýšenému riziku vzniku chyb, nespokojenosti personálu a pacientů a zvýšenému stresu ve zdravotnickém prostředí.

V poslední části jsou navržena řešení a strategie, jak zlepšit interakci mezi lékaři a sestrami. Mezi tato řešení patří zvýšení důrazu na komunikační dovednosti během vzdělávání lékařů a sester, podpora týmové práce, odstranění hierarchie a vytvoření otevřeného prostředí pro dialog mezi oběma skupinami zdravotnického personálu.

Klíčová slova: spolupráce lékařů a sester, kvalitní péče, komunikační dovednosti

Abstract

This thesis focuses on the issue of interaction between Medical Doctors and Nurses in the context of a healthcare environment. Mutual cooperation between doctors and nurses plays a key role in providing quality care to patients and has a significant impact on the efficiency of healthcare facilities. Various aspects of this interaction are evaluated, the main problems are defined, and a possible solution is offered.

The first part is devoted to the analysis of the main obstacles that can prevent effective communication and cooperation between doctors and nurses. These barriers include lack of communication, stereotypes and hierarchies in the work environment, lack of understanding

and respect for the other party's roles and responsibilities, and lack of inclusion of nurses in the decision-making process.

The second part contains an analysis of the consequences of these problems. Inadequate interaction between doctors and nurses can lead to reduced quality of care, increased risk of errors, staff and patient dissatisfaction, and increased stress in the healthcare environment.

In the last section, solutions and strategies are proposed to improve the interaction between doctors and nurses. These solutions include increasing the emphasis on communication skills during the education of doctors and nurses, promoting teamwork, eliminating hierarchy and creating an open environment for dialogue between both groups of medical personnel.

Keywords: collaboration between doctors and nurses, quality care, communication skills

Úvod

Problematika interakce mezi lékařem a sestrou představuje jeden z důležitých aspektů profesní etiky a lékařské praxe. S rostoucí poptávkou společnosti po lékařské péči prošla role sestry významnými změnami a z vágního projevu soucitu se vyvinula v jasně definovanou profesní odpovědnost a samostatnou sféru činnosti v rámci stanovených kompetencí. Tento vývoj lze vysledovat v historii medicíny, kde péče o pacienta, vytváření podpůrné atmosféry a provádění lékařských postupů postupně získávaly autonomní význam.

V 19. století byla role zdravotní sestry omezena na asistenci lékaři a musela se striktně řídit jeho pokyny bez vlastní iniciativy. V moderní době se však medicína výrazně změnila a s ní se změnily i požadavky na ošetrovatelský personál. Role sestry se rozrostla, její funkce se staly rozmanitějšími a vzdělávání se přesunulo od krátkodobých kurzů k plnohodnotnému vzdělávání na zdravotnických školách a univerzitách. Pro sestry existuje mnoho programů rekvalifikace a dalšího vzdělávání (Bochatay, 2017).

V dnešní době má sestra hluboké a systematizované znalosti, ovládá většinu lékařských postupů a má vynikající praktické dovednosti. V některých případech dokonce předčí v některých aspektech zdravotnické praxe i zdravotnické specialisty.

Cílem práce je analyzovat a prozkoumat problémy interakce mezi lékaři a sestrami v systému zdravotní péče s cílem identifikovat klíčové faktory ovlivňující tento vztah a navrhnout praktická doporučení pro zlepšení interakce a výkonnosti.

1. Překážky efektivní komunikace a spolupráce mezi lékaři a sestrami

Spolupráce a kooperace mezi lékaři a sestrami hraje klíčovou roli v úspěchu zdravotnického týmu. Zdravotní sestry, které jsou často přímo u pacientů, mohou odhalit změny zdravotního stavu, kterých si lékař nemusel všimnout. V minulosti se úloha sestry omezovala na plnění pokynů lékaře, dnes se však sestra stala samostatnější a má vlastní kompetence (Vasilenok, 2020).

Lékaři by měli tuto účinnou roli sester uznávat a respektovat a podporovat je v jejich práci. Vztahy ve zdravotnickém týmu jsou pro poskytování kvalitní péče velmi důležité. Zahrnují interakce mezi lékaři různých specializací, diagnostickými specialisty, zdravotníky a sestrami a ošetrovatelským personálem (Sweet, et al., 1995).

Efektivní komunikace a spolupráce mezi lékaři a sestrami jsou klíčovými prvky pro kvalitní péči poskytovanou pacientům (Mckay, et al., 2012). Přesto mohou existovat různé překážky, které mohou tuto spolupráci a komunikaci narušit. V některých zdravotnických zařízeních může existovat přísná hierarchie mezi lékaři a sestrami, což může vést k nedostatečné komunikaci a respektu, lékaři mohou považovat své názory za důležitější než názory sester, což může bránit otevřenému dialogu. Nedostatečná komunikace mezi lékaři a sestrami může vést k nesprávné interpretaci informací a plánů péče, což může ohrozit bezpečnost pacienta a kvalitu péče. Lékaři mohou neposkytovat sestram dostatečné informace o diagnózách, léčbě nebo změnách v plánech péče, a to může vést k neefektivním klinickým rozhodnutím a zvýšenému riziku chyb (Amudha, 2018).

Dále to může být nedostatečná komunikace mezi směny. Když se směny střídají, může dojít k nedostatečnému předávání informací mezi lékaři a sestrami, což může způsobit ztrátu důležitých informací o pacientovi a různé interpretace poskytování péče.

Lékaři a sestry mají často rozdílné perspektivy a cíle při poskytování péče. Lékaři se často soustředí na léčbu a diagnostiku, zatímco sestry mohou klást větší důraz na péči o pacienta a jeho komfort, pokud sestry nejsou aktivně zapojeny do rozhodovacího procesu týkajícího se pacienta, může to vést k narušení komunikace a spolupráce. Sestry mají cenné znalosti a zkušenosti, které by měly být brány v úvahu při plánování péče, ovšem někdy mohou lékaři i sestry nedostatečně rozvíjet dovednosti v oblasti komunikace a týmové spolupráce, a to může ztížit komunikaci a tím také spolupráci (Mcclure, et al., 2002).

Dobré vztahy ve zdravotnictví závisejí na dvou hlavních faktorech: společné diskusi o složitých klinických případech a diagnózách a vzájemném respektu. Vzájemný respekt je důležitý jak v osobních vztazích, tak při práci s pacienty a kolegy, nedostatek respektu k odborným názorům kolegů může poškodit jejich důvěryhodnost a důvěru pacientů.

V lékařské praxi, stejně jako v jiných profesích, hraje kolegiální důležitou roli při poskytování co nejlepší péče pacientům, to znamená, že každý názor a odbornost by měly být respektovány a zvažovány a všichni členové zdravotnického týmu by se měli vzájemně podporovat, zejména v obtížných situacích, protože to přispívá k efektivnějšímu a spolehlivějšímu poskytování zdravotní péče a k budování dobrých vztahů s pacienty (Lancaster, et al., 2015).

Psychologové upozorňují, že pracovní týmy ne vždy jasně vymezují hranice profesní interakce, odpovědnosti a vlivu. Navzdory hezkým teoriím o týmové práci, které předpokládají demokratický přístup, v praxi mnoho lékařských týmů upřednostňuje hierarchickou strukturu a uplatňuje rigidní autoritářské vedení.

V mnoha lékařských skupinách chybí výměna nápadů a podnětů mezi sestrami a lékaři a chybí přijetí konstruktivní kritiky a odborné pomoci a některé sestry se domnívají, že veškerá odpovědnost za plnění pokynů lékaře leží na lékařích, a to i v případě, že léčbu provádí sestra, což může vést k nedorozuměním.

Tyto faktory naznačují hierarchii ve vztahu mezi lékaři a sestrami, což může vést ke konfliktům a nedorozuměním, například ve zdravotnických zařízeních dochází často k situacím, kdy se zdravotničtí pracovníci v přítomnosti pacientů vyjadřují negativně o svých kolezích. Lékařská etika zkoumá morální aspekty a normy chování ve zdravotnickém týmu a postoje vyznačující se přehlížením, urážkami a neuctivým zacházením s kolegy, a to jak ze strany lékařů, tak ze strany sester, jsou považovány za závažné porušení lékařské etiky. Je také důležité mít na paměti, že odmítavé a nešetrné postoje starších kolegů vůči mladším odborníkům mohou způsobit napětí v týmu.

Zdravotnický tým se „zdravým“ mikroklimatem se vyznačuje následujícími znaky (Poghosyan, et al., 2013):

- Pokud si jeden lékař všimne chyby nebo nedostatku jiného lékaře, probere je v soukromí, přičemž použije korektní a zdvořilou formu komunikace a vyhne se porušení důvěrnosti před podřízenými nebo kolegy.
- Starší lékaři jednají s mladými kolegy s úctou a respektem.
- Vedoucí týmu pozorně naslouchají názorům a obavám svých podřízených.

Tento model týmových vztahů zvyšuje autoritu lékařů vůči sobě navzájem i vůči pacientům, zajišťuje efektivnější práci a prospívá pacientům.

2. Důsledky těchto problémů

Situace, kdy sestra zasahuje do povinností lékaře nebo lékař plní povinnosti sestry, jsou nepřijatelné. To svědčí o nejasném vymezení pracovních povinností zdravotnických pracovníků, které vede k překrývání a může být považováno za narušení sféry působnosti kolegy.

Někdy se profesionální chování sestry stává formálním a lhostejným. Za neprofesionální chování se považuje, když sestra neposkytuje pacientovi potřebnou informační a psychickou podporu. Je důležité si uvědomit, že sestra je za správné plnění lékařských předpisů odpovědná pacientovi, nejen lékaři. Formální přístup k práci okrádá sestru o její zkušenosti a podkopává její schopnost samostatného rozhodování a iniciativy (Goncalves, et al., 2019).

Sestry mnohdy bez váhání sdělují lékařům rady a doporučení týkající se jejich profesní činnosti, což často to zdůvodňují tím, že mají více zkušenosti, ovšem v některých situacích to může působit konflikty.

Profesní etika zdravotnických pracovníků zakazuje nezdvořilost, hrubost, agresivitu a chlad v komunikaci s kolegy, protože to odporuje zásadám lékařské etiky. Vedoucí pracovníci zdravotnických zařízení by měli těmto aspektům profesní činnosti věnovat náležitou pozornost a kontrolovat jejich dodržování (Sheldon, Hilaire, 2015).

Nedostatek respektu je hlavní příčinou konfliktů mezi lékaři a sestrami. Sestry pociťují nedostatečné uznání své role a profesní hodnoty, což vytváří emocionální napětí a interpretace jednání lékaře může vyvolat nedorozumění (Porter, 1991).

Příklad: Pokud lékař neprojeví úctu tím, že nepozdraví sestru, může to vyvolat její nespokojenost. Pokud se lékař zcela ujme pacienta, může to sestra vnímat jako nedůvěru.

Někdy sestry tyto situace prožívají příliš emotivně, což může vést ke konfliktu. Je však třeba poznamenat, že lékaři mohou být vůči ošetrovatelskému personálu neuctiví, což může představovat urážení kolegů v přítomnosti dalších zdravotníků či pacientů (Porter, 1991).

Další příčinou konfliktů může být nerealizace, zejména pokud se zkušené sestře nedostává zaslouženého respektu ze strany mladších lékařů. Zkušení odborníci se často rádi podělí o své odborné znalosti a jejich podceňování může způsobit napjaté vztahy (Schmalenberg, Kramer, 2009).

Příklad: Mladý lékař, který právě ukončil rezidenturu, nemusí dát na radu zkušené sestry a upozorní na dodržování hierarchie. V reakci na to začne sestra diskutovat o lékařových úkolech s ostatními zaměstnanci, což může vést ke stížnostem lékaře u vedení.

Konflikty mezi lékaři a sestrami mohou vznikat také kvůli nerovnoměrnému pracovnímu zatížení a platům v závislosti na specializaci lékaře. Pokud je práce u konkrétního lékaře pro sestru finančně nevýhodná, může to také vyvolat konflikt (Schirle, et al., 2018).

Příklad: Sestra na poliklinice může být finančně motivována ke spolupráci s lékařem, který má mnoho pacientů.

Konflikty mohou vznikat také kvůli rozdílům ve stylu řízení lékařských a sesterských nadřízených. Neshody mezi vrchními sestrami a nadřízenými mohou ovlivnit práci podřízených a způsobit napětí (Flicek, 2012).

Příklad: Pokud vrchní sestra vyznává demokratický styl vedení a vedoucí pracovník upřednostňuje autoritativní styl, může to vést k odporu sester, které jsou zvyklé na jiný styl práce.

3. Možnosti zlepšení interakci mezi lékaři a sestrami

Mezinárodní etický kodex sester zdůrazňuje, že při poskytování péče pacientům je důležité vytvářet respektující atmosféru. Sestra jako odpovědný článek v péči o pacienta má významný vliv na výsledky péče o pacienta. Nedostatečná péče může zmařit veškeré úsilí lékařů, včetně složitých chirurgických zákroků. Proto je profesní povinností sestry pečovat o život a zdraví pacientů. Etický kodex také zdůrazňuje, že sestra je osobně odpovědná za provádění činností k uspokojování zdravotních potřeb společnosti (Cobanoglu, et al., 2004).

Kodex rovněž stanoví povinnosti lékaře vůči sestře, včetně respektování práv pacientů, kolegů a ostatního zdravotnického personálu. Systém profesních vztahů ve zdravotnictví je velmi rozmanitý a zdravotničtí pracovníci se stýkají s různými organizacemi, občany

a sociálními skupinami (Despins, 2017). Tyto vztahy zahrnují komunikaci s kolegy, pacienty, návštěvníky zdravotnických zařízení, orgány činnými v trestním řízení, organizacemi sociální péče a komunitami a dalšími zdravotnickými a vzdělávacími institucemi. Vzhledem k tomu, že interakce v těchto sférách jsou různorodé, musí zdravotnický pracovník pro úspěšnou profesionální komunikaci brát v úvahu psychologické charakteristiky osob, s nimiž komunikuje (Hartog, 2015).

Vztahy mezi zaměstnanci jsou považovány za konstruktivní, pokud dodržují následující zásady (Copnell, et al., 2004):

1. Respektování hierarchie vedení: V dialogu mezi sestrou a lékařem hraje tradičně vedoucí roli lékař. Sestra prokazuje dodržování řetězce velení tím, že přijímá a plní příkazy lékaře. Je však důležité mít na paměti, že dodržování řetězce příkazů nevyklučuje, aby sestra měla vlastní názor nebo alternativní přístupy. Konstruktivní vztah předpokládá, že sestra může vyjádřit svůj názor a lékař jej bere v úvahu. K zásadě respektování hierarchie vedení patří také otevřený dialog a diskuse o sporných otázkách, nikoliv jejich ponechávání ve stínu (Schmalenberg, et al., 2005).
2. Vzájemný respekt: Konstruktivní pracovní vztahy vyžadují také vzájemný respekt mezi kolegy. To znamená, že každý člen týmu respektuje pohledy a názory ostatních. Je důležité zdůraznit, že respekt neznamena nutně souhlasit s každým názorem, ale znamená schopnost taktně vyjádřit svůj názor a naslouchat názorům ostatních.
3. Týmová práce: Pokud sestra a lékař sdílejí společné profesní cíle a hodnoty, mohou úspěšně pracovat jako tým. Je důležité, aby oba sdíleli společný cíl a mohli čerpat ze svých odborných znalostí. V takovém týmu existuje vzájemná podpora a každý člen týmu přispívá k celkovému úspěchu (Simborg, et al., 1978).

Prevence a řešení konfliktů mezi sestrami a lékaři může probíhat následujícími způsoby:

1. Nahlášení konfliktu vrchní sestře: Pokud dojde ke konfliktní situaci, je důležité ji nahlásit přímému vedení, čímž se zahájí řešení konfliktu v rané fázi (Kim, et al., 2015).
2. Diskuse o kritické situaci bez cizích osob: Pro konstruktivní řešení konfliktu je důležité zvolit správný čas a místo pro rozhovor, nejlepší je probrat situaci bez přítomnosti dalších osob, aby se předešlo zbytečnému napětí.
3. Respekt a klidný tón hlasu: Během rozhovoru je důležité zachovat věcný a klidný tón, je nevhodné sklouznout do pozice „dítěte“ hrajícího svou dětskou roli. Konstruktivní diskuse o problému je možná pouze v pozici „dospělý s dospělým“ (Al-Dossary, 2014).
4. Dodržování pravidel v konfliktní situaci: Dovednosti řešení konfliktů se lze naučit a je důležité věnovat pozornost tomu, že je důležité být aktivní, tedy člověk by se neměl stát obětí okolností, ale měl by podnikat kroky k vyřešení konfliktu.
5. Obrana proti nevhodnému chování lékaře: Pokud se lékař chová hrubě nebo agresivně, je důležité, aby se sestra uměla bránit, například asertivním vyjádřením toho, kde má hranice a v případě potřeby oslovením vedení kolektivu.
6. Říkat „ne“: Sestra by se měla naučit říkat „ne“ v situacích, kdy na ni lékař deleguje povinnosti nebo ji pověřuje úkoly, které nesouvisejí s její prací (Waldvogel, et al., 1991).

7. Proaktivní postoj a podpora vedení: Sestra a vedení mohou společně zaujmout proaktivní postoj při řešení obtížných situací a konfliktů. To může pomoci řešit problémy a zvýšit profesní kompetence sestry (Duclos-Miller, 2011).

Je důležité si uvědomit, že řešení konfliktů vyžaduje respekt, komunikaci a ochotu spolupracovat na dosažení společných cílů.

Závěr

Problémy v interakci mezi lékaři a sestrami zůstávají ve zdravotnictví závažným problémem. Tyto problémy mohou mít negativní dopad na kvalitu péče a celkovou spokojenost pacientů i zdravotnického personálu.

Jedním z hlavních faktorů, které přispívají ke konfliktům, je neuctivý přístup a nedodržování lékařské etiky ze strany lékařů i sester, protože neuctivé postoje vůči kolegům a porušování hranic kompetencí jsou nepřijatelné a mohou vést ke zmatkům a chybám v péči o pacienty.

Pro řešení těchto problémů je nutné aktivně pracovat na zlepšení komunikace a spolupráce mezi lékaři a sestrami. To zahrnuje školení, diskusi o pravidlech profesionálního chování a respektování práv a povinností každé strany. Důležité je také věnovat pozornost psychologickým aspektům interakce a řešení konfliktů.

Důležitou roli při zlepšování vztahů mezi lékaři a sestrami hraje také prevence a řešení konfliktů. Je důležité diskutovat o problémech bez cizích osob, v klidném prostředí a zaujmout konstruktivní přístup. Důležité je také naučit se chránit před neprofesionálním chováním a naučit se říkat „ne“ v situacích, které přesahují rámec povinností.

Společné úsilí lékařů a sester o zlepšení komunikace a dodržování lékařské etiky v konečném důsledku přispívá k efektivnější a bezpečnější lékařské praxi, což přináší prospěch pacientům a zajišťuje větší soulad zdravotnického týmu.

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HODNOTÍCÍ ŠKÁLY V PALIATIVNÍ PÉČI

RATING SCALES IN PALLIATIVE CARE

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Abstract

Special attention, especially for the elderly, is given to the study of quality of life in the aspect of palliative medicine, which is intended to alleviate the suffering of an incurable patient. Its main goal is to maintain the patient's optimal quality of life.

When studying the quality of life, it is very important to correctly understand the concept and methodology of its implementation. The study should be designed in accordance with standard generally accepted requirements and standard assessment tools should be used to obtain comparable data and their further application in clinical practice.

Among the tools for assessing the quality of life are generally accepted and widespread questionnaires filled out by patients. Special centers for the development of such questionnaires have been created in the USA and European countries. There are general questionnaires that can be used to assess the quality of life in various diseases, and special questionnaires for a specific group of diseases. More than 400 special questionnaires are currently in use.

Keywords: quality of life; palliative medicine; assessment tools.

Abstrakt

Zvláštní pozornost, zejména u starších lidí, je věnována studiu kvality života v aspektu paliativní medicíny, která je určena ke zmírnění utrpení nevyléčitelného pacienta. Jeho hlavním cílem je udržení optimální kvality života pacienta.

Při studiu kvality života je velmi důležité správně pochopit koncepci a metodologii její realizace. Studie by měla být navržena v souladu se standardními obecně uznávanými požadavky a k získání srovnatelných dat a jejich další aplikaci v klinické praxi by měly být použity standardní nástroje hodnocení.

Mezi nástroji pro hodnocení kvality života jsou obecně akceptované a rozšířené dotazníky vyplňované pacienty. V USA a evropských zemích byla vytvořena speciální centra pro vývoj takových dotazníků. Existují obecné dotazníky, pomocí kterých lze hodnotit kvalitu života u různých onemocnění, a speciální dotazníky pro konkrétní skupinu onemocnění. V současné době se používá více než 400 speciálních dotazníků.

Klíčová slova: kvalita života; paliativní medicína; nástroje hodnocení.

Úvod

Hodnotící škály v paliativní péči představují důležitý nástroj v oblasti medicíny a péče o pacienty, kteří mají nevyléčitelnou nemoc a jsou v terminálním stádiu života. Paliativní péče se zaměřuje na zmírnění utrpení a zlepšení kvality života pacientů, u nichž není cílem léčby úplné uzdravení.

Při hodnocení fyzické, psychické a sociální pohody pacientů v paliativní péči hrají zásadní roli hodnotící škály. Pomáhají zdravotnickým pracovníkům, příbuzným i samotným pacientům určit míru nepohodlí, symptomů a celkové pohody. Tyto nástroje poskytují nejen objektivní posouzení stavu, ale umožňují také systematické sledování změn v průběhu léčby a péče.

Hodnotící škály v paliativní péči předpokládají koncept kvality života, který se objevil v Index medicus v roce 1977 a dnes se aktivně používá ve zdravotnictví v mnoha zahraničních zemích (O'Hanlon, 2022). Kvalita života je mnohostranná analýza fyzického a psychického stavu člověka, jakož i jeho socioekonomické pohody, posuzovaná z hlediska subjektivního hodnocení jejího vlivu na celkovou pohodu a míru sociální spokojenosti.

Metody hodnocení kvality života mají široké uplatnění v různých oblastech, včetně sledování zdravotního stavu populace, výzkumu zdravotních služeb, klinických a ekonomických analýz, hodnocení rehabilitačních a habilitačních programů pro osoby se zdravotním postižením, kybernetiky a ekonomiky zdravotnictví. V sociálně-hygienických programech zaměřených na studium PL se jeho ukazatele používají k hodnocení účinnosti nových léčiv a léčebných metod a k analýze ekonomické proveditelnosti zavádění nových léčebných a diagnostických postupů. Hodnocení PL se rovněž používá jako socioekonomický referenční bod při vytváření programů paliativní péče, při prognózování vývoje různých onemocnění na základě rizika a při tvorbě „individuálních zdravotních pasů“ a „kolektivních zdravotních pasů“ (Ravens-Sieberer, 1998).

Cíl

Cílem studie je zhodnotit stávající nástroje pro hodnocení životosprávy se zaměřením na jejich použití v paliativní péči.

Cílem studia hodnotících škál v kontextu paliativní péče je zlepšit kvalitu péče o pacienty, zvýšit jejich komfort a poskytnout jim nejvhodnější lékařské řešení na základě komplexního posouzení jejich potřeb a stavu.

Materiál a metodika

Studium hodnocení kvality života pacientů v paliativní péči je komplexní a vícerozměrný proces. V této souvislosti byla jako klíčový nástroj pro studii zvolena metodika systémové analýzy.

Vědecký výzkum týkající se hodnocení zdravotního stavu, zejména v paliativní péči, vyžaduje systematickou analýzu. Tato metoda zahrnuje nejen rozsáhlé studium obecné populace,

ale také podrobné studium specifických populací podle cílů studie. Systematická analýza zahrnuje obsahovou analýzu zkoumaných jevů a podrobné zkoumání předmětu z různých hledisek s přihlédnutím k příčinným faktorům (Bisht, 2010).

Systémová analýza má několik charakteristických rysů:

- Neformalizovaný přístup k výzkumu;
- Použití všech statisticky podložených a analyticky formulovaných výzkumných metod;
- Zvážení strategického významu veškerého probíhajícího výzkumu a posouzení jeho potenciálního dopadu na praktickou zdravotní péči;
- Rozhodnutí založená na jasně formulovaných problémech a hodnotě výzkumu;
- Použití metody Delphi a brainstormingu ke sladění různých názorů;
- Věnování pozornosti rizikovým faktorům při tvorbě organizačních rozhodnutí.

Systémová analýza umožňuje integrovat výzkum z různých oblastí, což je důležité při stanovování strategických cílů. V posledních letech je systémová analýza vnímána jako vícefaktorová matematická metoda, která zohledňuje lidské kognitivní schopnosti a při ověřování výsledků se opírá o odborný posudek (Verni, 2001).

Pro tuto studii byly informace pro analytické zpracování získány z oficiálních zdrojů. Metodologicky byla v této studii použita metoda průzkumu, která zahrnuje logické zpracování informací. Tato metoda zahrnuje hierarchii různých metod odvozování znalostí, včetně popisu a systematizace, analýzy, hodnocení, zobecnění a syntézy (Schüttengruber, 2022).

Výsledky

Pro studii byly analyzovány existující a nejoblíbenější dotazníky kvality života a ty, které získaly popularitu v letech 1970 – 1990:

- Index EuroQoL (EQ-5D),
- MOS 36-Item ShortForm Health Survey (MOS SF-36). V této práci jsou zmíněny ty s největší informační hodnotou (Verni, 2001).

Dotazník MOS 36-Item Short-Form Health Survey (MOS SF-36) je široce používaný dotazník, který je určen k hodnocení celkového zdravotního stavu a celkové kvality života. Byl vyvinut v rámci studie Medical Outcomes Study (MOS) a skládá se z 36 otázek, které se týkají různých aspektů zdraví, včetně fyzického fungování, omezení rolí v důsledku fyzického zdraví, tělesné bolesti, celkového vnímání zdraví, vitality, sociálního fungování, omezení rolí v důsledku emočních problémů a duševního zdraví (WHO, 1996).

MOS SF-36 je rozdělen do osmi vícepoložkových škál, které lze shrnout do dvou širších kategorií: fyzické zdraví a duševní zdraví. Tyto škály poskytují cenné informace o zdraví a pohodě jednotlivce, což z nich činí cenný nástroj pro klinickou praxi i výzkum. Dotazník je známý svou spolehlivostí, validitou a citlivostí na změny zdravotního stavu v průběhu času (WHO, 2017).

Zdravotníci často používají dotazník MOS SF-36 k hodnocení dopadu lékařských zákroků nebo léčby na kvalitu života pacienta. Používá se také v epidemiologických studiích, ve výzkumu zdravotní politiky a v klinických studiích k měření kvality života související se zdravím.

MOS SF-36 má osm stupnic:

1. Fyzické funkce
2. Fyzická role (míra, do jaké míry fyzické zdraví omezuje obvyklé činnosti osoby)
3. Tělesná bolest
4. Obecné vnímání zdraví
5. Vitalita (energie/únava)
6. Sociální fungování
7. Emoční role (míra, do jaké emoční problémy omezují běžné činnosti osoby)
8. Duševní zdraví

Každá stupnice poskytuje skóre a kombinované skóre osmi stupnic poskytuje komplexní posouzení zdravotního stavu jednotlivce. Výzkumníci a poskytovatelé zdravotní péče mohou tato skóre využít k lepšímu pochopení fyzické a duševní pohody pacienta a ke sledování změn v průběhu času.

MOS SF-36 je vhodný pro hodnocení kvality života jak u zdravé populace, tak u osob s chronickými onemocněními (např. městnavé srdeční selhání, diabetes 2. typu, hypertenze, infarkt myokardu, selhání ledvin a depresivní poruchy). Tato onemocnění dnes představují významný sociální problém na celém světě.

Dotazník MOS SF-36 je tedy univerzálním nástrojem, který lze snadno použít k hodnocení kvality života zdravých i nemocných osob bez ohledu na jejich věk, pohlaví a profesní postavení.

Index EuroQoL, známý také jako EQ-5D, je standardizovaný nástroj pro hodnocení kvality života související se zdravím (HRQoL) a zdravotních výsledků. Běžně se používá ve zdravotnickém výzkumu a klinické praxi k měření a porovnávání dopadu různých zdravotních stavů a léčby na pohodu pacientů. EQ-5D je univerzální nástroj, který lze použít v širokém spektru zdravotnických zařízení a populací (Melzack, 1975).

EQ-5D se skládá ze dvou hlavních složek:

Deskriptivní systém (EQ-5D-5L nebo EQ-5D-3L): Tato složka zahrnuje dotazník s pěti úrovněmi zdraví, kterými jsou mobilita, péče o sebe, obvyklé činnosti, bolest/nepohodlí a úzkost/deprese. Každá úroveň má tři nebo pět stupňů závažnosti, což respondentům umožňuje popsat jejich aktuální zdravotní stav. Kombinací odpovědí vzniká jedinečný zdravotní profil.

Vizuální analogová škála (VAS): Jedná se o nástroj sebehodnocení ve formě vizuální analogové stupnice, kde jednotlivci hodnotí svůj celkový zdravotní stav na stupnici od 0 do 100, přičemž 0 představuje nejhorší možný zdravotní stav a 100 nejlepší možný zdravotní stav.

EQ-5D se používá k vytvoření skóre zdravotní užitečnosti, které kvantifikuje zdravotní stav osoby na základě jejich odpovědí v popisném systému. Skóre zdravotní užitečnosti se běžně

používá v analýzách nákladů a užitku a může pomoci určit hodnotu konkrétních zdravotních intervencí ve smyslu let života přizpůsobených kvalitě (QALY). Složka VAS poskytuje doplňující, subjektivní hodnocení celkového zdraví a pohody jednotlivce.

Výzkumní pracovníci a zdravotníci využívají údaje EQ-5D k hodnocení a porovnávání účinnosti různých zdravotnických zásahů a k rozhodování o přidělování zdravotnických zdrojů. Jedná se o široce uznávaný a akceptovaný nástroj pro ekonomiku zdraví a výzkum výsledků, což z něj činí základní nástroj v oblasti hodnocení kvality života související se zdravím.

Tento dotazník se vyznačuje stručností, snadným použitím, informativností a možností rozšíření jeho použití na další klinické obory ve veřejném zdravotnictví (Varni, 2001).

Nejrozšířenější jsou specializované dotazníky, které se používají k hodnocení kvality života u pacientů s chronickým onemocněním nebo k hodnocení různých symptomů.

Závěr

Hodnotící škály, jako je MOS SF-36 a EQ-5D, jsou cennými nástroji pro měření kvality života a celkové pohody pacientů. Poskytují informace o fyzické, psychické a sociální pohodě, což umožňuje výzkumným pracovníkům a zdravotníkům lépe pochopit dopad různých onemocnění a lékařských zákroků na život pacientů.

MOS SF-36 se vyznačuje komplexním hodnocením fyzické a duševní pohody, zatímco EQ-5D poskytuje stručné a informativní hodnocení podpořené hodnocením celkového zdravotního stavu na vizuální analogové stupnici.

Oba dotazníky mají své výhody a jsou široce používány ve zdravotnickém výzkumu, klinické praxi a ekonomických analýzách. Umožňují srovnávací analýzy různých intervencí, hodnocení účinnosti léčby a dopadu onemocnění na kvalitu života pacientů.

Hodnotící škály jsou důležitým nástrojem pro informované rozhodování v oblasti zdravotní péče a jejich používání pomáhá zlepšovat péči o pacienty a optimalizovat zdroje zdravotní péče. To vše činí z MOS SF-36 a EQ-5D nedílnou součástí moderní zdravotní péče a lékařské praxe.

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THE IMPORTANCE OF PROFESSIONAL ETHICS IN THE FIELD OF TELEMEDICINE AND PATIENT CARE

VÝZNAM PROFESIJNEJ ETIKY V OBLASTI TELEMEDICÍNY A STAROSTLIVOSTI O PACIENTOV

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Abstract

The concept of telemedicine has gained widespread recognition, particularly in light of the COVID-19 pandemic. While certain forms of telemedicine have existed since the early 20th century, the global health crisis has accelerated and expanded its adoption. Telemedicine involves the delivery of healthcare services through telecommunications and information technology, regardless of the patient's location. This article aims to examine the ethical considerations surrounding telemedicine, as the increased use of information and communication technologies necessitates adherence to ethical principles such as informed consent, data protection, confidentiality, and justice. The objective of this study is to assess the current state of telemedicine and identify the necessary ethical and legal standards. Furthermore, this article explores the limitations of telemedicine. The research draws upon data from reputable academic articles sourced from databases including PubMed, Scopus, and Science Direct. The search terms used were tele-health, telemedicine, and ethical issues in telemedicine. Full-text academic articles were thoroughly reviewed. In conclusion, we emphasize the significant role of ethics in IT and telemedicine, particularly with the increased accessibility of information through the internet. However, this accessibility also poses a threat to patients' personal information. Therefore, the introduction of telemedicine must be accompanied by a clear, precise, and unambiguous ethical and legal framework.

Keywords: Telemedicine, Professional ethics, Ethical rules, Informed consent.

Abstrakt

Pojem telemedicína sa do širokého povedomia dostal najmä počas pandémie COVID-19. S určitými formami telemedicíny sa stretávame už od počiatku 20. storočia a pandémia len urýchlila a rozšírila prijatie telemedicíny na celom svete. Telemedicína znamená poskytovanie služieb zdravotnej starostlivosti prostredníctvom telekomunikačných a informačných technológií, bez ohľadu na to, kde sa pacient alebo príslušné informácie nachádzajú. V príspevku skúmame etické aspekty telemedicíny, nakoľko častejšie používanie informačných a komunikačných technológií zvyšuje dôležitosť etických pravidiel ako sú informovaný súhlas, ochrana osobných údajov a dôvernosť, princíp spravodlivosti. Naším cieľom je analyzovať súčasný stav a identifikovať, čo je potrebné implementovať do telemedicíny s ohľadom na etické a právne normy. Tento článok tiež analyzuje limity používania telemedicíny.

Požadované údaje v tomto výskume boli odvodené z publikovaných elektronických zdrojov a dôveryhodných akademických článkov publikovaných v databázach ako PubMed a Scopus. V separácii a kombinácii sa hľadali tieto kľúčové slová: tele-zdravie, telemedicína, etické problémy v telemedicíne. Odborné texty boli preskúmané v plnom znení. V závere zdôrazňujeme, etika má veľký význam v telemedicíne, najmä na internete, pretože poskytuje viac príležitostí na prístup k informáciám. Je to však sprevádzané ohrozením osobných údajov pacientov. Preto ak sa pripravujeme zaviesť telemedicínu, musíme tak urobiť na základe jasného, presného a jednoznačného etického a právneho rámca.

Kľúčové slová: Telemedicína, Profesionálna etika, Etické pravidlá, Informovaný súhlas

Introduction

The healthcare industry has undergone a significant transformation due to advancements in information technologies. These developments have introduced novel approaches to delivering medical care, particularly through the integration of telemedicine and information technology. This integration has paved the way for innovative methods in disease prevention, diagnosis, and treatment. Telemedicine, which encompasses both medical practice and information and communication technologies, has proven to be a highly efficient tool for remote healthcare, particularly in underserved regions. As technology continues to play an increasingly important role in everyday life, healthcare is also experiencing a shift in patient-doctor interactions. Technological innovations and applications are reshaping the time, location, and manner in which patients and doctors connect and communicate.

In the present scenario, there is an increasing inclination among patients to utilize online resources for obtaining information about their health concerns. Moreover, the progress in technology has paved the way for the provision of remote healthcare services through telemedicine applications. This progress offers a valuable opportunity for patients residing in rural or remote areas, as well as those facing various barriers that hinder their access to healthcare. Similarly, innovative technologies have empowered patients suffering from rare diseases to access specialized medical care from distant specialists. These advancements possess substantial potential in improving healthcare accessibility and catering to the requirements of diverse patient populations (Chaet, et al., 2017).

The advancements in question present significant potential for enhancing patient outcomes, but they also present ethical challenges. In particular, concerns have been raised regarding the electronic transmission of health data and the provision of remote care, as these practices may introduce new risks to the quality and safety of healthcare. As a result, there is a possibility that these risks could undermine the crucial doctor-patient relationship, which is fundamental to effective medical practice. It is essential to address these concerns and establish strong frameworks that guarantee the ethical implementation of these innovations, thereby ensuring the well-being of patients and upholding the integrity of the healthcare profession.

Proponents of telemedicine emphasize the immense potential of these technologies in enhancing healthcare accessibility and delivering patient-centered care. Nevertheless, critics voice concerns regarding the potential threats to privacy and confidentiality, the limitations of electronically mediated interactions during physical examinations, and the potential for disruption in the patient-physician relationship.

1. Defining Telemedicine

The term telemedicine was first introduced by R. L. Murphy and K. T. Bird in 1974, after successfully conducting 1000 patient encounters between Logan International Airport's medical station and the emergency department at Massachusetts General Hospital in Boston (Shawwa, 2003). Currently, there are multiple definitions of telemedicine. According to the World Health Organization, *telemedicine refers to the delivery of healthcare services, where distance plays a crucial role, by healthcare professionals who utilize information and communication technologies to exchange valid information for the purpose of diagnosing, treating, and preventing diseases and injuries, conducting research and evaluation, and further educating healthcare providers, all with the aim of improving the health of individuals and communities* (WHO, 2019). The European Commission's Directorate General XIII defines telemedicine as the immediate access to shared and remote medical expertise through telecommunications and information technologies, regardless of the patient's location or the location of relevant information (Stanberry, 2001). More recently, it has been defined simply as the use of telecommunications for medical diagnosis and patient care (Stanberry, 2001).

2. History of Telemedicine

Telemedicine has a long and captivating history that can be traced back to the 1860s. During the American Civil War, the telegraph played a crucial role in relaying information about injured soldiers to medical teams. In the early 20th century, William Einthoven's groundbreaking invention of the first EKG enabled the sharing of vital medical data between his laboratory and academic institutions. As technology advanced, the telegraph was eventually replaced by the radio and telephone, which were primarily utilized to provide medical guidance to personnel on ships. It was in 1920 that the first medical advice service for seafarers, employing Morse code and voice radio, was established. A significant milestone occurred in 1944 when The Johns Hopkins Hospital broadcasted a closed-circuit television operation to a large audience of surgeons. The 1960s witnessed the utilization of two-way closed-circuit television systems, enabling the seamless transmission of radiograms and consultations between medical professionals and patients.

The proliferation of the Internet, in conjunction with rapid technological advancements, has significantly facilitated the expansion of telemedicine. At present, telemedicine and telecare encompass a broad spectrum of applications, including the transmission of visually rich media such as pathology slides (telepathology), images of skin conditions such as lesions, rashes, and tumors (teledermatology), and radiograms (teleradiology).

These transmissions can occur in real-time or be stored as part of the patient's electronic medical record. The emerging field of telesurgery involves mentoring and training surgeons through videoconferencing systems, as well as performing surgical procedures using robotic surgeons guided by a remote surgeon via computer data (Stanberry, 2001). Electronic health applications, such as videoconferencing, the Internet, and email, are increasingly being utilized for communication between patients and healthcare professionals, as well as for consultation and education among healthcare professionals themselves.

Based on a comprehensive 2020 report on the telemedicine market in the United States, it was revealed that a significant majority, specifically over 75 percent, of hospitals across the nation have successfully integrated telemedicine programs into their operations (Shawwa, 2023). At present, healthcare providers are effectively delivering medical services to patients within the convenience and safety of their own homes, utilizing live chat and video conferencing technologies.

In light of the COVID-19 pandemic, there was a deliberate reduction in hospital visits to mitigate the potential transmission of the disease. Consequently, there was a notable increase in the utilization of online consultations as a viable substitute for face-to-face appointments. As the crisis gradually recedes, it becomes crucial to ascertain the appropriate role of telemedicine, whether it should be exclusively reserved for health emergencies or integrated as a supplementary or alternative approach to conventional care (Membrado, et al., 2021).

3. Ethical Aspects of Telemedicine

The ethical considerations pertaining to telemedicine were initially deliberated upon in the early 1980 s, a time characterized by rapid technological progress. In 2006, the World Health Organization commissioned the American Society for Bioethics and Humanities (ASBH) to conduct a comprehensive analysis of the ethical predicaments linked to telemedicine.

Telemedicine poses ethical considerations across multiple domains, encompassing technology, doctor-patient rapport, data privacy and security, informed consent, and fairness. Healthcare providers' adherence to ethical principles can augment patient care. Essentially, prioritizing ethical concerns in telemedicine ensures the secure and efficient utilization of these services.

3.1 Informed Consent and Instruction of the Patient During the Implementation of Telemedicine

Informed consent is a fundamental ethical principle that has been increasingly integrated into healthcare legislation, establishing itself as a cornerstone of the doctor-patient relationship from both moral and legal standpoints. It necessitates the performance of diagnostic and treatment procedures on a patient only with their voluntary agreement, after providing them with comprehensive information beforehand. This principle upholds the essential right to self-determination, acknowledging that each individual has autonomy over their own body and possesses the ability to make independent choices regarding all aspects of their healthcare.

The provision of healthcare services is dependent on obtaining the patient's informed consent. Before any medical procedure, it is crucial for the physician to provide the patient with detailed instructions regarding the purpose, nature, consequences, and associated risks of the proposed healthcare intervention. Furthermore, the patient must be informed about alternative procedures and the potential risks associated with declining medical treatment. These principles are equally applicable to the delivery of healthcare services through telemedicine. Just like any procedure conducted during in-person interactions between a patient and a healthcare professional, the telemedicine procedure must be thoroughly documented in the patient's medical records.

3.2 Personal Data Protection and Confidentiality

The significance of ethics in the realm of telemedicine, particularly in the online domain, cannot be overstated. The increased avenues for information accessibility pose a potential risk to patients' personal data, making privacy and security concerns primary impediments to the widespread adoption of telemedicine. Healthcare providers have a responsibility to safeguard and fortify patient information while utilizing telemedicine platforms.

The provision of remote consultation and care involves a diverse range of third-party entities compared to traditional doctor's office visits. In addition to medical personnel, telecommunication service providers play a significant role in facilitating these interactions. While certain meetings and consultations are subject to data protection laws and regulations, others may not be, thereby posing additional risks. It is important to note that websites offering health information may not guarantee the anonymity that visitors assume. Similar concerns arise with home monitoring devices and mobile health apps, as they may lack adequate privacy protections (Chaet, et al., 2017). Furthermore, patients themselves may unknowingly utilize unsecured internet connections or devices that are vulnerable to cyber attacks. The advent of electronic health records has further compounded the challenges surrounding patient privacy, as these records contain highly personal data (Nittari, et al., 2020). Given these circumstances, it is imperative for technological equipment suppliers and healthcare workers to prioritize the utmost protection of patient personal data.

3.3 Ethical Principle of Justice

The digital divide presents a substantial impediment to the widespread integration of telemedicine. Despite the growing accessibility of high-speed Internet and mobile devices, there are still numerous regions where access to these technologies remains restricted. This creates a challenge of fairness and parity, as certain families or individuals are unable to avail themselves of telemedicine services due to a lack of knowledge or the requisite technology, such as an Internet connection. Certain countries confront severe limitations in Internet coverage, while others grapple with the prohibitive expense of the technical equipment necessary for telemedicine implementation.

Moreover, the scarcity of experts in this particular domain poses an additional obstacle to the delivery of telemedicine services. Moreover, elderly individuals and those with limited proficiency in technology may face challenges when endeavoring to utilize telemedicine platforms. It is imperative to address the digital divide in order to guarantee equitable and unbiased access to telemedicine services.

4. Contraindications (limits) of Telemedicine

Telemedicine may not be suitable for all patients and health conditions as a care model. The lack of physical interaction between the physician and patient restricts the ability to perform certain medical procedures remotely. In cases where technology does not meet the required clinical standards, telemedicine should not be the primary approach. It is crucial to acknowledge that telemedicine does not substitute the physical provision of healthcare, clinical examination, or personal contact between the physician and patient. Instead, it serves as an supplementary method for delivering healthcare services.

A 2019 publication in The New York Times newspaper highlighted a concerning incident that exemplifies a lack of sensitivity in patient communication during telemedicine consultations (Jacobs, 2019). The article describes a case in which a patient received news of an unfavorable prognosis in an insensitive manner through telemedicine. The patient, who was critically ill, had a monitor brought into their hospital room, and a doctor unfamiliar to them or their family appeared on the screen to deliver the news of an incurable lung disease. This incident raises significant ethical concerns as the hospital staff prioritized efficiency over compassion. It is strongly recommended that healthcare providers refrain from delivering negative news to patients electronically, as effective communication plays a vital role in patient care and support for their family. In this particular case, it appears that the healthcare providers may have neglected the principle of beneficence, as the patient's well-being may have been compromised in favor of expediency or convenience. Therefore, it is imperative that physicians prioritize face-to-face discussions with patients when delivering terminal diagnoses, as serious conversations should not be conducted solely through telemedicine. Telemedicine should be viewed as a supplementary tool to in-person medical care, rather than a replacement (Humbyrd, 2019). By utilizing telemedicine in conjunction with traditional methods, healthcare providers can ensure that patients receive the necessary support and empathy during difficult times.

Conclusion

Telemedicine provides healthcare providers with the ability to remotely consult and treat patients in different locations, eliminating the need for physical travel or leaving their own homes or medical facilities. One significant benefit of telemedicine is its capacity to improve access to healthcare services for individuals residing in rural and remote areas. Despite facing challenges such as inadequate funding, limited experience, and insufficient infrastructure, telemedicine offers cost-effective and convenient medical solutions that have

proven effective in numerous instances, particularly during the ongoing pandemic. However, additional efforts are necessary to optimize the utilization of telemedicine, address ethical and legal considerations, and ensure patient safety.

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QUALITY OF LIFE OF NURSES IN THE SURGICAL DEPARTMENT

KVALITET ŽIVOTA SESTARA NA HIRURŠKIM ODELJENIMA

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Abstract

Introduction: Nursing work in healthcare institutions is one of the more stressful and highly responsible jobs, where the nurse is aware all the time that the health and life of the patients depend on her. This, especially in stressful situations like pandemic etc, leads to chronic stress and fatigue (Waddill, 2019).

The goal: In our work we investigated the quality of life of nurses in surgical wards.

Method: We analyzed 40 nurses working in surgical wards, in 2022. The nurses evaluated their quality of life using the SF 36 questionnaire and compared it with previous periods. We processed the results using a Likert scale

Results and discussion: Based on the obtained data in the sample, we concluded that the quality of nurses in surgical departments is good (average score of 66), mental composite score with a value of 64 is classified as average. The lowest value is obtained for the vitality domain, with a value of 46, what is less than in other studies. This is understandable, as the study was performed at the end of the pandemic of covid.

Conclusion: The work represents the basis for further research and initiatives, primarily bearing in mind that fatigue at work can negatively affect both the quality of work and the quality of life of nurses.

Keywords: Nurse, Quality of life, SF 36.

Apstraktan

Uvod: Sestrinski rad u zdravstvenim ustanovama jedan je od stresnijih i veoma odgovornih poslova, gde je medicinska sestra sve vreme svesna da od nje zavisi zdravlje i život pacijenata. Ovo, posebno u stresnim situacijama poput pandemija i sl dovodi do hroničnog stresa i umora (Waddill, 2019).

Cilj: U ovom radu istraživali kvalitet života medicinskih sestara na hirurškim odeljenjima.

Metod: Analizirali smo 40 medicinskih sestara koje rade na hirurgskim odeljenjima u 2022. godini. Sestre su procenile kvalitet njihovog života pomoću upitnika SF 36 i uporedile ga sa prethodnim periodima. Rezultate smo obrađivali koristeći Likertovu skalu

Rezultati i diskusija: Na osnovu dobijenih podataka u uzorku, zaključili smo da je kvalitet medicinskih sestara na hirurgskim odeljenjima dobar (prosečna ocena 66), mentalni kompozitni skor sa vrednošću 64 je klasifikovan kao prosečan. Najniža vrednost dobijena je za domen vitalnosti, sa vrednošću od 46, što je niže nego u drugim studijama. To je razumljivo, jer je studija rađena na kraju pandemije kovida.

Zaključak: Rad predstavlja osnovu za dalja istraživanja i inicijative, pre svega imajući u vidu da umor na radu može negativno uticati kako na kvalitet rada tako i na kvalitet života medicinskih sestara.

Ključne reči: Medicinska sestra, Kvalitet života, SF 36.

Introduction

Nursing is one of the most rewarding and challenging professions in health care. During a 12-hour shift, nurses may take on a demanding workload due to staffing shortages; endure workplace bullying; risk exposure to infection; and, finally, the death of the patient (Anon, 2003). The impact of shift work on the working ability of employed nurses. Night shift work strongly affects people's psychology and psychophysiology, meaning it disrupts the sleep-wake cycle leading to severe sleepiness and reduced performance among the workforce. The phases of work, eating and sleep change concerning the physiological rhythm, and the cycle of sleep and wakefulness is disrupted, which leads to health problems.

The work environment affects nurses as it does in all professions. Nursing is not only a stressful occupation with an intense workload but also has many negative factors arising from the work environment. The nurse is the first person to whom the patient and his family turn for all kinds of complaints within 24 hours and the health staff who play a key role in communication within the health team because of this duty. Problems in the working environment negatively affect nurses from a physical, psychological, and social aspect.

General health status is related to the quality of life of nurses. Horváthné Kívés, et. al. (2015) investigated the health status of medical workers in Pecs, on a sample of approximately 1 500 medical technicians. The quality of life of nurses is lower than that of the population of Hungary. Discovering problems and factors affecting the quality of life of employees can provide important information for nursing management in order to improve the quality of life of nurses through organizational changes or support options. Precisely because of this, the goal of our work was to examine the quality of life of nurses and determine the factors that have the strongest influence on it.

Research objectives

The main goal of our research was to determine how and to what extent nurses' daily shift work affects the overall quality of life, and to determine the domains that negatively affect the quality of life.

Methodology

The study was conducted on a sample of 44 nurses who work in shifts in the wards after the surgical wards of the tertiary hospital of the center in Novi Sad, Serbia. 40 nurses gave their consent to participate. We had the permission of the Ethics Committee of the Institute for the examination.

For the research, the standardized Questionnaire for assessing the quality of life SF-36 was used. The SF-36 questionnaire has 36 questions, grouped into eight dimensions: general health, limitation in activities, physical health, emotional health problems, social activities, pain, energy and emotions, general health, and one question refers to the comparison of the general quality of life in one year ago (Zdravković, et al., 2010). When scoring the 36-Item Health Survey first, we added precoded numeric values from the 0 to 100 range so that the lowest and highest possible scores are 0 and 100, respectively. All items were scored so that a high score defines a more favorable health state. Scores represent the percentage of the total possible score achieved. In step 2, items in the same scale were averaged together to create the 8 scale scores. The obtained values for health quality were considered bad when the whole score was lower than 33, average when it was up to 66 and good when it was higher than 66 (Ware, Sherbourne, 1992). The cut-off point of SF-36 score ≥ 60 was suggested as good physical function (Garratt, et al., 1994; Ware, Sherbourne, 1992).

Results

Out of the total number of respondents, there were 5 (12.5 %) men and 35 (87.5 %) women employed as nurses. The average age of the respondents was 34.6 years. The oldest respondent was 60 years old at the time of filling out the questionnaire, the youngest was 20 years old.

Out of 40 respondents, 22 (55 %) respondents are childless. Other respondents have from one to four children. 18 (45 %) respondents stated that they were single, two (5 %) were in a cohabitation or permanent relationship, 16 (40 %) were married at the time of filling out the questionnaire, and four (10 %) were divorced.

At the time of filling out the questionnaire, 28 (70 %) respondents had secondary education, while 12 of them (30 %) had higher or higher vocational education.

Table 1. Sociodemographic parameter

Sociodemographic parameter		
sex	male	5 (12.5 %)
	female	35 (87.5 %)
age	34,6 y (MIN 20, MAX 60)	
marriage status	Single	18 (45 %)
	married	16 (40 %)
	other	6 (15 %)
education	Secondary school	28 (70 %)
	High school	12 (30 %)

Domain 1. General health

Nineteen (47.5 %) respondents rated their health as excellent or very good. 6 (15 %) respondents rated their health as bad or very bad, of which three (7.5 %) were over 50 years old. When declaring their state of health compared to the previous year, the largest number of respondents (23, or 57.5 %) answered that their state of health was the same as a year ago. Nine (22.5 %) participants rated their current state of health as slightly worse than last year, 1 (2.5 %) considered it much worse than last year, while 7 (17.5 %) participants considered their state of health to be better than last year (Table 1a). In declaring their health, the majority of respondents declared themselves neutral.

On questions about general health, the highest score was obtained on the question I think my health will get worse (64.3), and the lowest score on the question about comparing health with last year (48.12) (Table 2, 2a,)

Table 2. In general, how do you value your health

In general, how do you value your health	score 58.7
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Table 2a.

statement	score
I seem to get sick a little easier than other people	60
I'm as healthy as everyone I know	59,4
I expect my health to get worse	64,3
My health is excellent	63
average	61,1

Domain 2. Limitation of activities

Based on the responses of the respondents regarding the limitation of their activities due to poor health, it is clear that the majority of respondents do not feel significant restrictions on

activities due to poor health. These functions were difficult for one respondent, who belongs to the elderly population and who rated his health condition as bad.

In this domain, the average score was 78.3. Respondents were most limited by the inability to perform energetic activities such as running (score 71.2), while the highest score was obtained for the possibility of a short walk (85) (table 3).

Table 3. Answers to questions Does your health limit you in the following activities during a normal day? If so, how much?

Activity	score
Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	71.2
Moderate activities, such as moving the table, pushing a vacuum cleaner, bowling or playing golf, etc	76.2
Lifting or carrying groceries	80,0
Climbing one flight of stairs	81,3
Climbing several flights of stairs	78,8
Bending, kneeling, or stooping	72,5
Walking more than a mile	81.3
Walking several blocks	78.7
Walk one block	85,0
Bathing or dressing yourself	78.7
average	78,3

Domain 3. Physical health problems

Table 4. Answer to the question: Have you had any of these problems at work or during daily activities as a result of physical health?

Statement	score
Cut down the amount of time you spend on work or other activities	87,5
Accomplished less than you would like	57.5
Were limited in the kind of work or other activities	77,5
Had difficulty performing the work or other activities	65
average	71,9

The majority of respondents did not reduce the amount of time they spend at work or other activities. 23 of them (57.5 %) point out that they achieve less than they would like, while 17 of them (42.5 %) have a different attitude. Most respondents pointed out that they were not limited to work or certain types of activities. Regarding how much effort was invested in other activities, the respondents think that they generally had no difficulties in performing other activities or work. activities. From physical activities, the greatest limitation is the impossibility of achieving everything the respondent wanted (score 57.5), while physical problems did not affect the amount of time devoted to various activities (score 87.5) (table 4)

Domain 4. Emotional health problems

Table 5. Answer to the question: Have you had any of the following problems at work or during regular daily activities as a result of emotional problems?

Statement	score
You have reduced the amount of time you spend on work or other things activities	92,5
Accomplished less than you would like	62,5
Did not work or other activities as carefully as usual	70
average	75

To the statement: „You have reduced the amount of time you spend on work or other activities,“ 30 (75 %) respondents answered negatively, while 10 (25 %) respondents gave positive answers. To the statement: “You have achieved less than you would like“, 16 of them (40 %) answered in the affirmative, while 24 of them (60 %) answered in the negative. To the last statement from this domain: “Did not you work or other activities as carefully as usual“, 12 (30 %) agreed with the statement, while 28 (70 %) of them answered negatively. Emotional problems generally did not affect problems at work (score 75). The lowest score was obtained for the impossibility of achieving everything the respondents wanted (62.5) (table 4).

Domain 5. Social activities

Table 6. Answers to the question: Social activities interfered with your normal social activities with family, friends, neighbors or groups

Question	score
During the last 4 weeks, how much did your emotional problems affect your social activities with friends, neighbors, family, groups	65,6
During the last 4 weeks, how much did your physical health or emotional problems affect your social behavior (visiting friends, relatives, etc.)	74,5
average	70

Eighteen respondents claimed that during the past 4 weeks, physical health or emotional problems moderately interfered with normal social functions, while in 20 (50 %) of respondents emotional problems, and in 21 (52.5 %) of respondents neither emotional nor physical problems significantly affected social activities. Emotional problems generally affected social activities to a lesser extent (score 65.6) (table 6).

Domain 6. Pain

Table 7. Answer to the question about the impact of pain on the quality of life

Question	score
How much pain have you had during the last 4 weeks	68,7
During the past 4 weeks, how much has the pain affected your work, including work outside the home and at home	57,5
average	63,1

Out of 40, 33 (82.5 %) participants reported bodily pain, and the remaining 7 (17.5 %) had no pain. Out of 33 participants with bodily pain, fifteen (37.5 %) respondents declared that they had moderate pain, 10 (25 %) had very mild pain, and 7 (17.5 %) had mild or no pain. Intense pain was experienced by one person (2.5 %).

In 13 (32,5 %) respondents the pain interfered with the normal work or very little (12 respondents, 30 %). 8 (20 %) respondents' pain did not distract, 7 (17.5 %) a little, while there was no recorded case where the respondent was extremely distracted by this type of pain. The average score for the pain was 63.1 (table 7).

Domain 7. Energy

Table 8. Energija

Question	score
Did you feel full of energy?	55
Did you have a lot of energy?	47
Did you feel worn out?	45
Did you feel tired?	39
average	46,5

In this survey, possibly present fatigue, feelings of fulfillment, and feelings of energy were used as an indicator of cognitive function. The majority of respondents (16, 40 %) pointed out that they had a lot of energy for a good part of the time, 5 (12.5 %) respondents said that most of the time, 6 (15 %) respondents had little energy, and 4 (10 %) had no energy) of the respondents. When asked if they felt worn out in the past 4 weeks, 13 (32.5 %) of the survey participants said that some of the time, all of the time, a good part of the time, or not at all, 4 (10 %) of the participants answered, and 8 (20 %) respondents said that they were exhausted most of the time. The largest number of respondents 13 (32.5 %) think that they feel tired for some time, 9 (22.5 %) all the time, a good part of the time, 6 (15 %) respondents, 7 (17.5 %) feel a little tired, and 4 (10 %) respondents did not feel tired at all in the past 4 weeks.

The average score is 46.5 with the lowest value obtained on the question: Do you feel tired, only 39.

Domain 8. Emotions

Table 9. Emotions

Question	score
Were you a very nervous person	57
Have you felt so down in the dumps that nothing could cheer you up	72
Did you feel calm and peaceful?	60
Have you feel downhearted and blue	75
Have you been a happy person	61
average	65

When talking about emotions, the lowest score was obtained on the question Were you a very nervous person-57. The questions related to happiness and calmness had similar scores-60, while the highest scores in this domain were in answering the question about being blue and being down in the dump-75 and 72 (table 9)

SF questionnaire contains the transition question about comparing the health with the health last year, which is not used to score any of the eight scales. It is used as a measure for changing the perceived health.

When comparing their state of health with their state of health from the previous year the largest number of respondents (24, or 60.5 %) answered that their health status was the same as it was a year ago. Nine (22.5) participants rated their current state of health as slightly worse compared to last year, 1 (2.5) considered it much worse than last year, while 6 (15) participants believed that their state of health was slightly better than last year (table 10).

Table 10. Compared to last year, how do you rate your health

Question	score
Compared to one year ago how would you rate health in general now?	46,8

Evaluation of the quality of life through individual domains

Table 11 shows the assessment of the quality of life through individual domains. The score in the vitality domain has the lowest values, while the score values are the highest in the physical functioning domain in the context of physical health, satisfaction is expressed the most by the respondents.

Table 11. Life quality by domains

General health	61,1
physical functioning	78,3
physical role,	71,9
emotional role	75
pain,	63,1
social function	70
vitality	46.5
mental health	65
average	66.4

5.1 Assessment of quality of life through composite scores

Table 12 shows the composite scores of the quality of life assessment. It is noticeable that the mental score is lower, although both scores are above the limit of 60, which is an indicator of good quality.

Table 12. Composite scores of quality of life

score	domains	Average score
Physical composite score	63,1 71,9 78,3 61,1	68,6
Mental composite score	46.5, 65,70 75	64,1
Total score	66.4	

Discussion

Nursing is one of the most rewarding and challenging professions in health care. During a 12-hour or 24-hour shift, nurses may take on a demanding workload due to staffing shortages; endure workplace bullying; risk exposure to infection; and, despite all their professional experience, the death of patients (ANON, 2023). The high rate of turnover resulting in a lack of nursing personnel is making the situation more difficult (Stevanov, et al, 2021; Ki, et al, 2022). Nurses who experience high peer turnover are left with heavier workloads. Being on the front line in providing direct patient care, nurses are vulnerable to numerous stressors that impact their physical and emotional health and influence their quality of life (Scruth, et al., 2018; Babapour, et al., 2022). The quality of life of nurses, who deal with human lives, is of particular importance since they can provide more effective services when they have a better quality of life (Layali, et al., 2019). A surgical nurse provides holistic care to surgical patients. The service objects that are under the care of surgical nurses are quite special, and they are usually patients who have undergone surgery and trauma. Moreover, the development of diseases is changeable, so nurses are required to have a greater capacity to bear the strains that may be encountered. The high work intensity and heavy tasks involved in the work of surgical nurses mean that they are more prone to occupational stress and burnout, and can significantly influence their quality of life (Xue, et al., 2021).

The health quality of life is according to Ware (1992) low when the whole score is lower than 33, average when it is up to 66, and good when it is higher than 66. In our study, the average score is 66, between the classification as average or good. While the physical composite score was above 66, the mental composite score was only 63.4, classifying the quality of life in this domain as moderate. The lowest score was obtained in answering the questions about being worn out and tired, and lack of energy. This is expected, bearing in mind that the questionnaire was realized at the end of the covid pandemic, when the nurses were overloaded, worked more and in more difficult conditions than usual, exposed to insufficient sleep, long shifts, workplace changes due to lack of staff and chronic fatigue and stress for two years. They were almost constantly experiencing situations in which they are responsible for the health and lives of others (Del Prato, et al., 2011). In the study performed in Serbia, among health workers who treated (80) or not treated (86) patients during the Covid pandemic in 2019, (Stojanov, et al., 2021) average scores of life quality as well as both composite scores, physical and vitality were markedly better, higher than 80. The differences can be a result of more factors- in a study of Stojanov participated all medical workers, not only nurses. Also, that study was performed at the beginning of covid pandemic, while our study was performed at the end of the pandemic, when the nurses were exposed to constant pressure and stress for two years. In another study, in Iran, life quality was also higher than in our study, 71,44. Comparing the results by domains, the physical domain was 81 % for Iranian sisters, and the pain domain was 70.6 %, which is higher than in our research, but the other domains in our research had higher values. (Tabrizi, et al., 2022). However, in another Iranian study, the average score of life quality was 71,44, a little higher than in our investigation (Omrani, Talebi, 2018).

Fatigue and exhaustion among medical workers, especially among those who work in shifts, is a regular occurrence (Cho, et al., 2021; Scruth, 2018). However, fatigue can have consequences on cognitive functions and certain errors can occur, which can be fatal for the patient. In the territory of Serbia, in recent years, the trend has been for more and more medical workers to go abroad for better working conditions (Stevanov, et al., 2021). This speaks of a situation where there may be a shortage of healthcare workers and where the shortage is compensated for by dividing the work between the existing workers. Consequently, medical professionals may feel exhausted and fatigued. Here, it is necessary to implement a policy of active employment, to compensate for these shortcomings, because fatigue and exhaustion can lead to numerous mistakes.

Conclusion

Nursing work in healthcare institutions is one of the more stressful and highly responsible jobs, where the nurse is aware all the time that the health and life of the patients depend on her. Emergencies such as pandemics, migration, and others significantly increase the scope of work, responsibility, and stress of a nurse. When these situations last for a long time, they inevitably lead to chronic fatigue and a decrease in energy in nurses. Therefore, it is

necessary to take measures to avoid such situations and to preserve the health of nurses. Questionnaires for determining the quality of life of nurses are therefore of great importance because they can show the directions in which it is necessary to act to improve the quality of life.

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HEALTHCARE-ASSOCIATED INFECTIONS FOCUSING ON CATHETER RELATED BLOODSTREAM INFECTIONS IN A SELECTED MEDICAL FACILITY

INFEKCE SPOJENÉ SE ZDRAVOTNÍ PÉČÍ SE ZAMĚŘENÍM NA KATÉTROVÉ INFEKCE KREVNÍHO ŘEČIŠTĚ VE VYBRANÉM ZDRAVOTNICKÉM ZAŘÍZENÍ

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Abstract

Introduction: In our work, we focused on Catheter-Related Blood Stream Infections (CRBSI), which increase the morbidity and mortality of patients, increase the costs of healthcare, especially in patients who are hospitalized at intensive care units. These infections are associated with the intravascular insertion of peripheral, central, or arterial catheters, and according to the Centers for Disease Control and Prevention (CDC), the prevalence of bloodstream infections in North America and Europe is about one in five per 1000 catheter days. These infections are not among the most common, but their mortality is high.

Objective of the work: To analyze the state of catheter infections of the bloodstream in a selected medical facility.

Material and methodology: In our work, we are concerned with monitoring the frequency of catheter infections of the bloodstream in a selected medical facility. The selected medical facility is located in the Czech Republic, and around 80,000 patients are hospitalized here each year. We monitored the frequency of catheter infections of the bloodstream and mapped their microbial causative agents in a selected medical facility in the period from 01/01/2015 – 31/12/2019. The research group consisted of respondents with an inserted central venous catheter, who were shown to match (CRBSI) with a positive blood culture and were simultaneously hospitalized in the period from 01. 01. 2015–1. 12. 2019 in a selected medical facility. We carried out a cross-sectional study, which concerned the introduction and care of patients with a central venous catheter, at the monitored intensive care unit in the period from 01/01/2020 to 02/29/2020. The research population of this study consisted of patients with an indwelling central venous catheter in a given intensive care unit.

Results: In our study, during the monitored period 01/01/2015–12/31/2019, 26,656 distal ends of the gastrointestinal tract were sent for microbiological examination, of which 3,583 (13.4 %) distal ends of the gastrointestinal tract were colonized. Concordance (CRBSI) with positive blood culture was in 509 cases (1.91 %). We further investigated the incidence of CRBSI/1000 OD and concluded that the incidence of CRBSI has a decreasing trend from

0.33/1000 OD in 2015 – 0.13/1000 OD in 2019. The data analysis in our study showed that what refers to the occurrence of individual microorganisms according to the type of clinic (in the order of surgical clinic, non-surgical clinic and KARIM), the most frequently identified microorganism in patients with CRBSI was coagulase-negative staphylococci (42.99 %, 35.98 %, 43.90 %). The second most frequent causative agent was *Klebsiella pneumoniae* (15.84 %, 11.59 %, 13.87 %). Furthermore, the order of individual agents differed according to the clinic, *Staphylococcus aureus* with an incidence of 8.14 %, 10.37 %, 4.88 %, *Pseudomonas aeruginosa* with an incidence of 6.33 %, 6.71 %, 5.69 %. *Candida albicans* with an overall incidence of 4.07 %, 7.93 %, 7.34 %. The research group for the cross-sectional study consisted of patients (two-thirds men and one-third women) with an established CŽK in the given department. During this period, a total of 146 patients were hospitalized at the monitored workplace, of which three-quarters of the patients were excluded from the study, due to having the catheter inserted in a department other than the monitored workplace, or because the catheter was not inserted at all. A total of 56 catheters were inserted in 40 patients during the observed period, the mean time of catheter insertion was 6.46 days, i.e. a total of 362 catheter-days. 3 catheters were colonized (5.3 %), In two cases the causative agent was coagulase-negative staphylococci and in one case *Enterococcus faecalis* in the catheter.

Conclusion: The results of the research investigation showed us that the incidence of CRBSIs is relatively low, and regarding the representation of microbial agents, the majority of CRBSIs were caused by gram-positive organisms such as coagulase-negative staphylococci and *Staphylococcus aureus*. In comparison, our results are comparable to studies from abroad. What we would like to emphasize is the fact that CRBSI can be prevented by following preventive procedures.

Keywords: Healthcare-associated infections. Catheter bloodstream infections. Central venous catheter. Prevention. Care bundles.

Abstrakt

Úvod: V naší práci jsme se zaměřili na katérové infekce krevního řečiště (z angl. Catheter-Related Blood Stream Infections, CRBSI), které zvyšují morbiditu a mortalitu pacientů, zvyšují náklady na zdravotní péči, a to především u pacientů, kteří jsou hospitalizováni na jednotkách intenzivní péče. Tyto infekce jsou spojené s intravaskulárním zaváděním periferních, centrálních či arteriálních katétrů, a podle výsledků CDC (z angl. Centers for Disease Control and Prevention, Centrum pro kontrolu a prevenci nemocí) se prevalence infekcí krevního řečiště v Severní Americe a Evropě pohybuje kolem pěti případů na 1000 katérových dnů. Tyto infekce nepatří mezi nejčastější, ale jejich mortalita je vysoká.

Cíl práce: Analyzovat stav katérových infekcí krevního řečiště ve vybraném zdravotnickém zařízení.

Materiál a metodika: V naší práci se zabýváme sledováním četnosti katérových infekcí krevního řečiště ve vybraném zdravotnickém zařízení. Vybrané zdravotnické zařízení se nachází v České republice, a je zde ročně hospitalizováno okolo 80 000 pacientů. Sledovali jsme četnost katérových infekcí krevního řečiště a zmapovali jejich mikrobiální původce ve vybraném zdravotnickém zařízení v období od 01. 01. 2015–31. 12. 2019. Výzkumný soubor tvořili respondenti se zavedeným centrálním žilním katérem, jimž byla prokázána shoda (CRBSI) s pozitivní hemokulturou a současně byli hospitalizováni v období od 01. 01. 2015–31. 12. 2019 ve vybraném zdravotnickém zařízení. Průřezovou studii, která se týkala zavádění a péče o pacienty s centrálním žilním katérem jsme realizovali na sledovaném pracovišti intenzivní medicíny v období od 01. 01. 2020–29. 02. 2020. Výzkumný soubor této studie tvořili pacienti se zavedeným centrálním žilním katérem na daném oddělení intenzivní péče.

Výsledky: V naší studii bylo odesláno za sledované období 01. 01. 2015–31. 12. 2019 na mikrobiologické vyšetření 26 656 distálních konců CŽK, z nichž bylo kolonizováno 3 583 (13,4 %) distálních konců CŽK. Shoda (CRBSI) s pozitivní hemokulturou byla v 509 případech (1,91 %). Dále jsme zjišťovali výskyt CRBSI/1000 OD a došli jsme k závěru, že výskyt CRBSI má klesající tendenci od 0,33/1000 OD v roce 2015 – 0,13/1000 OD v roce 2019. Analýza dat v naší studii ukázala, že co se týká výskytu jednotlivých mikroorganismů podle typu kliniky (v pořadí chirurgické kliniky, nechirurgické kliniky a KARIM), byl na všech nejčastěji identifikovaným mikroorganismem u pacientů s CRBSI koaguláza negativní stafylokoky (42,99 %, 35,98 %, 43,90 %). Druhým nejčastějším původcem byl *Klebsiela pneumoniae* (15,84 %, 11,59 %, 13,87 %). Dále se pořadí jednotlivých agens lišila dle kliniky, *Staphylococcus aureus* výskytem 8,14 %, 10,37 %, 4,88 %, *Pseudomonas aeruginosa* s výskytem 6,33 %, 6,71 %, 5,69 %. *Candida albicans* s celkovým výskytem 4,07 %, 7,93 %, 7,34 %. Výzkumný soubor pro průřezovou studii tvořili pacienti (dvě třetiny mužů a třetina žen) se zavedeným CŽK na daném oddělení. V tomto období bylo na sledovaném pracovišti hospitalizováno celkem 146 pacientů, z nichž tři čtvrtiny pacientů bylo ze studie vyřazeno, z důvodu zavedení katétru na jiném oddělení než na sledovaném pracovišti, nebo jim katétr vůbec nebyl zaveden. Celkem bylo zavedeno ve sledovaném období 56 katétrů u 40 pacientů, střední doba zavedení katétru byla 6,46 dne, tj. celkem 362 katétr-dnů. Kolonizovány byly 3 katétrů (5,3 %), Ve dvou případech byl původcem koaguláza negativní stafylokoky a v jednom případě *Enterococcus faecalis* v katétru.

Závěr: Výsledky výzkumného šetření nám ukázaly, že výskyt CRBSI je poměrně nízký, a co se týká zastoupení mikrobiálních původců, většina CRBSI byla způsobena grampozitivními organismy, jako jsou koaguláza negativní stafylokoky a *Staphylococcus aureus*. V porovnání jsou naše výsledky srovnatelné se studiemi ze zahraničí. To, co bychom chtěli zdůraznit, je fakt, že vzniku CRBSI lze předcházet dodržováním preventivních postupů.

Klíčová slova: Infekce spojené se zdravotní péčí. Katérové infekce krevního řečiště. Centrální žilní katétr. Prevence. Care bundles.

Introduction

One of society's current problems is the issue of healthcare-associated infections. In our work, we focused on Catheter-Related Blood Stream Infections (CRBSI), which increase the morbidity and mortality of patients, increase the costs of healthcare, especially in patients who are hospitalized in intensive care units care.

These infections are associated with the intravascular insertion of peripheral, central, or arterial catheters, and according to the Centers for Disease Control and Prevention (CDC), the prevalence of bloodstream infections in North America and Europe is about one in five per 1000 catheter days. These infections are not among the most common, but their mortality is high.

Among the basic activities of the medical staff, working not only in the intensive care unit, is compliance with preventive measures for the emergence of catheter infections. This prevention mainly consists in observing barrier measures during the introduction of the catheter, the use of alcohol hand disinfection, the use of a mouthpiece, sterile gloves and a sterile mask, as well as aseptic treatment technique. Minimizing disconnection of infusion systems, preparation of a new infusion system immediately before replacement, use and regular replacement of antibacterial filters and infusion sets cannot be neglected. Last but not least, also taking samples under aseptic conditions using sterile tools. The goal of prevention is to minimize the occurrence of catheter infections of the bloodstream.

The motivation for writing the research paper was the fact that, at present, catheter infections of the bloodstream are considered a fully preventable group of healthcare-associated infections, provided that all preventive procedures are followed. However, the efforts of all healthcare workers must be made. We therefore decided to map the situation regarding the occurrence of catheter-related bloodstream infections in selected medical facilities in the Czech Republic and to analyze the possibilities of assessing and managing the risk associated with the introduction of central venous catheters and the possibility of evaluating good practice.

Focus

To analyze the state of catheter infections of the bloodstream in a selected medical facility.
Work sub-goals:

1. To analyze catheter infections of the bloodstream in the years 2015 – 2019 in individual departments in a selected medical facility.
2. To map the microbial causative agents of catheter infections in the years 2015 – 2019 in individual departments in a selected medical facility.
3. To conduct a cross-sectional study regarding catheter infections of the bloodstream at the workplace of intensive medicine in a selected medical facility in the period 01. 01. 2020 – 29. 02. 2020.
4. Create checklists related to central venous catheter advertising and care.

Material and Methods

The selected medical facility is located in the Czech Republic, and around 80 000 patients are hospitalized here each year. We monitored the frequency of catheter infections of the bloodstream and mapped their microbial causative agents in a selected medical facility in the period from 1 January 2015 to 31 December 2019. The research group consisted of respondents with an inserted central venous catheter, who were shown to be in agreement (CRBSI) with a positive blood culture and were simultaneously hospitalized in the period from 01. 01. 2015 to 31. 12. 2019 in a selected medical facility. We divided the research into several phases.

In the first, preparatory phase of the research activity (January 2019 – August 2019), we obtained information by studying the necessary professional relevant sources, such as recommended procedures, professional literature, on the basis of which we formulated the problem and the main goal of our research, including sub-goals.

The second phase of the research (August 2019 – August 2020) gradually followed, when we collected information from the hospital information system regarding the occurrence of catheter infections of the bloodstream and their microbial agents in the years 2015 – 2019 in individual departments. The ECDC (TESSy, The European Surveillance System) definition of catheter-related bloodstream infections and the Nursing Practice Checklist for Central Venous Catheter Insertion and Care for direct observation of healthcare workers were used for data collection.

In the third, research phase, the investigation itself was preceded by a pilot study in December 2019. The pilot study concerned the nursing practice for the insertion and care of 5 central venous catheters, while during the analysis we found minor discrepancies in the data we requested. We edited the discrepancies we discovered into a final, comprehensible form. The control sheet contained data on the type of central venous catheter, the location of catheter insertion, the number of lumens of the catheter, the type of disinfection used, the type of catheter cover used. We were also interested in whether aseptic procedures were followed during the insertion and care of the central venous catheter, proper hand hygiene was performed, and whether barrier measures were used to ensure staff sterility when inserting the catheter.

In the fourth phase of the research, to implement a cross-sectional study regarding the advertising and care of central venous catheters, we collected data using two methods, namely the method of direct observation and the method of document analysis. We conducted this study at the workplace of intensive medicine in a selected healthcare facility in the period 01. 01. 2020 – 29. 02. 2020. In the nursing practice checklist we compiled for the introduction and care of a central venous catheter, we recorded procedures that we obtained by direct by observing health workers in the intensive care unit. The research group of this study consisted of patients (28 men and 12 women) with an established CŽK in the given department. In this period, a total of 146 patients were hospitalized at the monitored

workplace, of which 106 were excluded from the study (102 patients had CŽK inserted in a different department than at the monitored workplace and in 4 patients CŽK was not inserted). Therefore, we included a total of 40 patients in the study, in whom 56 CŽK were inserted.

In these patients, we monitored the number of inserted central venous catheters using the Nursing Practice Checklist for insertion and care of a central venous catheter compiled by us, i.e. to specify the catheters that were inserted in the given department. The control sheet contained data on the type of central venous catheter, location of catheter insertion, mean catheter insertion time, number of catheter lumens, type of disinfection used, type of catheter cover used. We were also interested in whether aseptic procedures were followed during the insertion and care of the central venous catheter, proper hand hygiene was performed, and whether barrier measures were used to ensure staff sterility when inserting the catheter. At the same time, by analyzing the document, we also obtained data from the hospital information system. We were interested in the degree of colonization of the monitored CŽK and their possible agreement (CRBSI) with a positive blood culture.

What cannot be neglected for us from a nursing point of view is the observance of hygienic-epidemiological procedures during the introduction and treatment of catheters. The basic activities of medical staff working not only in intensive care include compliance with preventive measures for the emergence of catheter infections. This prevention consists primarily of observing barrier measures during the introduction of the catheter, the use of alcohol hand disinfection, the use of a mouthpiece, sterile gloves and a sterile mask, as well as aseptic treatment technique. We therefore decided to find out if the nursing staff follow the recommended practices outlined in the standards of care. These procedures play a key role in the prevention of hospital-acquired infections, and this was the subject of our research study.

The research data obtained in this way were processed and analyzed, we sorted and analyzed them. We used basic statistical values such as arithmetic mean, median, and quantitative statistical methods such as Pearson's INDEPENDENCE test. We also used comparison methods, which we processed using Microsoft Excel and MS Word.

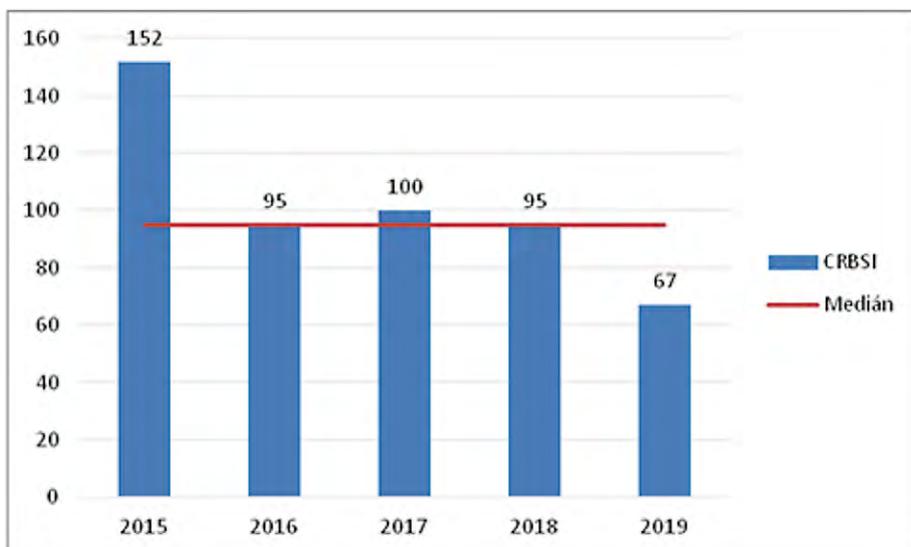
As a final goal, we set ourselves to create checklists regarding the advertisement and care of the central venous catheter and a record sheet for monitoring the need for a central venous catheter (recommended for the hospital information system).

The final stage of our research was the assessment and interpretation of the obtained results, the result of which is a set of information and the formulation of proposals and recommendations.

Results

The aim of our research was to analyze the state of catheter infections of the bloodstream in a selected medical facility.

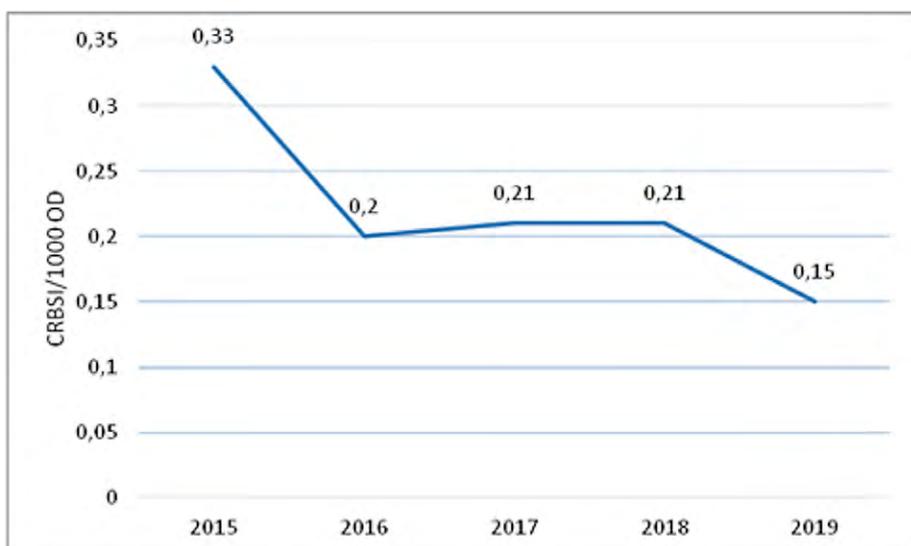
In the first objective, we analyzed catheter infections of the bloodstream in the years 2015–2019 in individual departments in a selected medical facility.



Graph 1. Incidence of CRBSI in the monitored years (Source: Author, 2021)

The occurrence of CRBSI was confirmed in 509 cases in 477 patients (representing 1,91 % of the total examined distal ends of central venous catheters) in total during the monitored period, with the highest occurrence of CRBSI in 2015 in 152 cases, representing 2,35 %. Conversely, 2019 saw the lowest incidence of CRBSI, namely 67 cases (1,53 %).

We also investigated whether there was a relationship between the number of CRBSIs and the number of hospitalizations between years. From the test we see that the $p\text{-value} < 0.05$ ($p = 1,36E-07$) therefore we rejected the null hypothesis, which implies that there are significant differences between years in CRBSI and the number of hospitalizations. Therefore, it follows that there are significantly many CRBSIs in 2015 and few in 2019. Regarding the number of hospitalizations in 2016, 2017 and 2019, there are significantly many, on the other hand, there are significantly few hospitalizations in 2015 and 2018.



Graph 2. Incidence of CRBSI/1000 OD in the monitored years (Source: Author, 2021)

To compare the occurrence of CRBSI, we chose treatment days as the denominator, i.e. the number of CRBSI/1000 OD, where we can see that the number of CRBSI has a decreasing tendency in the monitored facility from 0,33 cases/1000 OD in 2015 to 0,15 cases/1000 OD in 2019.

To analyze the occurrence of CRBSI at individual types of clinics (surgical, non-surgical and KARIM), we used the statistical method Pearson's chi-square test of INDEPENDENCE, while we see that the p-value > 0.05 (p-value 0,321816), so we do not reject the null hypothesis here, and we can say that there are no significant differences in the incidence of CRBSI between years and between individual monitored clinics.

We were also interested in the incidence of CRBSI/1000 OD in children's clinics, where it was found that the highest incidence of CRBSI was in KARIM children, at 0,62/1000 OD in total. The second highest incidence of CRBSI/1000 OD was found at the Children's Surgery Clinic, with a number of 0,44/1000 OD in total. The third highest number of CRBSI/1000 OD was found in the Neonatal Ward with a total of 0,34/1000 OD.

To compare data between the occurrence of CRBSI in clinics for adult and pediatric patients, we used the statistical method Pearson's chi-square test of INDEPENDENCE, while we see that the p-value > 0.05 (p =value = 0,061781735), so we do not reject the null hypothesis closely, and we can say that there are no significant differences in the incidence of CRBSI between years and between clinics for adult and pediatric patients.

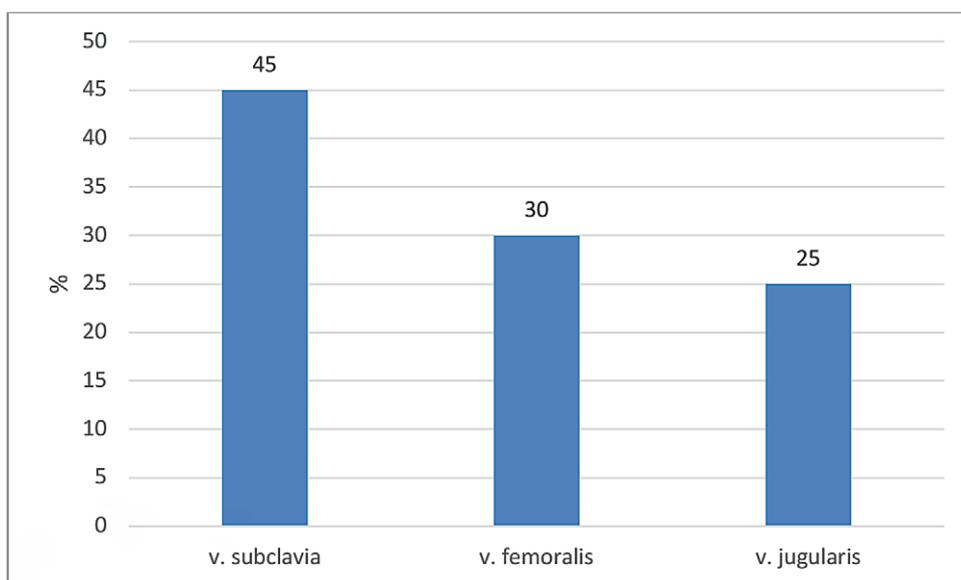
In the second objective, we analyzed the microbial causative agents of catheter bloodstream infections in the period from 1 January 2015 to 31 December 2019 in a selected healthcare facility.

Table 1. Occurrence of individual microorganisms in a healthcare facility (Source: Author, 2021)

Order	Agens	2015	2016	2017	2018	2019	Total	%
1	Coagulase-negative staphylococci	67	41	40	38	23	209	41,06
2	Klebsiella pneumoniae	17	12	14	14	10	67	13,16
3	Candida albicans	14	6	6	5	3	34	6,68
4	Staphylococcus aureus	10	9	4	10	5	38	7,47
5	Candida spp.	8	5	2	3	5	23	4,52
6	Enterococcus faecalis	8	2	8	3	1	22	4,32
7	Pseudomonas aeruginosa	5	4	8	5	5	27	5,30
8	Enterococcus faecium	4	3	1	3	1	12	2,36
9	Acinetobacter baumannii	4	2	2	2	1	11	2,16
10	Escherichia coli	3	2	4	1	2	12	2,36
11	Enterobacter cloacae	2	2	1	3	3	11	2,16
12	Klebsiela spp.	2	2	2	2	4	12	2,36
13	Proteus mirabilis	1	1	0	1	0	3	0,59
16	Serratia marcescens	0	1	2	1	1	5	0,98
17	Sternotrophomonas maltophilia	0	1	1	1	0	3	0,59
18	Burkholderia cepatia	0	1	3	0	0	4	0,79
19	Enterococcus spp.	1	0	0	1	0	2	0,39
20	Enterobacter spp.	4	1	1	1	2	9	1,77
21	al.	2	1	0	1	0	4	0,79
	Total	152	95	99	95	66	507	100,00

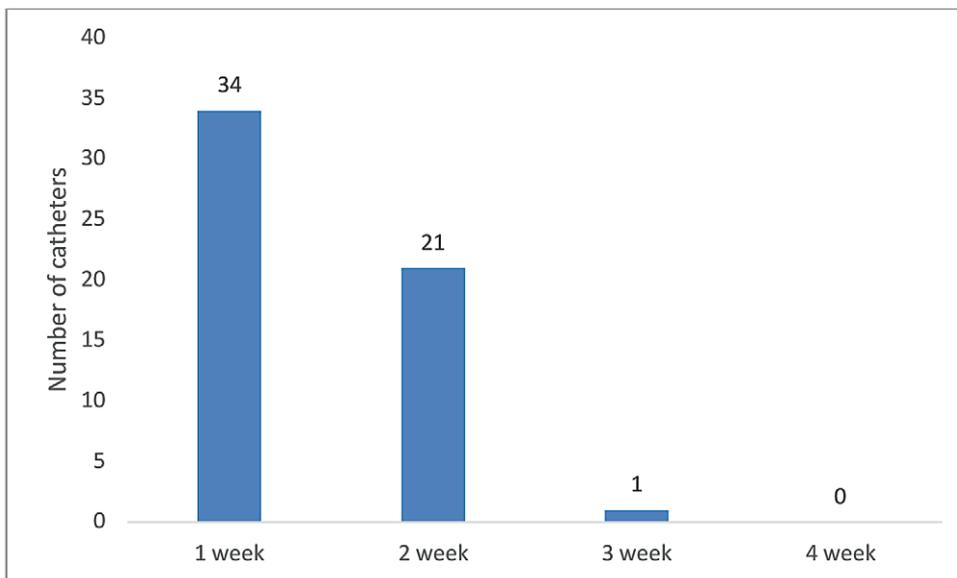
From the data we collected, it emerged that out of 509 isolated agents, the most frequently identified microorganism in patients with CRBSI was coagulase-negative staphylococci, which were represented in 41,06 %. The second most frequent causative agent was *Klebsiella pneumoniae*, with a total occurrence of 13,16 %, and the third most frequent causative agent was *Staphylococcus aureus*, with a total occurrence of 7,47 %.

In the third objective, we decided to conduct a cross-sectional study regarding catheter infections of the bloodstream at the workplace of intensive medicine in a selected healthcare facility in the period 01. 01. 2020 – 29. 02. 2020. The research group of this study consisted of patients (two thirds of men and one third women) with an established CŽK in the given department. During this period, a total of 146 patients were hospitalized at the monitored workplace, of which three-quarters of the patients were excluded from the study, due to the catheter being inserted in a department other than the monitored workplace, or the catheter was not inserted at all. A total of 56 catheters were inserted in 40 patients during the observed period, the mean time of catheter insertion was 6,46 days, i.e. a total of 362 catheter-days. 3 catheters were colonized (5,3 %), In two cases the causative agent was coagulase-negative staphylococci and in one case *Enterococcus faecalis* in the catheter. Concordance (CRBSI) with positive blood culture was not found in a single case.



Graph 3. Central venous catheter insertion site (Source: Author, 2021)

A total of 56 catheters were inserted, and the most common place of CŽK insertion was the subclavian vein in almost half of the cases. Insertion of the femoral vein was in second place in the number of insertions, in a third of the cases. In a fifth of the cases, the insertion was made into the jugular vein. After insertion, all CŽK were fixed with a suture. Catheters were coated with chlorhexidine and Ag sulfadiazine. The percentage of central venous catheters was represented in most cases by four-lumen catheters, and in a minimum of cases by three-lumen catheters, while all catheters were fixed with a suture. A preparation based on povidone iodinum was used to disinfect the central venous catheter insertion site.



Graph 4. Length of insertion of central venous catheters (Source: Author, 2021)

It was found that of the 56 central venous catheters inserted, the average length of insertion of which was 6,46 days, more than half of the CŽK was inserted within one week, more than a third within two weeks, and only one CŽK within three weeks. A transparent cover was used in four fifths of the cases and sterile squares were used in the remaining fifth of the cases. Catheter coverage was intact, holding without signs of underflow in almost all cases. The catheter insertion site was calm, without signs of redness, and the number of cases was almost identical to the proportion of catheters we observed.

As a final goal, we set ourselves to create checklists related to advertising and care of the central venous catheter. To support this goal, we were guided by the analysis of data from the research survey from our dissertation. We have supplemented the recommendation with a record sheet for monitoring the need for a central venous catheter (recommended for the hospital information system).

Discussion

Catheter-related bloodstream infections represent a significant problem that plagues both patients (due to disease severity, increased length of hospital stay, and especially mortality) and healthcare providers. What we would like to emphasize is the fact that CRBSI can be prevented by following preventive procedures, using evidence-based medicine (Hallam, et al., 2018).

In our study, during the monitored period 01. 01. 2015–31. 12. 2019 26 656 distal ends of the gastrointestinal tract were sent for microbiological examination, of which 3,583 (13,4 %) distal ends of the gastrointestinal tract were colonized. Concordance (CRBSI) with positive blood culture was in 509 cases (1,91 %). Also, the authors of a retrospective study by Pérez-Granda, et al. (2021), which was conducted in a healthcare facility in Madrid, focused on the incidence, etiology and frequency of CRBSI. The study was carried out in the period

3/2019-5/2020 in a medical facility with 1,350 beds and approximately 55 000 hospitalizations per year. Regarding the number of catheters sent for culture, there were 919 (41,9/1000 admissions) and 200 positive distal catheter ends (10,08/1000 admissions) over the entire study period. Compared with the data from our study, we see that the number of distal ends of catheters sent for culture was a total of 67,69/1000 admissions, which is 25,69/1000 admissions more, and in contrast, the number of positive distal ends in our study was 9,11/1000 admissions, which is 1,7/1000 admissions less. The authors of the study Bouza, et al. (2004), processed data into the ESGNI-005 Study, based on questionnaires completed by microbiology laboratories in European (European Union (EU) and non-EU) hospitals. The aim of the study was to obtain data on the microbiological techniques used, the types of microorganisms obtained by culturing the distal ends of the CŽK, as well as the sensitivity of specific microorganisms to ATB. 151 hospitals from 26 European countries participated in the study (including the Czech Republic, where 5 (3,3 %) hospitals cooperated), and the number of admissions during 2000 was 6 712 050. The total number of distal catheter tips sent for examination during 2000 was 142 727 (21/1000 admissions), of which 23,7 % were positive. The data showed that in 2000, a greater number of catheter tip samples sent for examination and thus the number of positive results were processed in EU hospitals (per 1000 patients admitted) than in non-EU countries. According to the authors of the study, this may point to a higher number of invasive procedures performed using central venous access in these countries, but at the same time, the authors add that the distal ends of catheters should not be sent for culture examination routinely, and this procedure should be enshrined in recommendations for practice (2004). Our study included the results of the culture of the distal ends of central venous catheters, of which 26 626 (36,69/1000 admissions) were sent from patients from a medical facility during the monitored period from 01. 01. 2015 – 31. 12. 2019. There were a total of 3,523 (13,46 %) positive samples, while in individual years the positivity varied from 16,05 % (2015) to 11,26 % (2016), which results in a significantly lower positivity compared to the results of the ESGNI-005 Study, by Bouza, et al. (2004).

Furthermore, we investigated the incidence of CRBSI/1000 OD in the monitored period 01. 01. 2015–31. 12. 2019 in a selected medical facility, where we came to the conclusion that the incidence of CRBSI has a decreasing tendency from 0,33/1000 OD – 0,13/1000 OD. She has been dealing with the incidence of CRBSI for seven years an ongoing retrospective study of bloodstream infections that compared central and peripheral venous catheter-related infections in patients older than 15 years hospitalized at the Hospital de Fuenlabrada in Spain. A total of 285 cases of catheter-related bloodstream infections (15,3 %) were identified in this study, and the incidence of these central venous catheter-related infections was 0,36/1000 OD (Ruiz-Giardin, et al. 2019). In our five-year study, the incidence of CRBSI starts at 0,33/1000 OD in 2015 and then has a decreasing trend to 0,15/1000 OD in 2019. Another study dealing with the incidence of CRBSI was by Süha – Karagözođlu (2019). The study was conducted in a medical facility in Turkey, in patients hospitalized from 6/2015-6/2016. The

results of the study showed a significant reduction in the incidence of catheter bloodstream infections from the original 10,59/1000 admissions to 2,88/1000 admissions. In our study, compared to a study conducted in a hospital in Turkey, the incidence of catheter bloodstream infections is lower. The authors of a retrospective study by Pérez-Granda, et al. (2021), which was conducted in a healthcare facility in Madrid, focused on the incidence, etiology and frequency of CRBSI. The study was carried out in the period 3/2019-5/2020. Regarding the number of patients with CRBSI for the period 2019-2020, the number of observed cases was 89 (4,09/1000 cases), while in our study, the number of CRBSI for the five-year observed period was 509 (1,29/1000 cases), which indicates a significantly lower incidence of CRBSI in the medical facility we monitored.

A prerequisite for the emergence of a catheter infection of the bloodstream is the colonization of the vascular catheter, while knowledge about microbial colonization of the vascular entrance improves the possibilities of prevention and also contributes to the provision of better quality care. The incidence of catheter bloodstream infections is variable and it can be safely said that its incidence depends on the specialization of the ICU and the severity of the particular patient's condition. At present, however, we know that the consequences of infections with individual microorganisms vary, and according to a number of studies, we see that trends in the occurrence of microorganisms also change over the years.

Data analysis in our study showed that, regarding the occurrence of individual microorganisms according to the type of clinic (in the order of surgical clinic, non-surgical clinic and KARIM), the most frequently identified microorganism in patients with CRBSI was coagulase-negative staphylococci (42,99 %, 35,98 %, 43,90 %). The second most frequent causative agent was *Klebsiella pneumoniae* (15,84 %, 11,59 %, 13,87 %). Furthermore, the order of individual agents differed according to the clinic, *Staphylococcus aureus* with an incidence of 8,14 %, 10,37 %, 4,88 %, *Pseudomonas aeruginosa* with an incidence of 6,33 %, 6,71 %, 5,69 %. *Candida albicans* with a total incidence of 4,07 %, 7,93 %, 7,34 %.

From the data collected by us, it follows that of the 509 isolated agents, the most frequently identified microorganism in patients with CRBSI was Coagulase-negative staphylococci, which were represented in 41,06 % and their occurrence prevailed in each individual year. In contrast, the CDC National Nosocomial Infection Surveillance System (NNIS) study, which since 1970 has collected data on the incidence and etiology of nosocomial bloodstream infections in patients from nearly 300 hospitals in the United States. In 1975, Coagulase-negative staphylococci were only fourth in frequency, at 6,5 %, while in the same study, conducted in 1983, the most common microorganisms were Coagulase-negative staphylococci, which represented 14,2 %, as well as it was also in the same study, carried out in 1986-1989, where Coagulase-negative staphylococci represented 27 %. Their increase also increased in the following years, which was evident in the same study conducted in 1992 – 1999, which showed that Coagulase-negative staphylococci were represented in 37 % (CDC, NNIS, 1999).

The results of Wisplinghoff, et al. (2004), a long-term prospective study (Surveillance and Control of Pathogens of Epidemiologic Importance (SCOPE) Project) conducted in 49 US hospitals over a 7-year period identified a total of 24 179 cases with 27 847 microorganisms. Of this, the system-wide incidence of BSI was 60 cases/10,000 hospitalizations. The study also showed that primary BSIs were observed in 12 893 patients (53 %), and that the most common microorganisms causing infection were coagulase-negative staphylococci (32 %), (2004). In a study that was conducted in 2019 and 2020 in a hospital with 1,350 beds and approximately 55 000 hospitalizations per year, Coagulase-negative staphylococci were also in the first place in representation, namely 38,43 % in 2019 – 2020 (Pérez-Granda, et al., 2021). The same results, which monitor the occurrence of individual microorganisms, can also be found in a seven-year retrospective study conducted on hospitalized patients over the age of 15 at the Hospital de Fuenlabrada in Spain, which lasted for 7 years and 4 months. In this study, a total of 285 cases of catheter infections of the bloodstream were detected, of which the most common microorganisms were Coagulase-negative staphylococci in 64.1 % (Ruiz-Giardin, et al., 2019). Also in our study conducted over a period of five years, we see a significant presence of coagulase negative staphylococci and their presence in all types of clinics and departments. Although these are the bacteria that colonize vascular catheters most often, their ability to penetrate the blood and cause a bloodstream infection is limited Jindrák, et al. (2014, p.639) states „that only around 20 – 30 % of populated vascular catheters will cause bacteremia. Clinically, these infections are less noticeable, only rarely accompanied by a more serious septic condition. They represent a significant risk for patients with artificial implants in the bloodstream, which can contaminate them during bacteremia and cause their infection with varying latency.“

In our work, we further dealt with factors that influence the emergence of infections associated with vascular accesses. At present, the properties of the introduced central venous catheter are discussed in many, not only foreign, studies. The authors of many studies are concerned with the effectiveness of catheters impregnated with antimicrobial substances in the prevention of bacterial colonization of the central venous catheter. Several types of antiseptic catheter surface treatment are currently available, for example Chlorhexidine and Ag sulfadiazine impregnation, minocycline/rifampicin impregnation, silver/platinum/carbon (SPC), Silver/zeolite, Silver nanoparticles, Polyhexanide, 5-fluorouracil (5-FU), (Křikava, Ševčík, 2008).

Our study dealing with the occurrence of infections associated with vascular accesses was conducted at the intensive care unit in a selected medical facility from 1/2020-2/2020. All indwelling central venous catheters were coated with chlorhexidine and Ag sulfadiazine. This type of coated catheter was investigated in a randomized controlled trial that aimed to estimate the expected incidence of CRBSI with regard to the type of central venous catheter used. The results of a study showed that the use of central venous catheters impregnated with chlorhexidine and Ag sulfadiazine in patients at high risk of catheter-related infections reduced the incidence of CRBSI by 2,2 % (Veenstra-Saint-Sullivan, 1999).

In our study, we also monitored another risk factor for the emergence of catheter infection of the bloodstream, namely the number of lumens of the central venous catheter. The risk is mainly associated with multi-lumen catheters, especially in situations where one of the lumens is not used for a long time and fluid stagnates in it (Jindrák, et al., 2014). The percentage of central venous catheters was 96,42 % represented by four-lumen catheters, and 3,58 % by three-lumen catheters, all of which were fixed with a suture. The authors of the prospective study aimed to test the effectiveness of a hospital-wide strategy to reduce CRBSI. The study was conducted between 2008-2011 in a 1908-bed healthcare facility in Geneva, Switzerland. A total of 189 643 patients were admitted during the monitored period, of which 3,952 (2,1 %) had at least one CŽK inserted. According to the results of the study, double-lumen (38,2 %) and triple-lumen (21,4 %) catheters were most often used (Zingg, et al., 2014).

The length of the inserted central venous catheter can also be mentioned as a factor for the emergence of a catheter infection of the bloodstream, while it is stated that the risk increases significantly with the length of the insertion. In our study, we found that out of 56 inserted central venous catheters, the average duration of which was 6,46 days, 60,7 % of the central venous catheters were inserted within one week, 37,5 % within two weeks, and only one central venous catheter within three weeks. The authors of a study that aimed to test the effectiveness of a hospital-wide strategy to reduce CRBSI reported that, although most CRBSI were diagnosed on CŽCs inserted for 12 days or more, a relationship between the onset of infection and the length of CŽC insertion of 7 – 12 days was demonstrated (Zingg, et al., 2014).

It is reported that the selection of the central venous catheter insertion site plays a very important role in the prevention of catheter infections, and it is reported that the lowest risk of CRBSI is when inserted into the subclavian vein. The risk of infection is higher in the femoral vein. It is also necessary to assess the composition of the patients and their diagnosis, where the reason for inserting the catheter in a specific place must be assessed individually for each one. In our study, 56 catheters were inserted, and the most common place of CŽK insertion was the subclavian vein in 25 cases (45 %), followed by the femoral vein in 17 cases (30 %) and the jugular vein in 14 cases (25 %). There are three commonly used sites for central venous catheterization, namely the jugular vein, the subclavian vein, and the femoral vein. The site of insertion of a central venous catheter is associated with a certain type of complication depending on the site of insertion, with the given risk varying according to the site of catheterization. As the authors Bell and O'Grady (2017) state in their work, if possible, femoral vein catheterization should be avoided because it has a higher incidence of complications compared to jugular vein and subclavian vein catheterization. Femoral vein catheterization is also associated with a higher rate of deep vein thrombosis compared to jugular vein and subclavian vein catheterization. The authors further add that although there are good reasons for catheterization of the femoral vein in the acute setting, it is reasonable to choose the alternative if the catheter will be in place for more than two days.

Based on the analysis of data from our research investigation in our dissertation, we set ourselves the goal of creating checklists regarding the advertising and care of central venous catheters. We have supplemented the recommendation with a record sheet for monitoring the need for a central venous catheter (recommended for the hospital information system). As an example of the importance of introducing preventive measures, we can cite an extensive American study by the authors Stone, Larson, Kavar (2002), which analyzed the differences between the costs of dealing with clinically manifest infections and their prevention. The results of the study showed a significant reduction in costs with adherence to preventive measures, with the cost of resolving 1 clinical case of bloodstream infection being seven times greater than the funds spent on prevention. Also, as an example of the effectiveness of the introduction of care packages, we can mention another study by the authors of Ista, et al., who performed a meta-analysis of studies, the aim of which was to assess the effectiveness of pre-defined care packages. The studies that were therefore included had to contain a package for the introduction of CŽK and a package for the care of CŽK for either adult or pediatric patients, which were published between 1/1990-6/2016. The average incidence of CLABSI was 5,7/1000 catheter days in the adult ICU; 5.9/1000 catheter days in pediatric intensive care units; and 8,4/1000 catheter days in neonatal intensive care units. After the introduction of packages for advertisement and care of CŽK, the incidence of CLABSI ranged from 0-19,5/1000 catheter days in all types of ICU (median 2,5/1000 catheter days), (2016). Comparisons with the results of a number of studies have shown us that the use of central venous catheter insertion and care packages can significantly reduce catheter colonization and CRBSI. To compile these packages based on EBM and practical experience, we compiled quality process indicators for the introduction of a central venous catheter and for the treatment of a central venous catheter, which are part of the appendix of our work.

Conclusion

In our work, we analyzed the state of catheter infections of the bloodstream in a selected medical facility in 2015–2020. Our goal was to analyze catheter infections of the bloodstream in individual departments and to map their microbial agents. We also conducted a cross-sectional study regarding catheter infections of the bloodstream in the intensive care unit. We found a low rate of CRBSI. Most CRBSIs are caused by gram-positive microorganisms, most commonly coagulase-negative staphylococci. We also found a high rate of *Staphylococcus aureus*. Our study had some strengths and unique features and some limitations. We have mapped the situation in the selected healthcare facility, for each department, being able to identify trends in order to implement effective changes. A limitation of our study was that it was a retrospective study and that it was conducted in a single hospital. Another important limitation was the difficulty of comparing CRBSI rates with other published studies, due to differences in patient case groups. Most of the literature addresses specific patient groups, such as intensive care patients and AROs, whereas we included all patients across the health care setting, including pediatric patients.

What we would like to emphasize is the fact, confirmed by the results of a number of studies, that CRBSI can be prevented by following preventive procedures. It is reported that if systemic measures are implemented and maintained, it is possible to achieve zero incidence of catheter infections („bacteremia zero“ strategy). Despite this fact, CRBSIs remain a significant problem that plagues patients (due to the severity of the disease, prolonged hospitalization and, above all, mortality) and health care providers, not only in the Czech Republic, but also in the world. The fight against infection is an ongoing process, mainly due to the changing characteristics of the infectious agents. This can be caused by increasing antibiotic resistance, or the appearance of microbial strains that have a higher virulence. It remains for us to uncover the causal relationships of catheter bloodstream infections while providing effective health care. At the same time, it is necessary to balance the benefits and costs of the care provided in this way.

Standardization of procedures for advertising and care of catheters combined with auditing, together with the introduction of standard training and division of competencies for staff, appear to have a significant impact on the way to reducing the incidence of CRBSI. This is the reason why we set as a final goal to create checklists for advertisement and care of a central venous catheter, a record sheet for monitoring the need for a central venous catheter and their implementation in practice in this setting. We managed to fulfill the objectives of the work.

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Topics 6

Social Work and Education

TUBERCULOSIS AS A SOCIAL DISEASE IN A MARGINALISED SOCIAL GROUP

TUBERKULÓZA AKO SOCIÁLNA CHOROBA U MARGINALIZOVANEJ ČASTI POPULÁCIE

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Abstract

Tuberculosis treatment lasts for several months, with the necessity of using a combination of drugs so that the treatment has an effect on the debacilization of the patient. It requires great discipline from the patient in following the treatment regimen, which means regular use of antituberculosis drugs for a longer period of time (6 – 9 months), regular check-ups with a doctor, and abstinence from alcohol during the entire treatment period. If the treatment regimen is not followed, complications occur in patients – more serious forms of tuberculosis appear, which often require surgical solutions. Last but not least, a tuberculosis patient who does not take antituberculosis drugs poses an infectious threat to those around him.

When treating a patient with tuberculosis in marginalized groups of the population, we are greatly helped by health education assistants who come from or live directly in settlements with the occurrence of tuberculosis and are thus accepted by these communities.

For marginalized groups of the population, patients with a disorder of the immune system, HIV-positive patients who have respiratory problems, we must also think about the occurrence of tuberculosis infection.

Keywords: tuberculosis, marginalized groups, treating of TB

Abstrakt

Liečba tuberkulózy trvá niekoľko mesiacov s nutnosťou nasadiť kombináciu liekov, aby liečba mala efekt na debacilizáciu pacienta. Vyžaduje si to veľkú disciplinovanosť pacienta v dodržovaní liečebného režimu, čo znamená pravidelné užívanie antituberkulotík na dlhšiu dobu (6 – 9 mesiacov), pravidelné kontroly u lekára, abstinenciu od alkoholu počas celej doby liečby. Pri nedodržaní liečebného režimu dochádza u pacientov ku vzniku komplikácií-objavujú sa závažnejšie formy tuberkulózy, ktoré si vyžadujú častokrát chirurgické riešenia. V neposlednom rade, pacient s tuberkulózou, ktorý neužíva antituberkulotiká, predstavuje pre svoje okolie infekčnú hrozbu.

Pri liečbe pacienta s tuberkulózou v marginalizovaných skupinách obyvateľstva nám veľmi pomáhajú asistenti osvetly zdravia, ktorí pochádzajú alebo priamo žijú v osadách s výskytom tuberkulózy a sú tak týmito komunitami akceptovaní.

U marginalizovaných skupín obyvateľstva, pacientov s poruchou imunitného systému, HIV pozitívnych pacientov, ktorí majú respiračné ťažkosti, musíme myslieť aj na výskyt tuberkulózneho infekcie.

Kľúčové slová: tuberkulóza, marginalizované skupiny, terapia tuberkulózy

Introduction

Tuberculosis has been, and is, a social disease. When socio-economic conditions deteriorate, its occurrence always increases. The second half of the 20th century was characterized by a decline in the incidence of TB in most developed countries (Solovič et al., 2019; Beňo, Meravý, 2020). Tuberculosis, despite the declared increase in the standard of living of the population, is currently one of the most serious social diseases, and therefore it is necessary to pay increased attention to those groups of the population who, for various reasons (especially unfavorable social conditions), have a significantly increased risk of developing it. The occurrence of tuberculosis in marginalized population groups reaches the highest numbers on a global scale.

In times of ongoing waves of the COVID-19 pandemic, the health care industry somehow puts the diagnosis of tuberculosis on the back burner. In correlation with the results of several authors (Solovič, Dobáková, 2022; Mishra, et al., 2021) and our observations, it follows that, especially when it comes to a patient coming from a marginalized social area, an immunocompromised patient, an HIV-positive patient, etc., in all in these cases, if the patient has symptoms of a respiratory infection, it is also necessary to test him for the presence of tuberculosis.

Core of work

A 20-year-old female patient, an abuser of ethyl and nicotine, otherwise without any serious pre-disease, coming from a marginalized Roma community, came to the pulmonary clinic for an examination with a cough that had lasted for approximately 4 months. In recent months, she was sporadically examined at the general practitioner's clinic, where she did not keep to the agreed examination dates, therefore only basic laboratory tests (blood count, CRP) were taken as part of the examination at the district doctor, which were without significant deviations. The patient was repeatedly recommended to have a chest x-ray and a lung examination, but these examinations were carried out approximately 4 months after the onset of the symptoms. At that time, the patient visited the pulmonary clinic and agreed to perform a chest x-ray, as the patient had a new symptom – hemoptysis. The chest x-ray showed changes typical of pulmonary tuberculosis, which were subsequently confirmed by bacteriological examination of the sputum, and the patient was treated at

a specialized pulmonary center. After debacillization, approximately 2 months after the start of anti-tuberculosis treatment, the patient was discharged to outpatient care. She was recommended to be checked at the pulmonary clinic after discharge from the hospital, but the patient did not come for the planned check-up.

Approximately 4 months after being discharged from the hospital, the patient called an ambulance for sudden dyspnea and hemoptysis. The patient answered targeted questions that she stopped taking antituberculosis drugs after being discharged from the hospital. Findings on chest x-ray and chest CT (Figure 1) showed the presence of a serious complication – bilateral pneumothorax. The patient was immediately treated in cooperation with thoracic surgeons, and antituberculosis treatment was started again. When she was discharged from the hospital, the patient was strongly warned about the necessity of following the treatment regimen, the use of antituberculosis drugs and the necessity of regular check-ups at the pulmonary clinic. To prevent repeated violations of the treatment regimen, we have ensured contact with health education assistants. These are non-medical workers who come directly from the Roma settlement and ensure mediation between members of marginalized population groups and medical workers. They accompany patients to examinations and monitor compliance with the treatment regimen. Our observed patient then regularly visited the pulmonary clinic and followed the treatment regimen consistently, resulting in a completely cured condition.

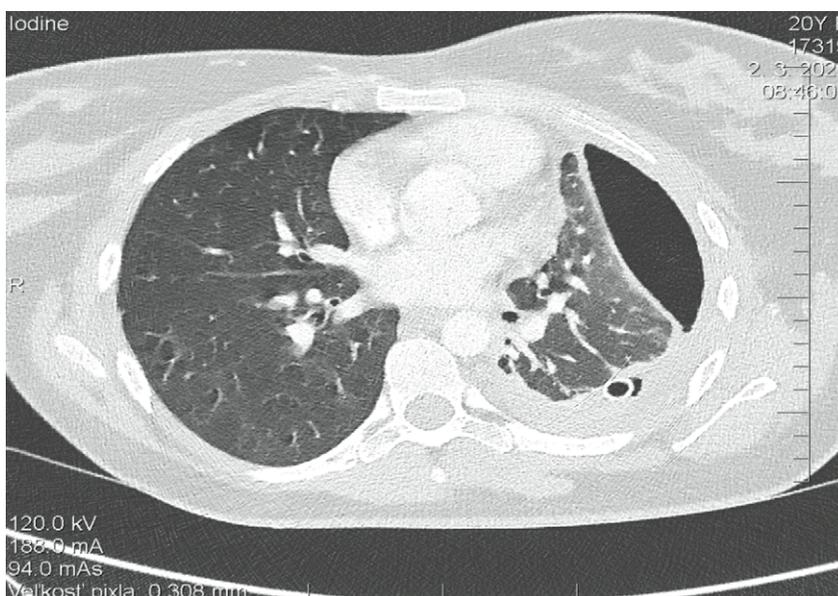


Figure 1. CT scan of patient with tuberculosis

Conclusion

Tuberculosis treatment lasts for several months, with the necessity of using a combination of drugs so that the treatment has an effect on the debacillization of the patient. It requires great discipline from the patient in following the treatment regimen, which means regular use of antituberculosis drugs for a longer period of time (6 – 9 months), regular check-ups with a doctor, and abstinence from alcohol during the entire treatment period. If the treatment

regimen is not followed, complications occur in patients – more serious forms of tuberculosis appear, which often require surgical solutions. Last but not least, a tuberculosis patient who does not take antituberculosis drugs poses an infectious threat to those around him.

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Conflict of interest:

none.

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AKTÍVNA SENESCENCIA – VÝZNAM EDUKÁCIE

ACTIVE SENESCENCE – THE IMPORTANCE OF EDUCATION

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Abstrakt

Úvod: Celkové starnutie populácie je témou v mnohých krajinách sveta. Je to prirodzený a nevyhnutný proces, ktorý zahŕňa celý rad fyzických, psychických a sociálnych zmien, ktoré sa vyskytujú v priebehu času. Zahŕňa zmeny v štruktúre a funkciách organizmu, ktoré podmieňujú jeho zvýšenú zraniteľnosť, pokles schopností a výkonnosti jedinca, a ktoré kulminujú v terminálne štádium a smrť.

Jadro práce: Cieľom práce je sumarizácia a prehľad faktorov vplyvajúcich na starnutie a možnosti pozitívneho ovplyvnenia zdravia a prežívania starnutia prostredníctvom edukácie a kreativity v každodennom živote.

Záver: V práci sme rezumovali aspekty aktívneho starnutia a jeho dôležitosť v živote seniora s presahom do sociálnej, ekonomickej a zdravotnej sféry.

Kľúčové slová: senescencia, aktívne starnutie, edukácia, kreativita

Abstract

Introduction: The general aging of the population is a topic in many countries of the world. It is a natural and inevitable process that involves a range of physical, psychological and social changes that occur over time. It includes changes in the structure and functions of the organism that condition its increased vulnerability, a decrease in the abilities and performance of the individual, and which culminate in the terminal stage and death.

The core of the work: The aim of the work is to summarize and review the factors influencing aging and the possibilities of positively influencing health and experiencing aging through education and creativity in everyday life.

Conclusion: In the thesis, we summarized the aspects of active aging and its importance in the life of a senior citizen with an overlap into the social, economic and health spheres.

Key words: senescence, active aging, education, creativity

Introduction

Podľa štatistík Eurostatu bola v roku 2019 viac než jedna pätina (20,3 %) obyvateľov EÚ27 vo vekovej skupine 65 a viac rokov. Predpokladá sa, že v období od roku 2019 do roku 2100 sa podiel osôb vo veku 80 alebo viac rokov na obyvateľstve krajín EÚ27 zvýši dva a pol násobne z 5,8 % na 14,6 %. V dôsledku toho v krajinách EÚ27 klesá podiel ľudí v produktívnom veku

a zároveň rastie relatívny počet osôb v dôchodku. Podiel starších osôb na celkovom počte obyvateľov sa v nadchádzajúcich desaťročiach výrazne zvýši.

K 1. januáru 2019 sa počet obyvateľov krajín EÚ27 odhadoval na 446,8 milióna. Staršie osoby (vo veku od 65 rokov) mali na celkovom počte obyvateľov podiel 20,3 %, zvýšenie o 0,3 percentuálneho bodu v porovnaní s predchádzajúcim rokom a o 2,9 percentuálneho bodu oproti obdobiu spred 10 rokov. Do roku 2050 bude podiel ľudí nad 65 rokov okolo 30 % v porovnaní s 20 % v súčasnosti.

Core of work

Aktívne starnutie je dôležité pre budúcnosť z mnohých dôvodov. V oblasti zdravia a sociálnej starostlivosti sa aktívne starnutie zaoberá podporou práv starších ľudí zostať zdraví, čím sa znižujú náklady na zdravotnú a sociálnu starostlivosť. Taktiež participácia na komunitnom a politickom živote zvyšuje sebahodnotu seniorov. Udržateľný rozvoja príprava na senescenciu populácie je nevyhnutná pre dosiahnutie integrovaného programu udržateľného rozvoja do roku 2030, pričom starnutie sa týka cieľov týkajúcich sa odstraňovania chudoby, dobrého zdravia, rodovej rovnosti, edukácie, hospodárskeho rastu a dôstojnej práce, zníženia nerovností a udržateľných miest. Tieto body zdôrazňujú, že starší ľudia by mali byť uznaní ako aktívni aktéri spoločenského rozvoja, aby sa dosiahli skutočne transformačné, inkluzívne a udržateľné výsledky rozvoja. Toto je dôležité, pretože sa očakáva, že do roku 2050 sa počet ľudí vo veku 60 rokov a starších zdvojnásobí na 2,1 miliardy. Podľa údajov z roku 2023 je medián veku na Slovensku 39,8 roka. Presné percento obyvateľstva vo veku 65 rokov a viac nie je k dispozícii, ale v roku 2020 tvorili ľudia vo veku 65 rokov a viac 20,6 % populácie EÚ. Tieto údaje nám môžu poskytnúť určitú predstavu o percentuálnej zástupnosti seniorov na Slovensku.

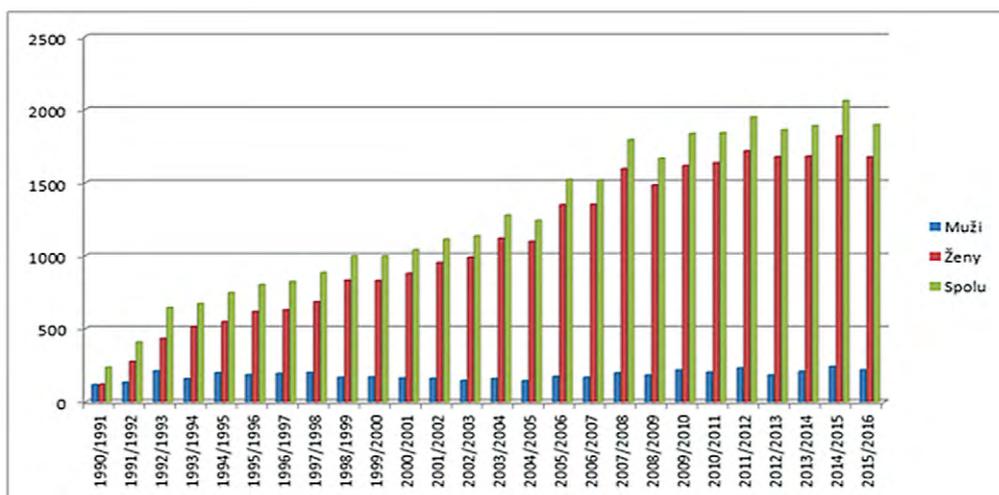
Senescencia prináša so sebou rôzne pozitívne aj negatívne aspekty. Strata nezávislosti a fyzické zmeny majú negatívny dopad na postoje k starnutiu a ovplyvňujú životnú spokojnosť a sociálne vzťahy. Seniorský vek ale prináša aj viac času na rozvoj stratégií zvládania stresu a tak isto čas na vzdelávanie a kreativitu. Motivácia seniorov ku vzdelávaniu má sociálny a seba realizačný rozmer.

Na Slovensku existuje niekoľko inštitúcií a programov, ktoré poskytujú vzdelávanie pre seniorov. Medzi ktoré patria Univerzity tretieho veku (UTV). Tieto inštitúcie sú najznámejšou edukatívnou možnosťou pre ľudí v staršom veku. Prvá Univerzita tretieho veku bola založená v Toulouse vo Francúzsku v roku 1973. Prvá Univerzita na Slovensku vznikla na Univerzite Komenského v Bratislave roku 1990. Následne v roku 1994 vznikla Asociácia univerzít tretieho veku na Slovensku. V čase založenia Asociácie univerzít tretieho veku na Slovensku (1994) bolo štúdium na Univerzitách tretieho veku určené iba pre dôchodcov a nehovorilo sa o znížení vekovej hranice pre zápis na štúdium na UTV. Nakoniec ale vplyvom záujmu verejnosti bolo sprístupnené štúdium na UTV záujemcom už od 40, 45, či od 50 rokov. V spoločnosti sa v tej dobe vážne neuvažovalo o posune vekovej hranice odchodu do dôchodku, aj keď

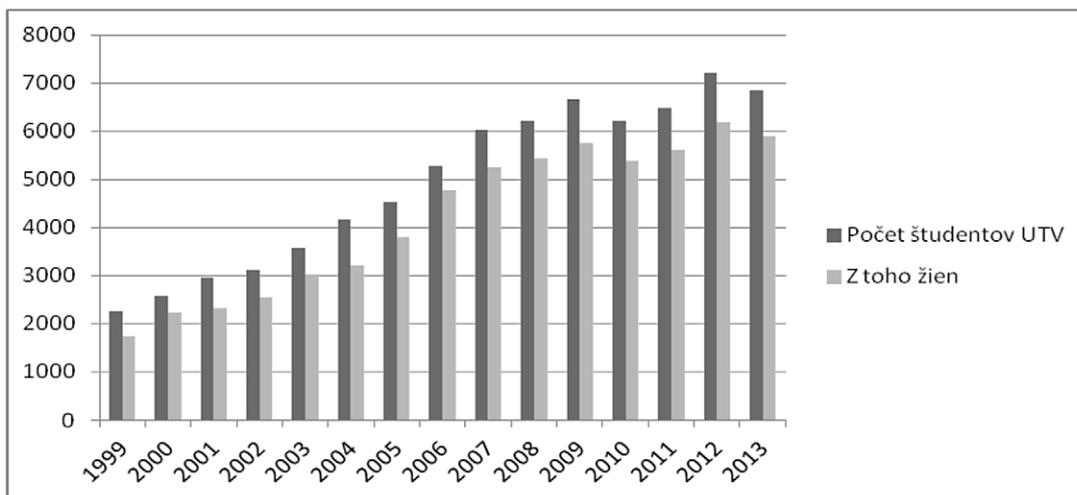
prognózy dávno hovorili o predlžovaní ľudského veku. Toto prinieslo aj na UTV nový fakt, ktorým je niekoľkonásobné opakované zapisovanie absolventov UTV na štúdium s výberom nového študijného odboru a stretávanie dvoch generácií – generácia od 45 rokov (stredný vek 45 – 59) do 75 rokov (starší vek – presenium 60 – 74 rokov) teda generácia tzv. tretieho veku a neskôr aj generácia tzv. štvrtého veku 75+ (starý vek – senium 75 – 89). (Členenie veku vybrané zo zaužívanej stupnice podľa Svetovej zdravotníckej organizácie WHO).

Ak sa chceme pozrieť na zloženie študentov UTV, tak najprv pre porovnanie uvádzame informáciu o riadnych študentoch VŠ, ktorá hovorí, že na univerzitách a vysokých školách študuje 1,5-krát viac žien, než mužov. Podiel študujúcich žien podľa jednotlivých študijných odborov je výrazne vyšší, okrem univerzít s technickým a vojensko-bezpečnostným zameraním. Tento údaj nám z určitého pohľadu môže vysvetľovať prevyšujúci záujem žien o vzdelávanie na UTV, keď v porovnaní počtu mužov a žien na UTV z celkového počtu tvoria ženy od 78 % a dokonca v roku 2006/2007 až 91 % počtu študentov UTV na Slovensku. Prevyšujúci záujem o vzdelávanie žien na UTV bol v minulosti výrazne podmienený absenciou ich vysokoškolského štúdia po skončení strednej školy z rôznych dôvodov (starostlivosť o deti, iný životný štýl a pod.) a dnes ešte stále aj z dôvodu skoršieho odchodu do dôchodku a ukončením profesijnej kariéry.

V súčasnosti je na Slovensku z celkového počtu 920 tisíc dôchodcov zapojených do ďalšieho vzdelávania na UTV 6 205 starších študentov. Seniori majú možnosť vybrať si vzdelávanie na 13 UTV a vzdelávacie cykly trvajú obvykle 4-6 semestrov na úrovni práce vysokej školy. Akadémie tretieho veku (A3V) združujú seniorov, ktorých základná orientácia je vzdelávacia. Vzdelávacie cykly sú 1 a viacsemestrálne, ale i krátkodobé cykly k aktuálnym otázkam. Menšie inštitúcie zastrešujúce edukačné a kultúrno-sociálne potreby sú kluby seniorov.



Obr. 1. Počet študentov univerzity tretieho veku na Univerzite Komenského od roku 1990. (Zdroj: Centrum ďalšieho vzdelávania UK v BA)



Obr. 2. Počet študentov na Univerzitách tretieho veku na Slovensku, z toho ženy
(Zdroj: ASUTV, 2013)

V procese edukácie seniorov je potrebné človeka vnímať ako zložitý bio-psycho-socio-spirituálny celok, a preto by všestranná edukácia mala zodpovedať rozvíjaniu autonómnej individuality ako celku s viacerými rovinami. Toto vnímanie zahŕňa rozvoj identity človeka a jeho dimenzií v rovine tela – prostredníctvom zdravej, plnohodnotnej výživy, uvoľňovania a oslobodzovania sa od stresu, ako aj vďaka vekovo adekvátnemu športu a telesnej aktivite dochádza k podpore pozitívneho telesného pocitu. V rovine citov sa pripúšťajú príjemné, ale aj nepríjemné pocity. Podporujú sa prostredníctvom básní, hudby, prírody, ako aj zážitkov s inými ľuďmi. Rovina myslenia zahŕňa vyrovnanie sa so sebou samým a s ostatnými ľuďmi, a to myšlienково i reflexívne, zatiaľ čo v existenčnej rovine ide o rozvoj autenticity, pravosti a identity aj prostredníctvom sebaoznania. Cesta dovnútra môže byť spätá aj so strachom, a to predovšetkým vtedy, keď sa v rovnakom čase aktivizuje veľa doposiaľ nevedomeného a nepoznaného. Cez spirituálnu rovinu sa človek dostane k vlastnému pokoju, k úcte voči iným ľudským životom a prírode, ale tiež k zodpovednosti za iných ľudí a za nové úlohy. Prostredníctvom sociálnej roviny sa človek excentricky otvára voči iným ľuďom a žije v intersubjektivite (Veelken, 1990; Noack, 2001). Veelkenov model progresívneho rozvoja osobnosti ako autonómnej bytosti teda správne poukazuje na všetky stránky ľudskej osobnosti, ktoré by v sociálno-edukačnom procese nemali zostať bez povšimnutia. Korešponduje s prijímaním individuality staršieho človeka ako zložitého komplexu, ktorý tvoria viaceré navzájom sa ovplyvňujúce atribúty osobnosti človeka. Edukácia seniorov plní hneď niekoľko ďalších funkcií. Funkcia seba aktualizácie v spolupráci s edukáciou ako celoživotným procesom je jedným z najefektívnejších nástrojov na budovanie znalostnej spoločnosti, resp. trvalo udržateľného rozvoja a na efektívnejšie riešenie vzniknutých a/alebo potenciálnych problémov človeka. V rámci udržania alebo zvyšovania telesného a celostného blahobytu môže mať edukácia podobu odborných znalostí a vedomostí, kedy je cieľom vzdelávania rozvoj a udržiavanie kvalifikácie so zámerom dosiahnuť (re)aktivizáciu seniorov. Rozvíja a udržiava kognitívne funkcie seniorov, ako je pamäť, pozornosť, vnímanie, koncentrácia, jazyková produkcia. V neposlednom rade je to sociálny prospech, kedy edukácia

seniorov musí nadobudnúť charakter záväzného programu spoločnosti, pričom jej realizácia sa má uskutočňovať pod taktovkou kvalifikovaných andragogických pracovníkov. Možnosť edukácie taktiež pomáha seniorom nadväzovať kontakty, čo je dôležité v kontexte možných pocitov osamelosti, kedy sú vystavení zvýšenému riziku fyzických a duševných ochorení, vrátane predčasného úmrtia.

Kognitívne potreby seniorov teda súvisia s udrzaním a zlepšením ich kognitívnych funkcií prostredníctvom vzdelávania, ako sú pamäť, pozornosť, vnímanie, koncentrácia, jazyková produkcia a funkcie. Kognitívne stimulačné cvičenia sú navrhnuté tak, aby chránili, udržiavali alebo dokonca zlepšovali kognitívne funkcie, ktoré sa v priebehu rokov zhoršujú. Tieto cvičenia môžu pomôcť seniorom zachovať alebo zlepšiť ich duševné schopnosti. S dôležitosťou edukácie ide ruka v ruke aj kreativita v procese starnutia. Tvorivosť, kreativita sa rozumie ako schopnosť človeka vytvárať akékoľvek nové a pôvodné myšlienky. Táto schopnosť sa môže prejavovať aj v staršom veku.

Kreativita je taktiež nástrojom sebaaktualizácie, ktorá umožňuje jednotlivcom vyjadriť svoje schopnosti, vlohy, talent, poznanie, sebaopoznanie, erudíciu, technickú zručnosť atď. Kreativita je funkciou ega, dáva životu a práci zmysel, je zdrojom hlbokého uspokojenia a je tak aj zdrojom pozitívneho sebahodnotenia. O sociálnom prospechu hovoríme, keď kreativita okrem originality splňuje aj podmienku spoločenského prospechu. To znamená, že kreatívne výtvory môžu prispievať k obohateniu kultúry a spoločnosti. Adaptácia na zmeny prostredníctvom kreativity môže pomôcť starším ľuďom lepšie sa prispôbiť zmene a progresívne zoslabovaniu fyziologických procesov, ktoré sú súčasťou starnutia. Takže, kreativita tak ako aj edukácia, môže byť veľmi užitočná v procese starnutia, umožňuje jednotlivcom lepšie sa prispôbiť zmene, vyjadriť svoje schopnosti a talenty, nájsť zmysel v živote a prispievať k spoločenskému prospechu.

Conclusion

Frankl konštatuje tri aspekty, v ktorých možno hľadať zmysel života, a to zážitkové hodnoty, vlastná tvorba a úctyhodný postoj k tomu, čo sa deje (Křivohlavý, 2011). Naskytá sa nám teda priama súvislosť medzi uvádzanými oblasťami a edukáciou v starobe. K problematike seniorskej edukácie nás privádza zvyšujúci sa počet seniorov v populácii a trend predlžovania dožitého veku. Na základe týchto dôležitých skutočností vyvstáva potreba naplňovať uznesenia európskeho spoločenstva o tvorbe sociálnej politiky pre seniorov a vytváranie dostupných vzdelávacích príležitostí a vydvihnúť celoživotný rozmer edukácie. Vznikom podporných orgánov, inštitúcií a rôznych výskumných a osvetových projektov, napr. Asociácie univerzít tretieho veku a Univerzít tretieho veku, naša spoločnosť postupne začína viac doceňovať významnosť nastolenej problematiky a potrebu jej riešenia v širších súvislostiach. V závere si dovoľujeme uviesť úvahu Křivohlavého (2011) o cielei tretej fázy života: „Úlohou tretieho úseku životnej cesty je kultúrne i osobnostne zrieť a dozrieť v plne rozvinutú, ucelenú a úctyhodnú harmonickú osobnosť, ktorá sa stále ešte snaží podieľať sa na kultúrnom dedičstve a odovzdávať ho ďalej.“

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ETHICAL APPROACH TO JOB APPLICANTS AND EXCLUSION OF DISCRIMINATION DUE TO AGE ETICKÝ PRÍSTUP K UCHADZAČOM O ZAMESTNANIE A VYLÚČENIE DISKRIMINÁCIE Z DÔVODU VEKU

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Abstract

Introduction: After 1989 “unemployment” is a negative phenomenon in society which can cause unpleasant physical, mental but also spiritual damage in our lives. When a person loses a job, this negative experience is often accompanied by humiliation, injustice, a feeling of inadequacy and bitterness. These facts can bring us undesirable consequences.

Losing a job is certainly an unpleasant experience, and it is even more unpleasant if a citizen over the age of 50 loses his job when the prospect of finding an adequate job is very minimal to negligible.

Objective: The involuntarily unemployed, especially after the age of 50 are deprived of the opportunity to get a job as soon as possible, adequate to their education and previous professional experience despite of the fact that their professional experience spans several decades. Therefore, in this paper we focus on pointing out the ethical approach to these people from the point of view of age as a discriminatory reason in labour-legal relations as well as the characteristics of important concepts related to discrimination and the principle of equal treatment, especially during the selection process for the selection of new employees.

The core of a job: When applying for a job, posting a selection procedure for a vacant position or during the selection procedure itself including a job interview the employer may not limit job positions to a certain age group. Questions about the job applicant’s age are also inadmissible during an interview as part of the selection process, they are classified as discriminatory against a certain vulnerable group of the population. The criteria for the selection of employees must guarantee equal opportunities for all citizens.

From the point of view of ethics and an ethical approach the process of reducing unemployment and filling jobs with more experienced applicants who from the point of view of the future employer do not meet his view of the future employee’s age or professional experience in the job position because younger applicants are for the employer, among other things, cheaper labour force, is inadmissible.

Conclusion: An employer who is interested in hiring new employees may not discriminate against any person based not only on the Slovak legislation but also on the basis of the European Union legislation even on the basis of age. These are not only older people but also graduates or younger job seekers. At a time of uneven unemployment rates within the

regions of the Slovak Republic such discriminatory practices occur in many organizations as they have the possibility of a wider selection of applicants in selected areas of job positions. We can see this many times in state and public administration in the society.

Key words: Ethics. Job applicant. Discrimination. Unemployment. Age and age discrimination.

Abstrakt

Úvod: „Nezamestnanosť“ je negatívny jav v spoločnosti po roku 1989, ktorý môže v našom živote spôsobiť nepríjemné fyzické, duševné, ale aj duchovné škody. Keď príde človek o zamestnanie, túto negatívnu udalosť často sprevádzajú poníženie, krivda, pocit nepotrebnosti, zatrpknutie. Už tieto skutočnosti nám môžu priniesť nežiadúce dôsledky.

Prísť o zamestnanie je určite nepríjemná skúsenosť, o to nepríjemnejšie je to vtedy, ak príde o zamestnanie občan vo veku nad 50 rokov, keď perspektíva adekvátneho nájdenia si zamestnania je veľmi minimálna až mizivá.

Zameranie: Nedobrovoľne nezamestnaní najmä po 50 roku veku sú ukrátení o možnosť zamestnať sa čo najskôr adekvátne svojmu vzdelaniu a doterajšej odbornej praxe napriek tomu, že ich odborná prax je v rozsahu niekoľkých desaťročí. Preto sa v tomto príspevku sústreďujeme na poukázanie etického prístupu na týchto ľuďoch z pohľadu veku ako diskriminačného dôvodu v pracovnom-právnych vzťahoch, ako aj charakteristiku dôležitých pojmov súvisiacich s diskrimináciou a so zásadou rovnakého zaobchádzania najmä v čase výberového konania pri výbere nových zamestnancov.

Jadro práce: Pri uchádzaní sa o zamestnanie, vypisovaní výberových konaní na voľné pracovné miesto ani pri samotnom výberovom konaní vrátane pracovného pohovoru, zamestnávateľ nesmie pracovné pozície ohraničiť na určitú vekovú skupinu. Ani pri rozhovore v rámci výberového konania otázky na vek uchádzača o zamestnanie sú neprípustné, zaradzujú sa medzi diskriminujúce určitú zraniteľnú skupinu obyvateľstva. Kritériá na výber zamestnancov musia zaručovať rovnosť príležitostí pre všetkých občanov.

Z hľadiska etiky a etického prístupu je neprípustný postup v rámci znižovania nezamestnanosti a obsadzovania pracovných miest skúsenejšími uchádzačmi, ktorí síce z pohľadu budúceho zamestnávateľa nespĺňajú jeho pohľad na vek budúceho zamestnanca či odbornú prax na obsadzovanej pracovnej pozícii, pretože mladší uchádzači sú pre zamestnávateľa okrem iného aj lacnejšou pracovnou silou.

Záver: Zamestnávateľ, ktorý má záujem prijímať nových zamestnancov do zamestnania, nesmie nielen na základe slovenskej legislatívy, ale aj z pohľadu legislatívy Európskej únie diskriminovať akékoľvek osoby aj z pohľadu veku. Nejedná sa iba o vekovo staršie osoby, ale aj o absolventov či mladších uchádzačov o zamestnanie. V čase nevyrovnanej miery nezamestnanosti v rámci krajov SR sa takéto diskriminačné praktiky dejú v mnohých organizáciách, keďže vo vybraných oblastiach pracovných pozícií majú možnosť širšieho výberu uchádzačov. Môžeme to mnohokrát vidieť v štátnej a verejnej správe v spoločnosti.

Kľúčové slová: Etika. Uchádzač o zamestnanie. Diskriminácia. Nezamestnanosť. Vek a veková diskriminácia.

Introduction

In the law of the European Union (hereinafter as “EU”), the principle of equal treatment is considered a central principle of primary law, from which secondary law is subsequently derived. In order to eliminate unfair approach to job seekers as well as to employees due to age in the field of ethics, anti-discrimination law is mostly applied within the EU, which is usually referred to as the most important EU law. Regarding age as a discriminatory ground, the prohibition of discrimination due to age as well as control in the application of exceptions to the principle of equal treatment due to age is an important part of fulfilling the EU’s objectives in the application of the principle of equal treatment on the basis of age. The aim of this paper is to clarify the essence of the ethical approach from the point of view of age as a discriminatory reason in labour law, as well as the characteristics of important concepts related to discrimination and the principle of equal treatment, especially during the selection process in the selection of new employees.

Objective

The aim of the paper is to clarify the essence of the ethical approach from the point of view of age as a discriminatory reason in labour-legal relations, as well as the characteristics of important concepts related to discrimination and the principle of equal treatment especially during the selection process in the selection of new employees.

Core of the paper

When it comes to selection procedures or job interviews the employer may not limit job positions to a certain age group. Questions about the job applicant’s age are also inadmissible during an interview as part of the selection procedure even if the estimated age cannot be completely hidden for any job applicant. The criteria for the selection of employees must guarantee equal opportunities for all citizens.

According to the EU law it is inadmissible for age to be the sole criterion for the selection of employees. From practical experience it is becoming more and more common that age as such has a significant effect on the selection of employees. It is often related to the employer’s requirements for the length of experience. The minimum duration of the work experience, the minimum qualification as well as the experience related to the performance of the profession are intended to guarantee expertise for the required job position as well as to eliminate applicants with an unreasonably short experience in the profession.

In job advertisements we can see specific age requirements for job applicants but also the requirement of a photograph, above-standard experience, maximum length of experience as well as offers in which employers are looking for young people offering the advantages of a young collective as a young dynamic team (Zozuláková, Matejčíková, 2011).

Such actions should be considered discriminatory by the employer if the employer were to select employees, for example, between the age of 25 and 35. With this procedure he would not only discriminate against younger job applicants under the age of 25 but also older applicants over 40 or older.

And especially such an approach is unacceptable from the point of view of ethics and an ethical approach in terms of reducing unemployment and filling jobs with more experienced applicants who, from the point of view of the future employer do not meet his view of age of the future employee, and in addition, younger applicants are also cheaper labour force for the employer.

Compliance with the principle of equal treatment (“principle of equal treatment”) consists in protection against discrimination and taking measures that will prevent discrimination. It is the fair and ethical principle of equal treatment of employees that presupposes the provision of equal opportunities (Vagaská, et al., 2020). However, not in every case the principle of equal treatment does not consist in the obligation of the employer to treat all employees in the same way in every situation.

An important area in our legislation are also residents who are included in the group of so-called disadvantaged persons from the point of view of the possibility of employment on the labour market. Who belongs to the group of disadvantaged persons for the labour market? This area is dealt with by the Act No.112/2018 Coll on the social economy and social enterprises as amended, which is referred to in Art. 2, Sect 5, letter a), that the disadvantaged persons are:

A natural person who has not been employed in the previous 6 months except for employment that did not exceed 40 days in a calendar year, and if his/her taxable monthly income and income from pensions did not exceed the amount of the subsistence minimum for one natural person of legal age, and

- is younger than 26 years, completed full-time studies less than 2 years ago and has not had a job lasting more than 6 months since its completion,
- is older than 50 years of age,
- is kept in the register of job applicants for at least 12 months,
- achieved an education lower than secondary vocational education,
- belongs to a national or ethnic minority and needs to develop language and professional knowledge or gain work experience for the purpose of obtaining employment,
- lives as a single adult with at least one dependent or takes care of at least one school-age child,
- has a permanent residence in the least developed district.

These persons are not required to be registered in the register of job applicants (Act No. 112/2018 Coll.). The definition of a disadvantaged person is mainly based on the Act No. 5/2004 Coll. on employment services.

If we were to characterize the concept of discrimination, we can see behind it such actions in which a person is treated less favorably than other persons in a comparable situation. We can divide discrimination into:

- direct discrimination (action or omission in which a person is treated less favorably than another person, is treated, was treated or could be treated in a comparable situation) and,
- **indirect discrimination** (an outwardly neutral regulation, decision, instruction or practice that disadvantages or could disadvantage a person compared to another person) (www.ip.gov.sk, 2014).

In recent years several provisions strengthening the principle of equal treatment have been incorporated into the legislation of the Slovak Republic, e.g. with men and with women. Likewise, the European Union declared a fight against discrimination. Citizens of countries living in the European Union who are different from the majority in a certain way continue to be discriminated against not only in the labour market but also in other areas of everyday life.

The latest Eurobarometer survey shows that compared to the last survey in 2015, Europeans seem to be (or at least say they are) more tolerant. What emerged from the latest Eurobarometer survey on discrimination in the EU for Slovaks?

A positive finding is that according to more than a half of Slovaks interviewed (60 %), efforts to fight against all forms of discrimination in Slovakia are effective. Rejection of discrimination can be enforced from an early age, for example in schools.

As criteria that disadvantage the candidate when applying for a job the majority of Slovaks in the survey cited Roma identity (39 %), age of the candidate (37 %), disability (29 %), colour of the candidate's skin (27 %), appearance of the candidate (25 %), sex of the candidate (22 %) or sexual orientation.

Among the most widespread forms of discrimination, Slovaks in the survey indicated discrimination on the basis of: Roma affiliation 41 % (EU 61 %), skin colour 29 % (EU 59 %), sexual orientation 25 % (EU 53 %), ethnic origin 24 % (EU 59 %), perceived as too old or too young 22 % (EU 40 %) and disability 21 % (EU 44 %) (Source: https://slovakia.representation.ec.europa.eu/news/ako-vnimaju-slovaci-diskriminaciu-2019-11-06_sk).

The risk group consists of both older people and young people, especially graduates after completing vocational training. Age discrimination is most often encountered in the area of access to employment where job applicants are required to meet criteria that are discriminatory for a certain age category.

Often, graduates are not able to meet such conditions as it is not objectively possible taking into account their age. Another disadvantaged group due to age consists of older people who are often considered less efficient than young people, slower, more difficult to adapt to new circumstances, more difficult to learn new things, do not know how to work with technical facilities, foreign languages, etc.

An undesirable situation is inequality of chances of middle-aged people compared to young people. Middle-aged people are currently in a situation where during their lifetime there has been rapid development in the field of technology, a change of regime and the associated current tendency of convergence and integration between individual states.

The following Tables 1 and 2 indicate the rate of employed and unemployed citizens in the year 2023 according to age. They show a lower rate of employed at a higher age as well as in the area of unemployed, mainly in districts Prešov, Košice and Banská Bystrica.

Table 1. Rate of employed by districts regarding age in II. quarter 2023 in thousands of people

District	Age category					
	15-24	25-34	35-44	45-54	55+	TOTAL
Bratislava	8,90	75,00	129,50	102,90	77,10	393,40
Trnava	12,80	59,20	75,30	79,80	50,00	277,10
Trenčín	10,00	59,40	82,70	76,00	53,30	281,40
Nitra	17,70	67,60	90,80	89,70	68,80	334,60
Žilina	17,50	76,20	95,30	89,30	64,00	342,30
Banská Bystrica	10,30	62,90	77,20	76,30	61,40	288,10
Prešov	19,90	85,00	98,10	89,40	63,80	356,20
Košice	17,80	76,70	92,60	88,60	60,30	336,00
TOTAL:	114,90	562,00	741,50	692,00	498,70	2609,10

Source: https://datacube.statistics.sk/#!/view/sk/VBD_SK_WIN/pr3115qr/v_pr3115qr_00_00_00_sk

Own data collection by the author

Table 2. Rate of unemployed by districts regarding age in II. quarter 2023 in thousands of people

District	Age category					
	15-24	25-34	35-44	45-54	55+	TOTAL
Bratislava	0,70	3,50	2,50	1,20	0,70	8,60
Trnava	0,60	2,70	5,10	1,70	1,30	11,40
Trenčín	1,70	2,40	1,90	0,70	1,40	8,10
Nitra	1,00	3,60	3,80	2,80	1,50	12,70
Žilina	2,90	5,60	1,60	2,00	1,10	13,20
Banská Bystrica	4,20	4,00	6,90	7,00	4,00	26,10
Prešov	7,20	9,70	8,80	7,60	6,30	39,60
Košice	8,20	8,30	12,40	6,10	3,10	38,10
TOTAL:	26,50	39,80	43,00	29,10	19,40	157,80

Source: https://datacube.statistics.sk/#!/view/sk/VBD_SK_WIN/pr3117qr/v_pr3117qr_00_00_00_sk

Own data collection by the author

How to prevent discrimination in the selection and hiring of job applicants?

Applicants for job positions and participants in selection procedures are protected from discrimination at this stage of industrial relations through the Labour Code, the Anti-Discrimination Act and the Civil Service Act. Likewise, Act No.5/2004 Coll. on employment services defines the right of access to employment as *the right of a citizen who wants to work, can work and is looking for employment, to services according to this law aimed at helping and supporting the facilitation of his entry into the labour market, including assistance and support for the entry and retention of a disadvantaged job seeker on the labour market for at least six consecutive calendar months*. Unequal treatment at this stage causes discrimination in access to employment. How to set up internal processes to prevent discrimination at the initial stage of the industrial relation?

- **Adoption of appropriate internal policies** – these should help prevent discrimination in hiring employees – define in them what is considered discrimination, what are the duties of members of selection committees, what job requirements to avoid when listing job positions so that the job advertisement does not have discriminatory effects, what you can require from applicants, etc.;
- **Training of employees of personnel departments and other employees**, who will participate in the selection process when hiring new employees;
- **Cooperation with third parties (e.g. recruitment agencies)** must be convincing, it is necessary to obtain maximum information about them so that they have enough information about their own internal regulations that eliminate discrimination,
- **Paying increased attention to the wording of job advertisements**, so that their wording does not discriminate against a certain group of job seekers. The future employer should not require applicants to take a photo with their CV, state the required age or date of birth in the CV, use gender-neutral language, avoid team evaluation as well as not make strict requirements that are not relevant for the given position, e.g. language and computer skills, driver's licence, etc. (Vagaská, Pavlíčková, Kováčová, 2020).
- **It is appropriate to state in the advertisement that the employer respects the principle of equal treatment and equal opportunities.**
- **Pay increased attention to the formation of selection committees.**

The employer writes e.g. selection procedure that he is looking for another employee for his young and dynamic team. The selection procedure is not directly discriminatory but if an older person reads this advertisement, he is discouraged from applying as his application may not even be invited to a job interview due to his age or he may receive an invitation but the result of the interview will be negative.

Conclusion

As it follows from the statement of the National Labour Inspectorate (www.ip.gov.sk), an employer who is interested in hiring natural entity must not violate the principle of equal treatment when it comes to the approach to employment. It follows that if a younger job

applicant is preferred over an older one during hiring despite of the fact that the older applicant meets the hiring criteria to a greater extent, this may lead to age discrimination against job applicants.

In conclusion we can state that equality of employment opportunities remains for many groups of people, and not only people from the point of view of age, rather unattainable myth than a natural reality. And for this reason our labour market is marked by inequality and discrimination.

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Act no. 55/2017 Coll on civil service and on amendments and supplements to certain acts

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PROBLEMATIKA DOMÁCEHO NÁSILIA PÁCHANÉHO NA ŽENÁCH A MOŽNOSTI POMOCI Z POHĽADU SOCIÁLNEJ PRÁCE

THE PROBLEM OF DOMESTIC VIOLENCE PERMITTED AGAINST WOMEN AND POSSIBILITIES OF HELP FROM THE PERSPECTIVE OF SOCIAL WORK

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Abstrakt

Úvod: Príspevok priblíži problematiku domáceho násilia páchaného na ženách a možnosti pomoci z pohľadu sociálnej práce.

Cieľ: Hlavným cieľom nášho výskumu bolo preskúmať problematiku domáceho násilia páchaného na ženách a možnosti pomoci z pohľadu sociálnej práce. Určili sme si parciálne ciele, zistiť, akými formami domáceho násilia participanti trpeli, zistiť, čo bolo spúšťačom domáceho násilia, zistiť, za akých okolností odišli od agresora, zistiť, koho požiadali o pomoc, zistiť, akým spôsobom bola poskytnutá odborná pomoc.

Súbor a metodika: Pozostáva z rozhovorov so šiestimi ženami z košického kraja. Všetky ženy sa stali obeťami domáceho násilia a každá z nich je matkou maloletého dieťaťa/maloletých detí. Ako metódu sme zvolili rozhovor. Rozhovory boli vykonané individuálne, s každou zo žien bolo osobné stretnutie. Ženy odpovedali na položené otázky. Celý priebeh rozhovorov bol zaznamenaný na diktafón a následne tieto odpovede boli prepísané do textovej formy.

Výsledky: Zistili sme, že obeťou domáceho násilia sa môže stať každá žena, bez ohľadu na vek, zamestnanie, vzdelanie, či spoločenské postavenie. Odísť od agresora nie je jednoduché. Domáce násilie zanecháva následky nielen na obetiach domáceho násilia, ale aj na maloletých deťoch.

Záver: Prácou sme preukázali, že je nevyhnutné sa zaoberať problematikou domáceho násilia páchaného na ženách a možnosťami pomoci z pohľadu sociálnej práce.

Kľúčové slová: Domáce násilie, Obete domáceho násilia, Aktéri domáceho násilia, Pomoc obetiam domáceho násilia.

Abstract

Introduction: The paper will introduce the issue of domestic violence against women and the possibilities of assistance from the perspective of social work.

Objective: The main objective of our research was to explore the issue of domestic violence against women and the possibilities of assistance from a social work perspective. We set ourselves partial goals, to find out what forms of domestic violence the participants suffered from, to find out what was the trigger for domestic violence, to find out under what circumstances they left the aggressor, to find out who they asked for help, to find out how professional help was provided.

File and methodology: It consists of interviews with six women from the Košice region. All women have been victims of domestic violence and each of them is the mother of a minor child(s). We chose interview as the method. The interviews were conducted individually, there was a personal meeting with each of the women. The women answered the questions asked. The entire course of the conversations was recorded on a dictaphone, and subsequently these answers were transcribed into text form.

Results: We found that every woman can be a victim of domestic violence, regardless of age, occupation, education or social status. Leaving the aggressor is not easy. Domestic violence leaves consequences not only on victims of domestic violence, but also on minor children.

Conclusion: Through our work, we have demonstrated that it is essential to address the issue of domestic violence against women and the possibilities of assistance from a social work perspective.

Keywords: Domestic violence, Victims of domestic violence, Actors of domestic violence, Assistance to victims of domestic violence.

Úvod

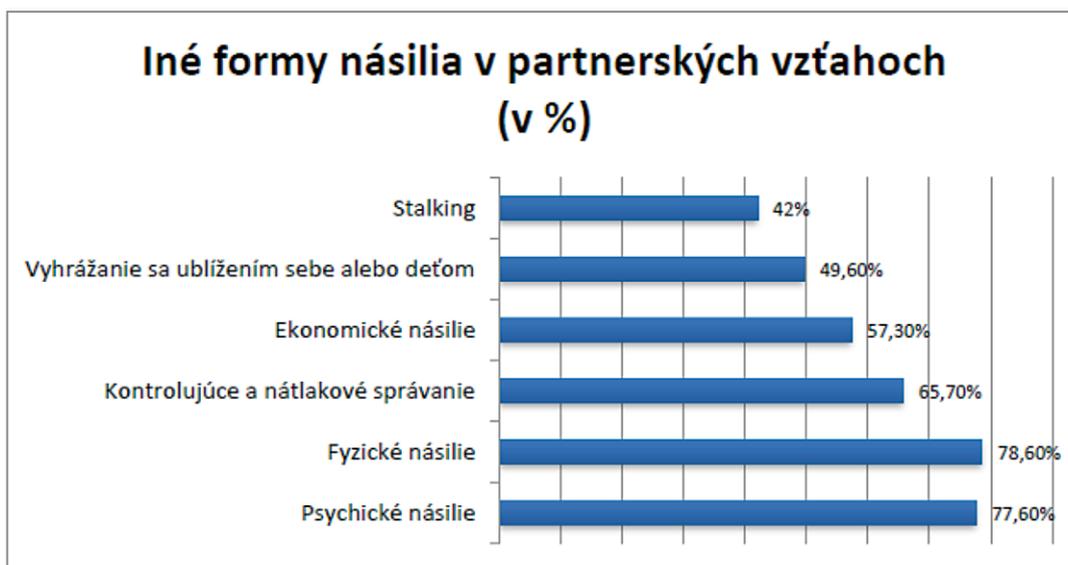
Rodina zvyčajne dáva ľuďom pocit bezpečia, lásky, istoty, ochrany, zázemia a domácej pohody. Musí to byť rodina, ktorá je stabilná, funkčná, v ktorej sa nevyskytujú sociálno-patologické javy a plní všetky svoje funkcie. Je všeobecne známe, že medzi členmi rodiny v mnohých prípadoch dochádza k násiliu v domácom prostredí, za zavretými dverami. Muži, ženy, ba aj deti majú v súčasnosti v spoločnosti rovnaké postavenie. Ale je tomu naozaj tak? Domáce násilie v rodinách chápeme nielen ako sociálno-patologický jav, ale aj ako deviáciu. Znamená nekonformné správanie, ktorého negatívne následky nepriaznivo vplyvajú nielen na jednotlivcov, rodiny, skupiny ale aj na celú spoločnosť. Pri domácom násilí dochádza k dlhodobému zneužitiu moci v rámci rodinných, manželských, partnerských vzťahov, a to aj po ich rozpade, či rozchode. Tento fenomén je skúmaný v poslednej dobe veľmi často, no napriek tomu sa vyskytuje nejednotnosť v terminológii a v prístupoch, ktoré sú potrebné k jeho identifikácii a následnému odstraňovaniu a pomoci.

Problematika domáceho násilia sa čoraz viac vyskytuje vo všetkých spoločenských vrstvách. Násilie sa týka každého z nás a je potrebné o tejto téme hovoriť. Môže ho zažiť každá žena zo strany svojho partnera, priateľa, či manžela, a to bez ohľadu na jej spoločenské, či ekonomické postavenie, vzdelanie, farbu pleti, ale aj vek, vzdelanie, etnický pôvod, či národnú príslušnosť.

Druhy domáceho násilia

Kozoň, et al. (2013) považujú každý čin, ktorým muž núti ženu vykonať, hoci ho vykonať nechce, alebo jej bráni robiť to, čo urobiť chce, pričom u nej vyvolá pocit strachu alebo neistoty, sa považuje za domáce násilie. Druhy domáceho násilia je možné rozdeliť nasledovne:

- *fyzické násilie* (mučenie, sácanie, rezanie, bitie, ťahanie za vlasy, spôsobovanie popálenín, topenie),
- *psychické násilie* (vyhrážanie sa, ponižovanie, kritizovanie, žiarlivosť, ničenie osobných vecí...),
- *sexuálne násilie* (znásilnenie, nútenie k prostitúcii, kontrola spodnej bielizne, nútenie k sledovaniu pornografie, orálnemu, či análnemu sexu...),
- *ekonomické násilie* (vydeľovanie peňazí, obmedzenie prístupu k peniazom, neplatenie výživného...),
- *sociálne násilie* (zamykanie v byte, obmedzenie kontaktu s inými ľuďmi, kontrola, sledovanie...) (Dianiška, et al., 2009).



Graf 1. Iné formy násilia v partnerských vzťahoch. Zdroj: Očenášová Z a Michalík P. Sexuálne násilie na ženách

Príčiny a následky domáceho násilia na ženách

Komparáciou autorov Králičková, et al. (2011) sme dospeli k zisteniu, že k domácejmu násiliu dochádza najčastejšie kvôli prílišnej intenzite emócií medzi členmi v rodine, u ktorých sa mieša láska s nenávisťou. Problémy, ktoré v domácnosti vzniknú sa stupňujú až vyvrcholia domácim násilím. Môžeme konštatovať, že príčiny domáceho násilia pochádzajú zo spoločnosti, v ktorej bolo násilie buď tolerované, alebo považované za tabu. V rodinách sa objavuje nielen nespokojnosť, ale aj patologické správanie partnera, nízka sebadôvera ženy a rozloženie síl medzi partnermi nie je vyrovnané (Marvánová-Vargová, et al., 2009). V mnohých prípadoch je príčinou domáceho násilia fakt, že domáce násilie sa dialo počas násilníkovho detstva, ktorého bol svedkom, alebo bol jeho samotnou obeťou a tieto negatívne vzorce správania si priniesol do vzťahu (Čirtková, 2007).

Čuhelová (2011) vidí príčiny domáceho násilia v tom, že v mnohých kultúrach mal muž právo biť manželku, ba dokonca aj deti. Toto „právo“ nebolo považované za násilie, dokonca malo podporu nielen v kultúrnych, ale aj v právnych normách. K príčinám vzniku domáceho násilia vo výraznej miere prispieva alkoholizmus, ktorý nie je primárnou príčinou domáceho násilia, avšak pôsobí ako jeho spúšťač (Čírtková, 2008). Pôvodne sa za príčinu vzniku domáceho násilia považovala aj nezamestnanosť a finančné problémy, ktoré s ňou súvisia. Dnes však vieme, že domáce násilie sa vyskytuje aj v rodinách, kde majú muži dobré spoločenské postavenie a sú ekonomicky veľmi dobre zabezpečení (Hardy, et al., 2011).

Obete domáceho násilia

Klimek, et al. (2020) poznamenávajú, že u žien, ktoré sa stali obeťami domáceho násilia sa vyskytujú javy, ktoré sa u obetí iných kriminálnych činov nevyskytujú, napr: citová väzba k tyranovi, zotrvanie vo vzťahu napriek násiliu, popieranie viny, či dokonca bránenie násilníka a odmietnutie poskytnutej pomoci. Poskytnutie sociálnej pomoci je síce nutné, no v mnohých prípadoch ju obeť vyhľadajú až vtedy, keď je ich život ohrozený. Syndróm týranej ženy (Battered Woman Syndrom) charakterizovala autorka Čírtková (2009) ako súbor špecifických charakteristík, ale aj dôsledkov zneužívania, ktoré spôsobujú zníženie schopnosti ženy, pričom s pribúdajúcim a opakujúcim sa násilím reaguje na prežívané násilie menej efektívne.

Aktéri domáceho násilia

Títo páchatelia násilia nielenže svoje obeť kontrolujú, žiarlia na svoje partnerky, obeť sa snažia izolovať nielen od priateľov, ale aj od blízkej rodiny. Výrazný vplyv na vznik násilia v rodine má aj alkohol, drogy, zlá ekonomická situácia a predstava muža o jeho postavení v rodine. Páchatelia si svoju vinu neprípúšťajú, zľahčujú celú situáciu a v mnohých prípadoch vinia partnerku (Gabura, Gabura ml., 2016). Mnoho páchatelov domáceho násilia bolo v detstve obeťou domáceho násilia, prípadne vyrastali v rodine, kde bolo násilie bežnou súčasťou rodinného života (Kutlík, Švehláková, 2016). Tieto osoby sú často psychicky choré a počas detstva a dospievania sa u nich z rozličných dôvodov nevybudoval k obeťami bežný partnerský alebo rodičovský vzťah. Vo svojich domácnostiach preferujú tvrdú výchovu nielen vo vzťahu k deťom, ale aj partnerkám. Domáce násilie sa vyznačuje veľkou latenciou (Pollák, Tittlová, 2018).

Pomoc obeťami násilia z pohľadu sociálnej práce

Sociálni pracovníci sú pri pomoci obeťami domáceho násilia veľmi nápomocní a nenahraditeľní. Oláh, et al. (2012) vysvetľujú, že sociálni pracovníci môžu pomôcť obeťami domáceho násilia v rámci rôznych inštitúcií. Na Slovensku pôsobia ako sociálni kurátori na úradoch práce, sociálnych vecí a rodiny, v rôznych krízových strediskách, zariadeniach sociálnych služieb, ale aj na mestských i obecných úradoch. Môžeme konštatovať, že veľkú rolu zohrávajú aj osoby pracujúce na internetovej a telefónnej linke dôvery. Podľa Záhoru (2018) je v zariadeniach SPODaSK obeťami domáceho násilia poskytnutá nielen krízová pomoc, ale aj rezidencionálna

starostlivosť. Je dôležité, aby sociálni pracovníci prešli školeniami, ktoré im dopomôžu včas rozpoznať symptómy a pomôcť obetiam. Ak obeť požiada o pomoc na ÚPSVaRe, sociálny pracovník poskytne obeti sociálne poradenstvo, nakontaktuje ju na iných odborníkov, poskytne kontakty na zariadenia, centrá a krízové strediská, ktoré sú nápomocné pri riešení domáceho násillia. Je veľmi dôležité obeti poskytnúť informáciu, že polícia môže vykázat násilníka z bytu na 48 hodín (Králová, 2011).

Vzhľadom k tomu, že uvedená problematika nám nie je ľahostajná a každým dňom sa s ňou stretávame v bežnom živote sme sa rozhodli uskutočniť výskum, kde si nižšie v texte rozoberieme podrobnejšie náš výskum a so samotným zistením a záverom.

Cieľ výskumu

Hlavným cieľom nášho výskumu bolo preskúmať problematiku domáceho násillia páchaného na ženách a možnosti pomoci z pohľadu sociálnej práce. Určili sme si parciálne ciele.

Parciálne ciele nášho výskumu boli:

- zistiť, akými formami domáceho násillia participanti trpeli,
- zistiť, čo bolo spúšťačom domáceho násillia,
- zistiť, za akých okolností odišli od agresora,
- zistiť, koho požiadali o pomoc,
- zistiť, akým spôsobom bola poskytnutá odborná pomoc.

Charakteristika súboru a metodika

Východiská spočívajú nielen v zbere údajov, ale aj v analýze teórie problematiky, ktorú skúmame a v následnom zbere dát z uskutočneného výskumu, ich porovnaní a vyhodnotení.

Hlavnou metódou nášho výskumu bola kvalitatívna metóda prostredníctvom individuálnych rozhovorov. Pred uskutočnením výskumu sme si dôkladne naštudovali dostupnú literatúru súvisiacu s riešením našej témy. Na základe teórie sme sa zorientovali v skúmanej problematike nielen u žien, ktoré sa stali obeťami domáceho násillia, ale aj sociálneho pracovníka, ktorý s týmito obeťami pracuje. Realizovali sme kvalitatívny výskum, v ktorom nám participanti poskytli odpovede na naše otázky. Za dôležité považujeme podotknúť, že výskumná vzorka bola vybraná dôkladne a nejedná sa o náhodný výber, dve participantky pochádzali z nízkej sociálnej vrstvy, ich ekonomická situácia bola na veľmi nízkej úrovni. Ďalšie dve participantky pochádzali zo strednej ekonomickej vrstvy, ich ekonomická situácia je štandardná. Dve participantky pochádzali z vysokej ekonomickej vrstvy, ich ekonomická situácia je nadštandardná. Otázky týkajúce sa danej problematiky sme si vopred pripravili a následne ich kládli participantom. Rozhovory boli zaznamenané prostredníctvom diktafónu so súhlasom participantiek. Nahrávky boli prepísané do písaného textu. Pred uskutočnením rozhovorov boli všetky participantky oboznámené s tým, že informácie, ktoré nám v rozhovoroch poskytnú, budú použité iba na účely výskumu a ich identita bude utajená.

Žien, ktoré sa zúčastnili na našom výskume sme sa opýtali nasledovných jedenást otázok:

1. Ako dlho ste boli obeťou domáceho násillia?
2. Akými formami sa vo vašej domácnosti prejavovalo násillie?
3. Ako ste sa správali počas páchania násillia na Vás?
4. Čo bolo spúšťačom násillného správania?
5. V akých časových intervaloch dochádzalo k domácemu násilliu?
6. Kedy a za akých okolností ste odišli od agresora?
7. Žiadali ste niekoho o pomoc (sociálneho pracovníka, políciu, rodinu, priateľov)?
8. Akým spôsobom Vám bola poskytnutá odborná pomoc?
9. Vedelo okolie, že vo vašej domácnosti dochádza k domácemu násilliu?
10. Máte nejaké trvalé následky?
11. Malo domáce násillie, ktorého ste sa stali obeťou dopad aj na vaše deti?

Ďalšie použité metódy:

- Analýza, ktorej cieľom je popísať skutkový stav situácie a legislatívne pozadie,
- Dedukcia – vyvodzujeme výrok, ktorý získavame logickým dôsledkom,
- Komparácia – medzi získanými odpoveďami stanovujeme zhodu a odlišnosť.

Analýza a kódovanie výsledkov:

Výskumný súbor tvorilo šesť žien, ktoré sa stali obeťami domáceho násillia. Hlavnými kritériami pre výber participantov bola ich ochota a súhlas zúčastniť sa na tomto rozhovore. Výskumu sa zúčastnilo šesť participantiek z košického kraja, avšak oslovených bolo štrnásť. Do výskumu boli vybraté prostredníctvom priameho oslovenia na základe ich skúseností s domácim násillím. Participantky boli vo veku od 27 do 49 rokov, pochádzali z rozličných spoločenských vrstiev, mali rozličné vzdelanie, každá z nich je matkou s maloletým dieťaťom, prípadne deťmi.

Prvou participantkou bola 29 ročná žena J. Ž., ktorá má 7 maloletých detí vo veku 15, 13, 12, 10, 8, 5 a 2-ročné dieťa, základné vzdelanie, momentálne pracuje ako upratovačka v hoteli, s agresorom nežije 16 mesiacov, žije v Košiciach, má nového partnera, s ktorým čaká dieťa.

Druhou participantkou bola 37 ročná žena M. M, ktorá má 2 maloleté deti vo veku 7 a 5 rokov, vysokoškolsky vzdelaná, nepracuje, býva v Košiciach. S agresorom žije v jednej domácnosti dodnes. Tretia participantka bola 27 ročná žena A. S., stredoškolsky vzdelaná, pracuje ako sekretárka, má 1 maloleté dieťa vo veku 9, býva v Košickom kraji, s agresorom nežije 6 rokov, nemá žiadneho partnera. Štvrtou participantkou bola 49 ročná žena R. H, ktorá bola matkou 2 detí, v jedno z nich bolo pred siedmimi rokmi osvojené, má ukončené stredoškolské vzdelanie – výučný list, privyrábala si predajom Nota Bene, t. č. si našla prácu ako pomocná sila vo výrobe, s agresorom nežije od augusta 2020, býva v košickom kraji, nemá nového partnera. Od agresora odišla až po vyňatí maloletého z rodiny, hoci pred jeho umiestnením jej bolo vybavené ubytovanie v krízovom centre aj s maloletým. Keďže odmietla agresora opustiť, maloletý bol opakovane agresorom napadnutý, neplnil si povinnú školskú

dochádzku, bol maloletý na základe Uznesenia o neodkladnom opatrení zverený do dočasnej starostlivosti centra pre deti a rodiny. Po umiestnení maloletého do centra matka opustila agresora. Toho času bolo maloletému Miroslavovi Rozsudkom uložené výchovné opatrenie. Ak uložené výchovné opatrenie splní svoj účel, maloletý bude opäť zverený do starostlivosti matky. Piatou participantkou bola 40 ročná žena K. D., žije s dvomi maloletými deťmi vo veku 17 a 15 rokov, má úplné stredoškolské vzdelanie, toho času externe študuje na vysokej škole, pracuje v záložní a kvetinárstve, býva v Košiciach, s agresorom nežije od júla 2015, má nového partnera. Šiesta participantka pôvodne odmietla účasť, avšak napokon nas oslovila, že si to rozmyslela. Dôvod, pre ktorý sa rozhodla predsa len zúčastniť bol ten, aby aj iným ženám ukázala, že je lepšie žiť na nižšej sociálnej úrovni, ako v bohatstve s tyranom. Participantka Ľ. P. má 45 rokov, 3 maloleté deti vo veku 16, 14 a 7 rokov, počas rozvodového konania agresor zomrel. Pracuje ako manažérka, má vysokoškolské vzdelanie, partnera nemá.

Vďaka rozdielnym spoločenským vrstvám sme mohli porovnať, ako vnímajú problematiku domáceho násillia ženy z rozličných spoločenských vrstiev a aké sú možnosti pomoci z pohľadu sociálnej práce týmto participantkám. Prostredníctvom rozhovorov sme získali šesť rôznych pohľadov na domáce násillie.

Tabuľka 1. Kódovanie otázky č. 1.

Participantka	Odpovede participantiek na otázku č 1: Ako dlho ste boli obeťou domáceho násillia?	
1.	<i>„Jak še nám perše dzecko narodzelo, a ona ma petnasc roky, ta das petnasc roky.“</i>	Participantka č. 1 bola obeťou domáceho násillia 15 rokov.
2.	<i>„6 rokov, začalo to, keď sme sa sem prisťahovali, u nás na dedine by si to nemohol dovoliť, tam všetci o každom všetko vedia.“</i>	Participantka č. 2 bola obeťou domáceho násillia 6 rokov.
3.	<i>„Vieš čo, začal s tým, keď som čakala Nellku, čiže v mojich sedemnástich a skončilo to, keď som ušla a onedlho na to ho zavreli. Vtedy som mala dvadsaťpäť.“</i>	Participantka č. 3 bola obeťou domáceho násillia 8 rokov
4.	<i>„To kedz ste nám vraceli Mirka z domova v 2017 ta prestal chodzic do roboty a začal pic, prepil i maringotku a nebuli peňeži, ta ja chodzela Nota Bene predávac a nechcela som mu dac peňeži, ta me bil, cigaretle na mne palel. A jak sce mi Mirka zas zobrali v 2020, ta som odišla byvac do Sokolan.“</i>	Participantka č. 4 bola obeťou domáceho násillia 3 roky.
5.	<i>„také 3 roky pred rozvodom, kedy som si povedala dost a chcem mať slovo, čo sa týka domácich financií. Viem, že to bolo už dávno predtým, ale nevedela som to tak pomenovať. Ako cítila som, že to tak neni v poriadku, ale predtým som s tým nevedela nič urobiť.“</i>	Participantka č. 5 bola obeťou domáceho násillia dlhšie ako 3 roky, avšak nie je možné presne určiť, ako dlho bola obeťou.
6.	<i>„Keď som otehotnela a oznámila mu to, úplne sa zbláznil, trvalo to 4 roky.“</i>	Participantka č. 6 bola obeťou domáceho násillia 4 roky.

Participantky boli obeťami domáceho násillia od 3 do 15 rokov. Je možné skonštatovať, že obeť domáceho násillia boli domácemu násilliu vystavené dlhodobo.

Tabuľka 2. Kódovanie otázky č. 2.

Participantka	Odpovede participantiek na otázku: Akými formami sa vo vašej domácnosti prejavovalo násilie?	
1.	<i>Pani sociálka, ta mne mal môj muž rád, ale keď sebe vypil, zlý bol na mne. Keď nebolo tak, jak on scel, vždy me dobil. Bitky mi vytrimala, bo ja už bula na bitku zvyknutá, ale ta keď mi ženy hutoreli, s ktorú ľubňu ho kde zaš vidzeli, barz som plakala. Bo potom keď domov prišol, ta sme še furt povadzili a strašne me dobil. Jak psa. Raz mi ruku zlamal, dvaraz nos.</i>	Participantka č. 2 bola obeťou fyzického násilia.
2.	<i>Neuvedomila som si, že nemám prístup k peniazom, iba ak mi dá. Nechcel, aby som sa stretávala s priateľmi, neskôr mu vadili aj priateľky, nakoniec aj členovia rodiny. Neskôr mi začal vykrikovať, že bez neho by som bola iba obyčajná nula a žila niekde v jednoizbáku, že vďaka nemu som niekto, nech sa pozriem na to, z akých biednych pomerov pochádzam. Ponižovanie bolo stále častejšie.</i>	Participantka č. 2 bola obeťou ekonomického, sociálneho a psychického násilia.
3.	<i>„Zo začiatku ma týral len psychicky. Potom zrazu prišla prvá facka, bil ma, podvádza, o vynútenom sexe ti asi vravieť nemusím, rodičák a prídavky boli na jeho účte, čiže ani peniaze mi nedával, deptal ma tiež. Raz, keď prehral v automate všetko, čo sme mali, požičal si 100 € od nejakého kamaráta a nemal mu ich ako vrátiť, tak mu navrhol, že si to u neho ja sexom odpracujem. Našťastie ten jeho známy mal rozum a dal mi pokoj, keď videl, ako som revala, vrieskala. A keďže sa sex nekonal a kamarát pýtal stovku naspäť, zbil ma tou hrubou hadicou z práčky, modriny som mala asi po celom tele. Ešte sa mi vyhrážal, že ma vyhodí na ulicu a tým pádom mi vezme malú.“</i>	Participantka č. 3 bola obeťou fyzického, ekonomického, psychického, a sexuálneho násilia
4.	<i>“On me bil, z domu vyrucoval, vrešcel po mne jak besný, že me zabije. I ku sexu me nucel, zamykal dvere, ja zo sekeru zozrubala, bo on še mi tak zhnusil. A i peneži mi kradol“</i>	Participantka č. 4 bola obeťou fyzického, psychického, ekonomického a sexuálneho násilia.
5.	<i>U nás to bolo tým, že on mi nedával peniaze, musela som si ich drankat' od neho, pýtať a dokladovať všetko, čo kupujem a keď som povedala dost, dost, že aj ja chcem rozhodovať, čo si z mojej výplaty kúpim, ne z jeho, z mojej, no tak začalo byť také, že som nič nevedela spraviť, lebo nevyplatil ani byt, ani na jedlo nedal, nič proste, sa mi chodil vysmievať do xichtu, že málo zarábam, že on si žije ako gróf, som už ani na kávu s kamoškami nechodila, lebo nebolo za čo. Že bez neho nie som nikto, na ulici skončím.</i>	Participantka č. 5 bola obeťou ekonomického a psychického násilia.
6.	<i>Nútil ma ísť na potrat, keď som odmietla, začal ma biť, pretože chcel, aby som potratila. Keď sa Erik narodil, bolo to ešte horšie. Nedal mi ani cent, musela som zabezpečiť všetko deťom z materskej a rodičovského príspevku. Zrušil mi prístup k jeho účtu. Predtým som si to neuvedomila, ale všetok majetok bol napísaný na neho.“</i>	Participantka č. 6 bola obeťou sexuálneho a ekonomického násilia.

Zistili sme, že domáce násilie páchané na ženách sa vyskytuje vo všetkých spoločenských vrstvách, nezávisí, či pochádza obeť o sociálne znevýhodneného prostredia, či je materiálne zabezpečená. Preukázali sme, že sa domáce násilie vyskytuje aj u osôb, ktoré majú iba základné vzdelanie, ale aj u stredoškolsky, ba aj vysokoškolsky vzdelaných osôb.

Vyskytuje sa u žien, ktoré sú ekonomicky závislé od partnera, ale aj u žien, ktoré prácu majú. Participantky boli obeťami fyzického, psychického, ekonomického, sociálneho a sexuálneho násilia. Vo väčšine prípadov sa jednalo o kombináciu viacerých druhov domáceho násilia.

Tabuľka 3. Kódovanie otázky č. 3.

Participantka	Odpovede participantiek na otázku: Ako ste sa správali počas páchania násilia na Vás?	
1.	<i>„Ta jak som še mala chovac, vreščela som i ja i on. Dakedy mu i plaskla nazad, kedz bol barz opitý, ta ho lehnuć dala, žeby cirkus nerobel. Ale kedz nemal vypito, ta som iba čekala, kedy skončí, bo vtedy bul barz zlý, keď som vystrajala.“</i>	Participantka č. 1 sa počas páchania násilia na nej správala rôzne, kričala, bránila sa, avšak keď bol násilník triezvy, iba čakala, kedy skončí
2.	<i>„Nijak, ho nechám nech si porozpráva, nechcem hádky, nalejem mu whisky, on sa ukludní a je pokoj. Kedysi som sa s ním hádala, ale už som prišla na to, že to nemá význam.“</i>	Participantka č. 2 sa v minulosti hádala s násilníkom, teraz ho nechá, aby sa upokojil.
3.	<i>„Snažila som sa mu vyhýbať, neurobiť nič, čo by ho mohlo rozzúriť, bála som sa aj ozvať. Tak som sa naučila tých pár faciek vydržať, on sa upokojil a dal pokoj.“</i>	Participantka č. 3 sa snažila násilníkovi vyhnúť, strpela fyzické násilie.
4.	<i>Ja furt kričela, žeby mi dakto na pomoc prišol. kedz som še branila, ta me bil ešči vecej, Ta čekala, kedy skončí.“</i>	Participantka č. 4 kričala o pomoc, fyzický útok strpela.
5.	<i>„Čušala som, áno, som proste čušala a bola som ticho a snažila som sa situáciu zachrániť, zachrániť, hej, stále zachrániť situáciu, vždy a za všetkých okolností.“</i>	Participantka č. 5. sa snažila zachrániť situáciu, násilníkovi neodporovala.
6.	<i>„Plakala, vrieskala, prosila ho, aby sa spamätal, neskôr som úplne rezignovala.“</i>	Participantka č. 6 prosila agresora, kričala, plakala.

Každá z participantiek sa počas páchania násilia správala inak, plakali, kričali, bránili sa, pričom všetky sa v danej situácii zachovali najlepšie, ako sa v danej situácii zachovať vedeli. Niektoré volali o pomoc, iné zas agresorovi neodporovali a čakali, kedy sa agresor upokojí.

Tabuľka 4. Kódovanie otázky č. 4.

Participantka	Odpovede participantiek na otázku: Čo bolo spúšťačom násilného správania?	
1.	<i>„to toten porazený alkohol a fet, bo on kedz pil a išol toulén kupic, ta ja furt znala, že doma budze konec šveta.“</i>	Spúšťačom bol alkohol a toluén.
2.	<i>„úplne stačilo, že mu nevyšiel nejaký kšeft, alebo sťažnosť od klienta, či negatívna recenzia o hoteli na Facebooku, už bol nas*atý a vybíjal si nervy na mne. Aj keď mu niektorá z jeho herečiek nedala, Alebo keď sa auto pokazilo, či pokutu dostal a nezabral jeho šarm A keď mu vzali vodičák na pol roka, no vtedy bol cirkus vždy, keď si zmyslel, že chce niekam ísť a nebola som oblečená „alebo nebol umytý riad, či sa mu nepáčila večera. Proste on si dôvod nájde</i>	Nie je možné presne definovať, čo bolo spúšťačom agresívneho správania u agresora č. 2, nakoľko si vždy našiel iný dôvod.
3.	<i>Asi automaty, keď prehral celú výplatu, aj môj rodičák, vtedy som takmer nedýchala, aby som ho čímisi náhodou nevyprovokovala, ale to ani nebolo treba. Vtedy bolo zlé fakt všetko, keď Nellynka plakala, keď pes štekal, keď bola málo osolená polievka. Proste našiel si úplnú sprostosť, len aby mal zámienku a mohol si zlosť vybiť na mne.</i>	Spúšťačom bola prehra financií v automatoch.
4.	<i>„Paľenka. A kedy sebe vypil, ta cirkusy robel na calu maringotku, to šicke znali, že zas bitka u nás budze. A dakedy len tak, z ničeho nič.“</i>	U násilníka č. 4 bol alkohol spúšťačom agresívneho správania.
5.	<i>Asi nedostatok financií, ale aj kým som robila toto, čo sa odo mňa očakávalo, tak bolo všetko v pohode, ale keď som sa ozvala, že som chcela dačo iné, tak vtedy bolo zle, čiže spúšťačom bolo aj to, že v podstate nesúhlasím s ním a mám vlastný názor.</i>	Spúšťačom agresívneho správania boli financie a vlastný názor
6.	<i>Neplánovane som otehotnela.</i>	Spúšťačom bolo neplánované tehotenstvo.

Spúšťačov agresívneho správania bolo viacero: alkohol, drogy, prehra peňazí v automatoch, neplánované tehotenstvo, nedostatok financií, prejavenie vlastného názoru, ale aj negatívne skutočnosti, ktoré vyvolali u agresora hnev – napr. neumytý riad, zlá recenzia.

Tabuľka 5. Kódovanie otázky č. 5.

Participantka	Odpovede participantiek na otázku: V akých časových intervaloch dochádzalo k domácejmu násiliu?	
1.	<i>„Ta každý mešac, kolo osomnactoho, kedz sme dostali peňeži, znace, havku v hmotnej nudzi, pridavky.“</i>	Raz mesačne, resp. ak sa oslavovalo narodenie dieťaťa.
2.	<i>Nedá sa to povedať tak presne, ale raz, niekedy dvakrát týždenne, keď sme na dovolenke, tak je kludný počas celého pobytu, ale prideme domov a už prúdi, aj pár dní, kým sa zas neukľudní.</i>	Raz – dvakrát týždenne, počas dovolenky sa agresor ovláda, po príchode domov si to kompenzuje.
3.	<i>„Zo začiatku to vôbec nebol pravidelne, neskôr sa to stupňovalo a došlo to do štádia, že to bolo denne.“</i>	Interval sa skracoval a stupňoval.
4.	<i>„Pani kurátorka, to každý druhý deň.“</i>	Každý druhý deň.
5.	<i>Ťažko mi to je určiť, lebo to nemalo nejaký interval, niekedy to bolo raz za mesiac, niekedy dvakrát za mesiac, pred rozvodom skoro každý deň, čiže neviem to tak presne povedať, ale čím sme sa viac blížili k rozvodu, tým častejšie to bolo.“</i>	Interval sa skracoval.

6.	<i>Odo dňa, keď som oznámila, že čakáme dieťa až do dňa, kedy zomrel. Nebol jeden jediný deň, kedy nám nerobil zo života peklo.“</i>	Násilie bolo na dennom poriadku.
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U každého z agresorov sa vyskytoval iný interval, agresor č. 1 bol agresívny vtedy, keď dostal dávku v hmotnej núdzi, prípadne bol pod vplyvom alkoholu z dôvodu, že sa narodilo dieťa kamarátovi a zapíjal ho, agresor č. 2 sa vie ovládať, počas pobytu mimo domu k páchaniu násilia nedochádza, následne si kompenzuje to, že sa musel ovládať. U agresora č. 3 sa interval skracoval a stupňoval, až k násiliu dochádzalo denne, u agresora č. 4 dochádzalo k páchaniu násilia každý druhý deň, u agresora č. 5 sa interval skracoval, zo začiatku raz mesačne, postupne až denne, u agresora č. 6 dochádzalo k násiliu denne.

Tabuľka 6. Kódovanie otázky č. 6.

Participantka	Odpovede participantiek na otázku: Kedy a za akých okolností ste odišli od agresora?	
1.	<i>„No vtedy, keď mi vaši dzeci pobrali. Bo me bil, ja i v nemocnici bula, cirkusy u nás v noci, dzeci to školy nechodzeli a pán sociálnik povedzel, že kec dzeci do školy nebudú chodzic, nebudze doma navareno a choré budú, ne tota korona, ale daco že doktorka podnet dala, či ký gutu, ja temu nerozumím, ta ich odoberú. Triraz tu bol a povedzel, potom ich pobrali a do dzeckých domovov dali. Ja vtedy bula v nemocnici, bo jak me udrel, ta me mušeli operovac, ja ušla domu, ale dzeci už nebuli doma.“</i>	Participantka č. 1 opustila agresora po vyňatí detí z rodiny pred šestnástimi mesiacmi.
2.	<i>„Neodišla som od neho. Mám s ním 2 deti, bojím sa, že ak by som od neho odišla, postará sa o to, aby som ich už nikdy nevidela. Nepracujem 11 rokov, som na ňom finančne závislá.“</i>	Participantka č. 2 agresora neopustila z dôvodu finančnej závislosti a strachu o odobratie detí.
3.	<i>„Keď mala malá 3 roky a začala chodiť do škôlky, muž ma nepustil do práce. Vraj by som sa tam len s chlapmi váľala. Takže som bola celé dni doma sama. Učiteľke v škôlke to bolo asi divné, pár krát sa ma opýtala, prečo nepracujem. Stále som sa len vyhovárala, že si nič poriadne neviem nájsť, potom že robím z domu a tak... Ale aj Nellka chodila taká mĺkva do škôlky a raz mi povedala, že kreslí také divné obrázky. Všetko je čierne a keď kreslí maminku, tak ona plače. Ja som to skrátka nevydržala a všetko som tej učiteľke povedala. Na chodbe medzi skrinkami som plakala ako malé dieťa a rozpovedala som jej, ako ma muž mláti každý večer, ako sa mi vyhráža, všetko som jej povedala. Sľúbila mi pomoc a svoj sľub naozaj dodržala. Mala po byt na prenájom a jej manžel potreboval do firmy sekretárku. Poslala ma na sociálku a keď bol v práci, zbalila som sa, odviezla ma do bytu a začala som chodiť do práce.“</i>	Participantka odišla od agresora pred šiestimi rokmi., keď jej bola poskytnutá pomoc vo forme bývania, práce a sociálneho poradenstva.
4.	<i>Ta vtedy, kedz sce mi Mirka zobrali a tu jak totu konferenciu, dobre hutorím? Tak še to volá, ne? No ta vtedy jak mi pani, čo Mirka má v detskom domove povedzela, že tam v Sokolanoch by som v zariadení mohla byť, že vy dve sce spolu vydumali, že Mirka by z Barce dali do Sokolanoch, on by bol v deckom domove na jednom poschodí a ja v krízaku na inom, ale ta by sme boli še mohli vidzic každý deň.“</i>	Participantka č. 4 opustila agresora až po tom, keď bol maloletý umiestnený v centre pre deti a rodiny a bolo jej ponúknuté bývanie v zariadení núdzového bývania.

5.	<p>„Odišla som od neho po jedenástich rokoch manželstva, s tým, že mi pomohla moja rodina, priatelia a hlavne ty. Ty si mi otvorila oči, keď si mi povedala, že toto, čo sa u nás doma deje, nie je normálne. Pomohla mi sestra Jana s bývaním a teda s tým, že som mala vyriešené bývanie aj s dvomi deťmi. Hoci zo začiatku bola Jana proti rozvodu, vieš ako, čo povedia ľudia, ale raz prišiel domov a už od dverí spustil, nevedel, že Jana sedí u nás. Vtedy mu povedala, nech vypadne z jej bytu a viac sa sem nevracia. Vďaka priateľstvu som si našla lepšie platenú prácu, síce som sa obávala, aké to bude mať za šéfa kamaráta, ale je to Vďaka tejto robote som si dokázala zaplatiť bývanie sama.</p>	<p>„Odišla som od neho po jedenástich rokoch manželstva, s tým, že mi pomohla moja rodina, priatelia a hlavne ty. Ty si mi otvorila oči, keď si mi povedala, že toto, čo sa u nás doma deje, nie je normálne. Pomohla mi sestra Jana s bývaním a teda s tým, že som mala vyriešené bývanie aj s dvomi deťmi. Hoci zo začiatku bola Jana proti rozvodu, vieš ako, čo povedia ľudia, ale raz prišiel domov a už od dverí spustil, nevedel, že Jana sedí u nás. Vtedy mu povedala, nech vypadne z jej bytu a viac sa sem nevracia. Vďaka priateľstvu som si našla lepšie platenú prácu, síce som sa obávala, aké to bude mať za šéfa kamaráta, ale je to Vďaka tejto robote som si dokázala zaplatiť bývanie sama.</p>
6.	<p>Keď mal Erik 2,5 roka, omylom mu odliol notebook, hoci ho od narodenia ignoroval, vtedy ho začal biť, bránila som Erika, zbil aj mňa. Zavolala som políciu, kým bol preč, zavolala som kamarátke, či u nej môžem zostať pár dní, pobalila som všetky deti, ich veci, šperky a odišla. Eva mi ešte v ten deň napísala návrh na rozvod, ja som podala trestné oznámenie. Uvedomila som si, že sme mali naozaj veľa peňazí a ja zrazu nemám nič. Začínam od nuly s tromi deťmi. Erikovi som vybavila jasle. Nakoľko som aj predtým pracovala, veľmi rýchlo som si našla prácu, pracujem ako manažérka. Síce som si zo začiatku nemohla dovoliť kúpiť byt, šli sme do podnájmu,</p>	<p>Participantka č. 6 opustila agresora pred 4,5 rokmi po tom, keď agresor fyzicky napadol 2,5 ročného syna a následne ju. Našla si prácu, bývanie zabezpečila prostredníctvom podnájmu.</p>

Dve z participantiek opustili agresora až po tom, keď im boli odňaté deti z ich osobnej starostlivosti. Jedna z participantiek do dnešného dňa agresora neopustila, nakoľko si uvedomuje finančnú závislosť na agresorovi a bojí sa, že by maloleté deti boli zverené do starostlivosti otca. Ďalšie participantky opustili agresorov až keď boli schopné finančne zabezpečiť maloleté deti. Posledná participantky opustila agresora po tom, čo fyzicky napadol jej syna. Všetky participantky pri rozhodovaní brali ohľad na maloleté deti.

Tabuľka 7. Kódovanie otázky č. 7.

Participantka	Odpovede participantiek na otázku: Vedelo okolie, že vo vašej domácnosti dochádza k domácej násiliiu?	
1.	„Hej, znali.“	Okolie vedelo, že v domácnosti dochádza k domácej násiliiu
2.	Nie, my sme navonok dokonalá rodina na vysokej úrovni.“	Okolie nevie, že v domácnosti dochádza k domácej násiliiu.
3.	„Neviem, možno susedia niečo tušili, ale nik nič neriešil.“	Nie je možné zhodnotiť, či okolie vedelo, že v domácnosti dochádza k domácej násiliiu
4.	„Vedzeli susedia, i Slávka,	Okolie vedelo, že v domácnosti dochádza k domácej násiliiu
5.	„Zo začiatku to okolie nevedelo, keď som im začala rozprávať, že čo sa u nás deje, tak všetci boli prekvapení a nikto tomu ani nechcel veriť, len nakoniec videli, jak sa veci majú a začali mi veriť.“	Okolie spočiatku nevedelo, že v domácnosti dochádza k domácej násiliiu, dozvedelo sa to až vtedy, keď im to participantka sama povedala

6.	„Všetci si všimli, že sa zmenil, začal piť, že už nie sú žiadne priateľské grilovačky, oslavy, ale asi nevedeli, čo sa u nás deje.“	Okolie pravdepodobne nevedelo, že v domácnosti dochádza k domácejmu násiliu
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Je možné skonštatovať, že nie v každej domácnosti, v ktorej dochádzalo k páchaniu domáceho násillia, dochádzalo takým spôsobom, aby okolie vedelo, že k jeho spáchaniu dochádza. Pri psychickom násillí okolie nemalo vedomosť, že k jeho páchaniu dochádza.

Tabuľka 8. Kódovanie otázky č. 8.

Participantka	Odpovede participantiek na otázku: Máte nejaké trvalé následky?	
1.	„Tota ruka, čo mi mušeli operovac me bolí, kedz vonka žimno.“	Fyzické následky.
2.	„Asi áno, ale psychického charakteru.“	Psychické následky.
3.	„Fyzické nie, rany na duši budem mať už asi navždy.“	Psychické následky.
4.	„Ta zo začatku som bola stresovaná“	Psychické následky.
5.	„Tak ja sa domnievam, že nie.“	Nemá následky
6.	„Navštevujem psychiatra, vieš, on zomrel skôr, ako došlo k rozvodu, ale ja sa s tým neviem vyrovnat.“	Psychické následky.

Jedna z participantiek nemá následky po domácom násillí, jedna participantka má fyzické následky, ale až štyri participantky majú následky psychického charakteru.

Tabuľka 9. Kódovanie otázky č. 11.

Participantka	Odpovede participantiek na otázku: Malo domáce násillie, ktorého ste sa stali obeťou dopad aj na vaše deti?	
1.	„Ta hej, bo sce ich pobrali.“	Deti boli kvôli domácejmu násilliu vyňaté z biologickej rodiny a následne umiestnené v Centre pre deti a rodiny
2.	„Snažím sa, aby deti nič nevideli, ale Alex si už všima a minule bol strašne drzý, sme sa bavili, prečo sa tak ku mne správa a mi povedal, že aj ocko tak so mnou hovorí“	Starší syn preberá nevhodné vzory správania od svojho otca.
3.	„Našťastie nie, malá si z toho obdobia nič nepamätá.“	Nemalo dopad.
4.	„Hej, bo Mirko není so mnou a i Mirko še ho bojí, bo i jeho mlacil.“	Syn participantky bol kvôli následkom domáceho násillia vyňatý z biologickej rodiny a umiestnený v Centre pre deti a rodiny.
5.	„No mám 2 deti a ich sa násillie netýkalo, hm, on ku nim a nikdy nesprával, že ich bil, alebo niečo, čiže deti by som z toho vynechala.“	Nemalo dopad.
6.	Natali a Pečo chodia na terapie. On sa pri tom treťom tehotenstve tak zmenil, uzavrel, že deti z toho majú traumou	Deti majú traumou, chodia na terapie.

U dvoch participantiek nemalo páchanie domáceho násillia dopad na maloleté deti. U dvoch participantiek bol dopad domáceho násillia taký, že maloleté deti boli vyňaté z biologickej rodiny a následne umiestnené v centre pre deti a rodiny. U jednej z participantiek preberá starší syn nevhodné vzory správania od svojho otca a správa sa k nej nevhodným spôsobom. Deti poslednej z participantiek majú následky po domácom násillí na psychike, navštevujú psychoterapeuta.

Diskusia

Vykonaním rozhovorov s obeťami domáceho násillia sme spracovali a zanalyzovali výsledky výskumu. Na tomto kvalitatívnom výskume sa zúčastnilo šesť participantiek, ktoré boli obeťami domáceho násillia v trvaní od 3 do 15 rokov.

Čechová (2014) sa vo svojej práci zaoberala domácim násillím páchaným na ženách. Výskumu sa zúčastnilo päť participantiek, ktoré uviedli, že obeťami domáceho násillia boli v trvaní od 3 do 17 rokov. Na základe komparácie týchto zistení je možné skonštatovať, že obeť domáceho násillia sú domácemu násilliu vystavené dlhodobo. Interval, kedy dochádzalo k páchaniu domáceho násillia bol u každého z agresorov rôzny, ale postupne sa skracoval.

Participantky boli obeťami fyzického, psychického, sociálneho, ekonomického a sexuálneho násillia. Naše zistenia sú porovnateľné s výskumom, ktorý v roku 2008 realizovali Bodnárová, Filadelfiová a Holubová. Ich Reprezentatívny výskum a skúsenosti žien s násillím na ženách bol zrealizovaný prostredníctvom Inštitútu práce a rodiny v Bratislave. Zúčastnilo sa ho 827 žien vo veku 18 – 65 rokov. V tomto výskume sa im kládli otázky o skúsenostiach obeť s psychickým, sociálnym, ekonomickým, fyzickým a sexuálnym násillím.

Naše zistenia sa však nezhodujú s ich výsledkami, nakoľko v našom výskume najčastejšími následkami boli psychické následky, avšak v ich reprezentatívnom výskume malo najviac obeť fyzické následky. V našom výskume mala fyzické následky iba jedna participantka. V ich výskume mali všetky obeť nejaké následky, v našom výskume jedna z obeť uviedla, že po domácom násillí nemá žiadne následky.

Filadelfiová, Gerbery, Vittek v roku 2017 zrealizovali Reprezentatívny výskum domáceho násillia na Slovensku, ktorého sa zúčastnilo 1 108 žien vo veku 18 – 70 rokov. 8 % malo ukončené základné vzdelanie, 29 % malo stredoškolské vzdelanie bez maturity, 46 % úplné stredoškolské vzdelanie a 17 % vysokoškolské vzdelanie. V tomto výskume sa potvrdilo, tak, ako aj v našom výskume, že obeťami domáceho násillia sa môže stať žena so základným, stredoškolským, ale aj vysokoškolským vzdelaním. Z tohto výskumu zároveň vyplýva, že domáce násillie sa vyskytuje aj u osôb, ktorých ekonomická úroveň je na veľmi nízkej, strednej, ale aj u osôb, ktoré sú na ekonomicky vysokej úrovni a môžeme skonštatovať, že domáce násillie sa vyskytuje vo všetkých spoločenských vrstvách.

Ďalší z výskumov, ktorého výsledky je možné porovnať s našimi je výskum Agentúry Európskej únie pre základné práva z roku 2014. Výsledky výskumu preukázali súvis s nadmerným užívaním alkoholu a domácim násillím. Môžeme poukázať na fakt, že u troch participantiek

bol spúšťačom domáceho násillia alkohol, drogy, nedostatok financií, ale aj neplánované tehotenstvo. V jednom prípade nie je možné presne stanoviť, čo bolo spúšťačom agresívneho správania, nakoľko si agresor vždy našiel iný dôvod.

Očenášová (2020) vo svojom výskume uvádza, že väčšina obetí opustila agresora náhle a najčastejším dôvodom ich odchodu bolo fyzické násillie, pričom hlavný dôvod, prečo partnera neopustili bolo udržanie rodiny. V našom výskume dve z participantiek opustili agresora až po tom, keď im boli odňaté deti z ich osobnej starostlivosti. Jedna z participantiek do dnešného dňa agresora neopustila, pretože je na ňom finančne závislá a obáva sa, že by maloleté deti boli zverené do starostlivosti otca. Ďalšie participantky opustili agresora až keď boli schopné finančne zabezpečiť maloleté deti. Posledná participantka opustila agresora po tom, čo fyzicky napadol jej syna. Všetky participantky pri rozhodovaní brali ohľad na maloleté deti.

Hurbanová (2018) v kvantitatívnom overovaní skutočností zistila, že obetiam je poskytovaná pomoc zo strany polície, lekárov, rodiny, príbuzných, priateľov, ale aj sociálnych pracovníkov pracujúcich na úradoch práce, právnikov, ktorí sú zamestnancami organizácií na pomoc obetiam domáceho násillia. Jej zistenie sa zhoduje s výsledkami nášho výskumu, podľa ktorého pomoc sociálneho pracovníka bola ponúknutá všetkým participantkám, avšak využilo ju päť zo šiestich. Ostatné druhy pomoci, ktoré boli poskytnuté, boli zo strany krízového strediska, polície a priateľov. Sociálni pracovníci vedia obeti zabezpečiť viacero foriem pomoci: či už vypísanie rôznych dokumentov, ktoré sú potrebné napr. k získaniu finančných príspevkov od štátu, prípadne nakontaktovanie na zariadenie núdzového bývania, poskytnutie sociálneho poradenstva, či odporúčanie k iným formám odbornej pomoci. Ďalšia z foriem pomoci zo strany sociálneho pracovníka je pri rozvode, nakoľko sociálny pracovník je ustanovený súdom za kolízneho opatrovníka maloletého dieťaťa pri zverení do starostlivosti. Aj táto forma pomoci bola participantkám poskytnutá. Najmenšia pomoc bola poskytnutá zo strany lekárov. Máme zato, že je nutné komunikovať a hľadať spoločné riešenia, ktoré uľahčia obetiam domáceho násillia agresora opustiť. Kým obeť nie je rozhodnutá agresora opustiť, žiadnu z ponúkaných foriem pomoci nevyužije. Je dôležité poznamenať, že polovica participantiek nepožiadala o pomoc, ak by im pomoc nebola ponúknutá, z vlastnej iniciatívy by o ňu nepožiadali.

V tomto výskume sa zároveň uvádza, že okolie až v 75 % vedelo, že k domácejmu násilliu dochádza, avšak nikto ho nenahlásil. V uskutočnenom výskume boli obeť najčastejšie vystavené fyzickému násilliu. Na základe našich zistení je možné skonštatovať, že nie v každej domácnosti, v ktorej dochádzalo k páchaniu domáceho násillia, dochádzalo takým spôsobom, aby okolie vedelo, že k jeho spáchaniu dochádza. Pri psychickom násillí okolie nemalo vedomosť, že k jeho páchaniu dochádza. Ak bola obeť vystavená fyzickému násilliu, v rodine dochádzalo k hádkam, prípadne kričala o pomoc, vtedy okolie vedelo, že k domácejmu násilliu dochádza.

Martinková, Slavětínsky, Vlach (2014) v ich výskume, ktorý sa realizoval v Českej Republike uvádzajú, že vplyv domáceho násillia má dopad aj na maloleté deti. Násillníci v mnohých

prípadoch prevezmú vzorce negatívneho správania a ich konanie považujú za normálne. Tento fakt sa nám potvrdil u participantky, ktorá agresora neopustila a jej maloletý syn sa k nej správa drzo, pretože toto správanie prevzal od svojho otca.

Pikálková, Podaná, Buriánek realizovali v roku 2015 výskum v Českej Republice, v ktorom sa zamerali na to, aké následky mali maloleté deti vyrastajúce v rodine s domácim násilím. V uvedenom výskume zistili, že mnohé z detí, ktoré boli svedkami domáceho násillia, aj keď neboli jeho obeťou majú psychické problémy. Naše zistenia sa zhodujú s ich výsledkami iba čiastočne, nakoľko iba deti jednej z participantiek navštevujú psychológa. Avšak predpokladáme, že aj u detí, ktoré boli kvôli následkom domáceho násillia vyňaté z biologických rodín, sa vyskytujú psychické problémy.

Záver

Táto problematika je veľmi vážna a aktuálna. Násillie sprevádza ľudstvo od samotného začiatku ľudskej existencie, pretože len ten silnejší mohol prežiť. V minulosti bola problematika domáceho násillia tabuizovaná a na verejnosti sa o nej nerozprávalo, všetko sa odohrávalo za zatvorenými dverami. Za posledných štyridsať rokov táto „súkromná“ záležitosť zmenila na celospoločenský problém. Za túto zmenu vďačíme najmä organizáciám, ktoré sa rozhodli pomôcť týraným ženám. Rodina je základnou bunkou spoločnosti, no napriek tomu môže nastať situácia, že prestane plniť jednu z jej základných funkcií a to ochrannú funkciu a miesto ochrany nastáva v rodine bolesť a utrpenie. Obetiam je potrebné zabezpečiť rôzne druhy odbornej pomoci.

Ako sa vo výskume ukázalo, problematika domáceho násillia sa vyskytuje vo všetkých spoločenských vrstvách. Participantky boli obeťami viacerých foriem domáceho násillia, najčastejšie to bolo psychické násillie a obeť potrebujú psychologickú pomoc. Zistili sme, že obeťou domáceho násillia sa môže stať ktokoľvek, bez ohľadu na vek, pohlavie, vzdelanie, či spoločenské postavenie. Nie každá participantka o pomoc požiadala sama, ale každej z nich bola zo strany sociálneho pracovníka poskytnutá pomoc. Opustiť agresora nie je jednoduché, dve z participantiek to dokázali až vtedy, keď im boli odobraté deti, nakoľko násillie, ku ktorému v ich domácnosti dochádzalo, malo dopad na maloleté deti, došlo k zanedbávaniu školskej dochádzky, na základe ktorej boli maloleté deti po opakovaných upozorneniach z rodiny odobraté. Participantky si uvedomili, že ak chcú maloleté deti späť do svojej starostlivosti, musia zabezpečiť maloletým deťom vhodné podmienky na bývanie a riadnu osobnú starostlivosť.

Nie každá participantka však dokáže agresora opustiť. Jedna z nich zatiaľ nenašla odvahu odísť. Strach, či pohodlný život ju zatiaľ držia pri agresorovi.

Ak sa nám niekto zdôverí, že je obeťou násillia, nemali by sme jeho slová brať na ľahkú váhu, pretože obeťou domáceho násillia sa môžeme stať my všetci. Ako z výskumu vyplýva, aj niektoré maloleté deti majú po domácom násillí následky, hoci neboli jeho obeťou a zabezpečenie odbornej pomoci je nevyhnutné.

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INTERDISCIPLINARITA SOCIÁLNEJ PRÁCE A INKLUZÍVNEHO VZDELÁVANIA V PODPORE DETÍ ZO SOCIÁLNE ZNEVÝHODNENÉHO PROSTREDIA V KONTEXTE DOPADOV PANDÉMIE COVID-19

INTERDISCIPLINARYNESS OF SOCIAL WORK AND INCLUSIVE EDUCATION IN SUPPORT OF CHILDREN FROM SOCIALLY DISADVANTAGED ENVIRONMENTS IN THE CONTEXT IMPACT OF THE COVID-19 PANDEMIC

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Abstrakt

Úvod: Vzdelávanie deklarovanou oblasťou záujmu politických elít. Mnoho krát ide o verbálnu podporu bez finančného ohodnotenie učiteliek, učiteľov, kvalitnej vybavenosti školských zariadení, podpovania neformálneho vzdelávania alebo budovania multidisciplinárnych tímov. Príchod informačných technológií do informačnej spoločnosti zachytil školstvo nepripravené. Nejedná sa len o počítačovú gramotnosť, ale aj potreby detí a mládeže v on-line svete. Cyberbullying sa stal fenoménom ktorý ťažkosti detí znásobil. Školstvo en bloc doposiaľ nečelilo výzvam, ako bola pandémie ochorenia Covid-19. Deti ktoré obývajú prostredia na periférii intravilánu obcí a miest sa tak stali najviac zraniteľnou a ohrozenou skupinou žiačok, žiakov. Kvalita vzdelávania v tzv. kontajnerových školách, ktoré sú priamo v osadách, je diskutovaná a problematická najmä z dôvodu priestorovej segregácie. Zaradovanie detí zo sociálne znevýhodneného prostredia do systému špeciálneho školstva je dôvodom konania zo strany európskych inštitúcií. Celosvetová pandémia by tak mohla byť posledným klincom do rakvy vzdelávania, ktoré môže vyústiť do „generácie v zabudnutí“ – generácia detí bez kvalitnej edukácie.

Cieľom príspevku: Cieľom príspevku je poukázať na oblasť vzdelávania detí zo sociálne znevýhodneného prostredia na základe spolupráce medzi sociálnou prácou a školským prostredím. Na dopady, izolácie a pandémie, ktoré zasiahli celý svet vrátane Slovenskej Republiky v najzraniteľnejších skupinách detí a mládeže.

Metódy a metodika: Pomocou kvantitatívneho výskumu v podobe dotazníkového šetrenia analyzujeme interdisciplinaritu sociálnych pracovníkov v školskom systéme ako aj pedagógov v podobe dopadov, pozitívnych aspektov ako aj prekážok vo vzdelávaní žiakov.

Výsledky: Výsledkom nášho skúmania je naplnenie cieľa príspevku na základe porovnania výskumu s teoretickými východiskami, ale aj odporúčania pre prax. V práci sa nachádzajú aj čiastkové ciele.

Záver: naše výsledky výskumu sú nami prezentovanom príspevku sú prezentované návrhy a odporúčania pre prax vzťahujúce sa prevencii, k jej riešeniu a k dôležitosti multidisciplinárnej spolupráce sociálnych pracovníkov v multidisciplinárnom tíme.

Kľúčové slová: Sociálna práca. Vzdelávanie. Žiaci zo sociálne znevýhodneného prostredia. COVID-19.

Abstract

Introduction: Education is a declared area of interest of political elites. Many times it is verbal support without financial evaluation of teachers, high-quality equipment of school facilities, support of informal education or building of multidisciplinary teams. The arrival of information technologies in the information society caught education unprepared. It is not only computer literacy, but also the needs of children and youth in the online world. Cyberbullying has become a phenomenon that has multiplied children's difficulties. En bloc education has not yet faced challenges such as the COVID-19 pandemic. Children who live in environments on the periphery of the inner city of villages and towns have thus become the most vulnerable and threatened group of pupils. The quality of education in the so-called container schools, which are located directly in settlements, is discussed and problematic mainly due to spatial segregation. The inclusion of children from socially disadvantaged backgrounds in the special education system is the reason for action by European institutions. The global pandemic could thus be the last nail in the coffin of education, which can result in a "forgotten generation" – a generation of children without quality education.

The aim of the contribution: The aim of the contribution is to highlight the field of education of children from socially disadvantaged backgrounds based on cooperation between social work and the school environment. On the effects, isolation and pandemics that have affected the whole world, including the Slovak Republic, in the most vulnerable groups of children and youth.

Methods and methodology: Using quantitative research in the form of a questionnaire survey, we analyze the interdisciplinarity of social workers in the school system as well as educators in the form of impacts, positive aspects as well as obstacles in the education of students.

Results: The result of our investigation is the fulfillment of the goal of the contribution based on the comparison of research with theoretical starting points, but also recommendations for practice. There are also sub-goals in the work.

Conclusion: our research results are presented in the paper we present proposals and recommendations for practice related to prevention, its solution and the importance of multidisciplinary cooperation of social workers in a multidisciplinary team.

Keywords: Social work. Education. Pupils from socially disadvantaged backgrounds. COVID-19.

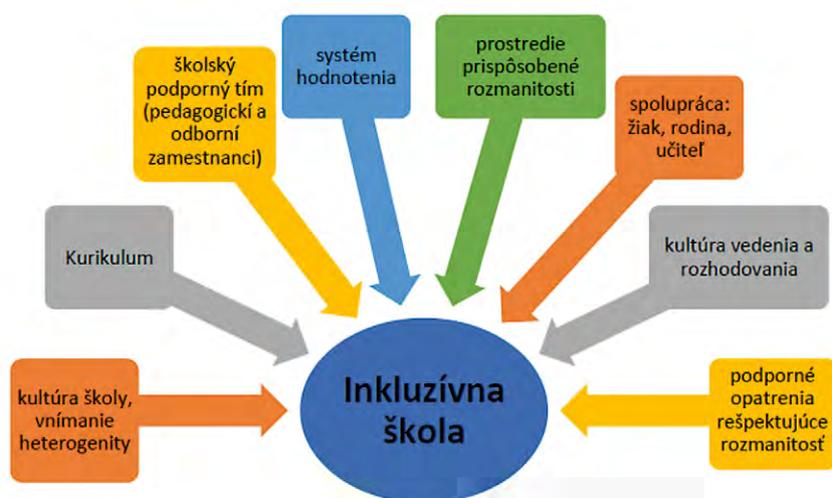
Úvod

Už dekády je vzdelávanie deklarovanou oblasťou záujmu politických elít. Často krát ide o verbálnu podporu bez finančného krytia platov učiteliek, učiteľov, kvalitnej vybavenosti školských zariadení, podpory neformálneho vzdelávania či budovania multidisciplinárnych tímov. Prechod z postmodernej do informačnej spoločnosti zachytil školstvo nepripravené. Nejde len o počítačovú gramotnosť vzdelávateľov, ale aj potreby detí v online svete. Psychické problémy súvisiace s neocenením vo virtuálnej realite či cyberbullying sa stali fenoménmi, ktoré ťažkosti detí znásobili. Navyše, školstvo en bloc nikdy nečelilo výzvam, ktoré pred neho postavila pandémia ochorenia COVID-19. Deti obývajúce rurálne prostredia na periférii intravilánu obcí a miest sa tak stali najviac zraniteľnou a ohrozenou skupinou žiačok, žiakov. Kvalita vzdelávania v tzv. kontajnerových školách, umiestnených priamo v osadách, je diskutovaná a problematická najmä z dôvodu priestorovej segregácie. Zaraďovanie detí zo sociálne znevýhodneného prostredia do systému špeciálneho školstva je dôvodom konania zo strany európskych inštitúcií. Celosvetová pandémia môže byť posledným klincom do rakvy vzdelávania, ktoré môže vyústiť do „zabudnutej generácie“ – generácia detí bez prirodzenej a kvalitnej edukácie.

Vzdelávanie žiakov zo sociálne znevýhodneného prostredia. Pandémia neúmerne postihuje zraniteľné a marginalizované komunity v celej krajine. Nevynímajúc vzdelávanie. Obmedzený prístup ku kvalitnému pracovnému vzdelávaniu a programom prispôsobeným jazykovým potrebám niektorých skupín rasových a etnických menšín môže obmedziť pracovné príležitosti a neskôr viesť aj k nestabilnej, nedostatočne platenej práci. Pre žiakov, žiačky zo zraniteľných skupín obyvateľstva bolo dištančné vzdelávanie počas pandémie obzvlášť náročné. Žiakom a žiačkam mohol chýbať prístup k spoľahlivému internetu, súkromie na prípravu do školy a pedagogický dohľad, ktorý poskytujú prezenčné hodiny v školách. Žiaci a žiačky, ktorí predtým dostávali bezplatné alebo cenovo zvýhodnené školské jedlo, nemuseli mať počas pandémie prístup k primeranej výžive, čo sťažuje sústredenie sa na výchovu a vzdelávania.

Zásah do práce rôznorodých profesií vrátane sociálnych pracovníkov

Vzdelávanie žiakov zo sociálne znevýhodneného prostredia



Graf 1. Determinanty vstupujúce do premenných vplyvajúcich na inkluzívne vzdelávanie (zdroj: Stratégia inkluzívneho vzdelávania, Ministerstvo školstva, vedy, výskumu a športu SR, 2021)

Mimo pandemického obdobia: segregácia žiakov zo sociálne znevýhodneného prostredia

Mimo pandemického obdobia: Prví sociálni pracovníci v školskom systéme na Slovensku začali pracovať v školskom roku 2006/2007. Do školského zákona č. 245/2008 sa možnosť pôsobenia sociálneho pedagóga priniesla o dva roky neskôr. Treba však zdôrazniť, že nejde o synonymum sociálneho pracovníka. Sociálny pedagóg je samostatný študijný program. Avšak v praxi môže sociálneho pedagóga vykonávať aj sociálnych pracovník s doplnením si pedagogického minima. V porovnaní napríklad s USA, kde školská sociálna práca má vyše storočnú tradíciu ide o relatívne mladý koncept profesie. sociálni pracovníci nie sú legislatívne ukotvení v školskom systéme

Počas pandemického obdobia: sociálni pracovníci pôsobili v rámci interdisciplinariny v školách, bez prístupu k dištančnému vzdelávaniu

Klientom sociálnej práce v školskom systéme je dieťa, žiak a jeho najbližšie sociálne okolie, ktorý si vyžaduje sociálnu starostlivosť, sociálnu podporu z dôvodu nachádzania sa v sociálno-ekonomickej núdzi, negatívnej sociálnej situácii a ťažkostí iného sociálneho aspektu. V kontexte školskej sociálnej práce hovoríme o sociálnej núdzi ako aj o nepriaznivej sociálnej situácii ak sa sociálne prostredie dieťaťa, žiaka nachádza v nepriaznivých podmienkach. Sociálne znevýhodneným prostredím fakticky znamená život v chudobe, bez uplatnenia na trhu práce, adekvátneho bývania a primeraného príjmu, zväčša v sociálnej izolácii či v skupine sociálne znevýhodnených ľudí pohybujúcich sa na okraji spoločnosti.

K introgénym, alebo aj vnútorným faktorov s vysporiadaním sa na život v sociálne znevýhodnenom prostredí patrí dedičnosť, predispozícia na závislosti, či ich psychické, alebo návykové závislosti, traumatizujúce skúsenosti, násilné sklony, nízka autokontrola, oslabená koncentrácia, znížené mentálne schopnosti, slabá sebaúcta, či oslabené sebahodnotenie, atď.

K exogénnym, respektíve vonkajším faktorom pôsobiacich a vplývajúcich na život v sociálne znevýhodnenom prostredí vplýva rodina, školské prostredie, ako aj sociálna komunita rovesníkov.

Pre ľudský organizmus je mimoriadne dôležité, aby všetky životné podmienky boli v žltej, neohrozujúcej úrovni pre život (Šilonová, Klein, 2015).

Ak hovoríme o rodine, výrazne vplývajú časové možnosti a málo času, ktorý vie rodina venovať starostlivosti o dieťa, oslabené emocionálne vzťahy, neidentifikované pravidlá správania v rodinnom prostredí, patologické a negatívne vzorné správanie, negatívne až patologické vzťahy, násilie, alkoholizmus, gambling, konfliktné vzťahy medzi rodičmi, užívanie psychotropných látok, sexuálne zneužívanie, bezdomovectvo a iné sociálne-patologické javy, ktoré môžu vplývať na schopnosť reziliencie voči sociálne znevýhodnenému prostrediu.

Cieľom nášho príspevku bolo zamerať sa na analýzu sociálnych determinantov vo vzdelávaní žiakov zo sociálne znevýhodneného prostredia počas pandemického ochorenia COVID-19 a vplyv sociálneho pracovníka v školskom systéme na inkluzívne výsledky žiakov. Naším cieľom je aj navrhnúť možné riešenia na zlepšenie ich kvality a čiastočne eliminovať negatívne aspekty v živote žiakov z vylúčených komunit z pohľadu sociálnej práce. Zo stanoveného hlavného cieľa rigorózneho štúdia vyplynuli **tri parciálne ciele**:

1. Zistiť názory pedagógov, či účasť sociálneho pracovníka bola ovplyvňujúcou proces vzdelávania počas dištančného vzdelávania spôsobeného pandemickým obdobím spôsobeným ochorením Covid-19.
2. Zistiť názory pedagógov, aké sú najčastejšie dôvody nedostatočnej školskej dochádzky rómskych žiakov a aké možnosti na intervenciu až elimináciu daného problému možno identifikovať v roly sociálneho pracovníka.
3. Zistiť názory pedagógov na spoluprácu sociálneho pracovníka, rómskych rodičov a školy, ktorú navštevujú žiaci zo sociálne znevýhodneného prostredia.

Metódy výskumného šetrenia:

Hlavná metóda: neštandardizovaný anonymný **dotazník**

Zbieranie spätnej väzby: **január – september 2022**

Respondenti z **350 základných škôl v Prešovskom, Košickom a Banskobystrickom kraji**

Spätaná väzba od: 278 pedagógov, 47 sociálnych pracovníkov a 114 rodičov detí z marginalizovaného rómskeho prostredia

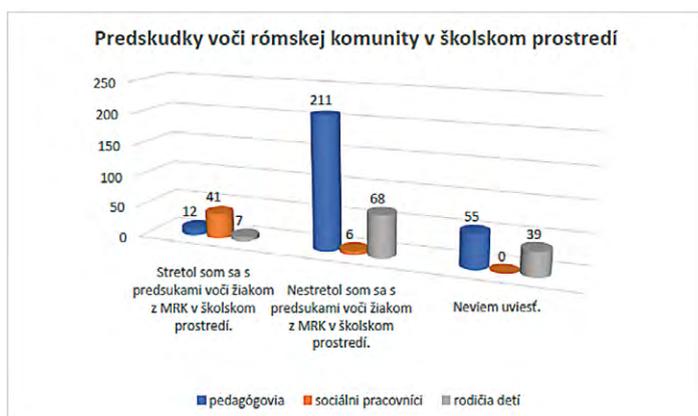


Graf 2. Komparácia spolupráce školy a sociálneho pracovníka pred dištančným vzdelávaním počas neho a po skončení dištančného vzdelávania spôsobeného pandémiou Covid-19. Zdroj autor príspevku

Komparácia spolupráce školy a sociálneho pracovníka pred dištančným vzdelávaním počas neho a po skončení dištančného vzdelávania spôsobeného pandémiou COVID-19

Spolupráca školy so sociálnym pracovníkom vzrástla počas dištančného vzdelávania v rámci pravidelnej spolupráce o 92 %. Zatiaľ čo pred dištančným vzdelávaním bola spolupráca so sociálnymi pracovníkmi najčastejšie indikovaná podľa potreby, a to konkrétne, až u 72 % respondentov, a žiadna spolupráca u 24 % škôl, tento trend sa počas dištančného vzdelávania otočil. Počas zavretých škôl a prenesenie vzdelávania do dištančnej formy, až 63 % škôl spolupracovalo so sociálnymi pracovníkmi pravidelne. Podľa potreby s nimi spolupracovalo 30 % škôl a vôbec so sociálnymi pedagógmi nespolupracovalo 7 % pedagógov. Spolupráca po skončení pandemického obdobia spôsobeného ochorením Covid-19 priniesla zvýšenie do pravidelnej spolupráce sociálnych pracovník a škôl. Pravidelnú spoluprácu v súčasnosti má nastavených 47 % pedagógov. Podľa potreby spolupracuje so sociálnymi pracovníkmi 42 % škôl a pedagógov v nich a vôbec so sociálnymi pracovníkmi nespolupracuje 11 % pedagógov žiakov pochádzajúcich z marginalizovaných rómskych komunití.

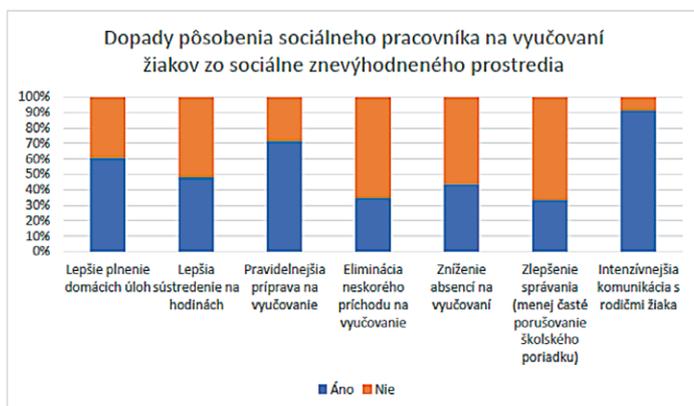
Vplyv sociálneho pracovníka na proces vzdelávania žiakov zo sociálne znevýhodneného prostredia počas dištančného vzdelávania spôsobeného pandemickým obdobím spôsobeným ochorením Covid-19.



Graf 3. Zdroj: Autor príspevku

Prítomnosť sociálneho pracovníka na vzdelávaní žiakov zo sociálne znevýhodneného prostredia vníma veľmi pozitívne až pozitívne takmer 99 % pedagógov a rodičov detí zo sociálne znevýhodneného prostredia.

Najvýraznejšie dopady pôsobenia sociálneho pracovníka u žiakov sú indikované nasledovne.



Graf 4. Najvýraznejšie dopady pôsobenia sociálneho pracovníka u žiakov sú indikované nasledovne.

Zdroj: Autor príspevku

Z hľadiska určenia dopadov na vzdelávanie žiakov zo sociálne znevýhodneného prostredia, možno identifikovať fakt, že najvýraznejšie bol pozitívny dopad zo strany pedagógov vnímaní v intenzívnejšej spolupráci s rodinou žiakov v takmer 90 % respondentov. Druhým najvýraznejším prínosom bola pravidelnejšia príprava na vyučovanie, ktoré u žiakov z marginalizovaného rómskeho prostredia indikovalo takmer 70 % pedagógov. Tretie v poradí bolo svedomitejšie plnenie domácich úloh v takmer 60 % žiakov, nasledovalo lepšie sústredenie na hodinách u necelých 50 % žiakov, zníženie absencií na vyučovaní u viac ako 40 % žiakov, eliminácia neskorého príchodu na vyučovanie u 35 % žiakov a zlepšenie celkového správania u niečo cez 30 % žiakov. Komplexne možno vytvoriť záver, že vplyv sociálneho pracovníka na výchovno-vzdelávacie aspekty žiakov pochádzajúcich z marginalizovaných rómskych komunit sú z pohľadu pedagógov hmatateľné a prínosné.

Limity príspevku

V súčasnosti existujú limity toho, čo môžeme študovať vedeckými metódami. Aby sme správne zmerali rozsah našej štúdie, musíme identifikovať jej hranice. Keďže výskumné vzorky nie vždy predstavujú zamýšľanú demografickú skupinu, nemožno projektovať závery na celú populáciu a skôr brať výsledky ako výsek času, priestoru a danej vzorky respondentov. Sme presvedčení, že výsledky dotazníka analyzované v našej práci by nemali byť pilotnými údajmi a majú potenciál ďalšej a široko spektrálnejšej vedeckej práce.

Najdôležitejším záverom výskumnej časti je fakt, že takmer všetci učitelia a rodičia žiakov zo sociálne znevýhodneného prostredia tvrdí, že prítomnosť sociálneho pracovníka pri vzdelávaní má pre ich dieťa pozitívnu skúsenosť. V daných prípadoch hovoríme o segregácii,

ktorá je spôsobená nekorektným diagnostickým procesom zo strany poradenských pracovníkov (Anzenbacher, 1992; Barát, 2000).

Z pohľadu vzdelávania je zrejmé, že rodiny žiakov, ktorí sú sociálne znevýhodnení, majú významný vplyv na vzdelávací systém a dosiahnuté výsledky ich detí. Sociálny pracovník má citeľný vplyv na úspešnosť vzdelávania žiakov z marginalizovaných rómskych komunít. Celkovo prítomnosť sociálneho pracovníka vplývala na všetky aspekty vzdelávania, od edukačných, cez socializačné až po inkluzívne. Rovnako sa spolupráca medzi pedagogickou a sociálnou komunitou odborníkov prehĺbila, upevnila a zautomatizovala.

Návrh riešení na základe našich zistení

Legislatívne návrhy riešení:

- Doplniť možnosť sociálneho pracovníka medzi kategórie pedagogických a odborných zamestnancov do Zákona č. 138/2019 Z. z. o pedagogických zamestnancoch a odborných zamestnancoch a o zmene a doplnení niektorých zákonov,
- Doplniť možnosť pôsobenia sociálneho pracovníka v rámci inkluzívnych tímov na školách, v školských zariadeniach a poradenských centrách poradenstva a prevencie, v školách na všetkých stupňoch vzdelávania prostredníctvom Zákona č. 245/2008 Z. z. o výchove a vzdelávaní,
- Vymedzenie profilu pôsobnosti a kompetencií prostredníctvom štandardov profesie, ktoré sa prijímajú rozhodnutím ministra školstva, vedy, zákonu a športu SR
- Zaviesť zákaz segregácie do školského zákona č. 245/2008 Z. z.,
- Zaviesť školy s vysokým zastúpením detí a žiakov z marginalizovaných rómskych komunít medzi národnostné školy s rovnakými možnosťami, právomocami a financovaním ako iné národnostné školy na území Slovenskej Republiky prostredníctvom už uvedeného školského zákona ako aj následne zákona o financovaní škôl č. 597/2008 Z. z.

Odporúčanie na úrovni zriaďovateľov škôl:

- Pred nástupom dieťaťa do prvého ročníka zabezpečiť a spolupracovať pri plnení predprimárnej povinnej školskej dochádzky, ktorá pomáha deťom prekonávať sociálne znevýhodnenia,
- citlivo vnímať segregačné praktiky v školách a upozorňovať inšpektorov na ich prítomnosť. Zriaďovateľ musí spolupracovať s vedením školy na vytváraní inkluzívnej klímy.

Záver

Sociálnej práci sa v slovenskom prostredí nedostáva adekvátneho uznania a postavenia. Môžeme len hádať, prečo sa táto profesia uvádza ako príklad odboru, ktorý chrlí absolventky, absolventov bez kvalitnej prípravy a neuplatniteľnosti. Ide však len o slovenské špecifikum, pretože v zahraničí ide o profesiu, ktorá sa teší záujmu a rešpektu v spoločnosti. Dôvodom je predovšetkým pomoc bližným v ťaživých životných situáciách, ktorá sa vyžaduje nielen špičkovú teoretickú prípravu, ale najmä zručnosti akými sú empatia, kongruencia,

bezpodmienečné pozitívne prijatia a rešpekt voči odlišnosti. Ide o schopnosti, ktoré sú v demokratických spoločnostiach považované za cnotné a chvályhodné. Práve výsledky nášho výskumu ukazujú, že sociálna práca je pre pomoc a podporu žiakom zo sociálne znevýhodneného prostredia kľúčová.

Na jednej strane je dôvodom kladné, priateľské a humanistické nastavenie sociálnych pracovníčok, pracovníkov a ich schopnosť poskytnúť špecializované sociálne poradenstvo, terapeutickú pomoc, sanovanie rodinného prostredia a komunitnú pomoc na strane druhej. To v rámci sociálnej pedagogiky absentuje. Tá sa javí ako účinná intervencia len v prostredí bežných škôl. Preto dôrazne odporúčame, jasné vymedzenie kompetencií, schopností a zručností v interdisciplinárnych školských tímoch. Určenie hraníc zodpovednosti a pracovnej agendy je základom kvalitnej profesionálnej a vzájomne prepojenej pomoci. Okrem toho je potrebné budovať kultúrnu citlivosť voči rôznorodosti žiakov zo sociálne znevýhodneného prostredia na strane ostatných členov tímu.

Sociálne pracovníčky, sociálni pracovníci práve v rešpektovaní rozdielností stoja na prvom mieste pomyselného rebríčka inkluzívneho vnímania a nastavenia. Kreovanie spoločnosti, v ktorej bude mať každé dieťa zabezpečené rovnaký prístup k vzdelávaniu, a zároveň pokryté základné životné potreby musí byť záujmom každého jedného aktéra interdisciplinárneho tímu. Nie je priestor pre nenávistné postoje, stereotypné nastavenie či predsudky. Je pred nami ešte dlhá cesta. Aktuálne však štátne inštitúcie pripravujú rôzne vzdelávania a školenia, ktoré majú budovať kriticky a spravodlivo uvažujúcich profesionálov, profesionálky. Jedným zo základných atribútov poznania tkvie v priblížení a učení sa materinskému jazyku detí pochádzajúcich z marginalizovaných rómskych komunít. Závety nášho výskumu potvrdzujú, že práve jazyk a jeho poznanie pomáha sociálnej práci preklenúť priepasť medzi čierno-bielymi svetmi. Veríme, že uznaním svojbytnosti rómskej národnostnej menšiny aj v každodennej realite osád, môžeme prispieť k prvému kroku začlenenia a inklúzie v slovenskom prostredí.

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(NIE)ZANIEDBYWANIE DZIECKA – BIBLIOTERAPIA I BAJKOTERAPIA JAKO ODDZIAŁYWANIE WSPOMAGAJĄCE ROZWÓJ DZIECKA I KOMPETENCJE SPOŁECZNE MATKI

(NOT)NEGLECT OF THE CHILD – BIBLIOTHERAPY AND FAIRY-TALE THERAPY AS METHODS STIMULATING THE CHILD'S DEVELOPMENT AND SOCIAL COMPETENCE OF MOTHER

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Streszczenie

Wprowadzenie: Wychowawcza i terapeutyczna funkcja czytelnictwa sięga czasów antycznych. Biblioteki zwano lecznicami duszy. Biblioterapia i bajkoterapia jako metody stymulowania rozwoju dziecka, a także metody sprzyjające zdrowiu psychicznemu zarówno dzieci jak i dorosłych w ostatnim czasie zyskały na popularności. W pierwszym okresie pandemii COVID-19 z uwagi na zagrożenie epidemiczne, związane z dynamicznym rozprzestrzenianiem się nowego patogenu zamknięto wszystkie instytucje kultury, w tym biblioteki. Jediną placówką dostępną czytelnikom w tym czasie był księgozbiór dostępny w Domu Matki i Dziecka.

Celem pracy jest wskazanie na użyteczność oddziaływania biblioterapeutycznego na rozwój dziecka oraz zmianę postaw społecznych kobiet odbywających karę pozbawienia wolności, realizowanych w ramach twórczej resocjalizacji.

Materiał i metody: analiza wielopłaszczyznowego oddziaływania czytelnictwa i bajkopisania na matki i dzieci, obserwowanych w latach 2019 – 202 w Domu Matki i Dziecka.

Wyniki: wszystkie matki są zachęcane do czytania pozycji przeznaczonych dla dorosłych, wszystkim dzieciom czytane są codziennie książeczki dostosowane do wieku.

Wnioski: biblioterapia i bajkoterapia realizowane w Domu Matki i Dziecka pozytywnie wpływają na rozwój dzieci i zmiany postaw społecznych matek, a także oddziaływania te zminimalizowały skutki całkowitego zamknięcia jednostki na realizację zajęć kulturalno-oświatowych przez podmioty zewnętrzne.

Słowa kluczowe: biblioterapia, bajkoterapia, resocjalizacja, zapobieganie zaniedbywaniu dziecka, bajkopisanie

Abstract

Introduction: The educational and therapeutic function of reading goes back to the ancient times. Libraries were called healers of the soul. Bibliotherapy and fairy-tale therapy as methods of stimulating a child's development, as well as methods favoring the mental health of both children and adults, have recently gained popularity. In the first period of the COVID-19 pandemic, all cultural institutions, including libraries, were closed due to the epidemic threat related to the dynamic spread of the new pathogen. The only library available to readers at that time was the book collection available at the Mother and Child Home.

The aim: aim of the study is to indicate the usefulness of bibliotherapeutic influence on child development and the change of social attitudes of women serving prison sentences, implemented as part of creative rehabilitation.

Material and methods: analysis of the multifaceted impact of reading and fairy-tale therapy on mothers and children, observed in the years between 2019 and 2022 at the Mother and Child Home.

Results: all mothers are encouraged to read adult books, all children are read age-appropriate books every day.

Conclusions: bibliotherapy and fairy-tale therapy implemented in the Mother and Child Home positively affects the development of the children and change in the social attitudes of mothers and these impacts minimized the effects of the complete closure of the individual for the implementation of cultural and educational activities by external entities.

Key words: bibliotherapy, fairy-tale therapy, resocialization, prevention of child neglect, storytelling

1. Wprowadzenie

Światowa Organizacja Zdrowia (ang. WHO World Health Organisation) za działania krzywdzące wobec dziecka uważa każde zamierzone działanie lub zaniechanie osoby dorosłej, społeczności lub państwa, które wywiera niekorzystny wpływ na rozwój dziecka. Zaniedbywanie jest jedną z form krzywdzenia – wymienianą wraz z przemocą fizyczną, nadużyciami seksualnymi, krzywdzeniem ekonomicznym, jednorazowym lub stałym niezaspokajaniem potrzeb rozwojowych dziecka, które powoduje określone szkody w jego rozwoju. Do nieprawidłowych zjawisk obserwowanych w środowisku dziecka zaliczane są: nieodpowiednia opieka fizyczna, nieodpowiednia opieka medyczna lub jej brak, krzywdzące, okrutne traktowanie dziecka, niewłaściwy nadzór nad edukacją, wykorzystywanie do zarobkowania, narażanie na wpływy niemoralne (Meier, 1964). Dnia 20 listopada 1989 roku Zgromadzenie Ogólne Narodów Zjednoczonych przyjęło Konwencję o Prawach Dziecka – doniosły dokument traktujący dziecko podmiotowo. Polska ratyfikowała Konwencję 30 kwietnia 1991 roku (Kancelaria Sejmu, 1991). Od momentu ustanowienia praw dziecka nierespektowanie ich również jest uważane za zaniedbywanie. Istotnym wskazaniem w

definicji WHO jest określenie, że działania krzywdzące – w tym zaniechywanie – mogą być realizowane świadomie lub nieświadomie przez jednostkę, społeczność lub państwo. Za nieprawidłowe działanie jednostki uważa się aktywność rodzica lub opiekuna prawnego, za zaniechywanie społeczne – zaniechania członków społeczności zobowiązanych do dbałości o dobrostan dziecka, natomiast zaniechaniem państwa jest brak stosownych regulacji legislacyjnych chroniących populację w wieku rozwojowym przed aktywnością negatywnie oddziaływującą na populację w wieku rozwojowym.

Kara pozbawienia wolności skutkująca osadzeniem osoby karanej towarzyszy ludzkości od czasu powstania zaawansowanych struktur państwowości – w przypadku Polski od X-XI wieku (Uruszczak, 2015). Przez wiele wieków kary wykonywano publicznie dla celów prewencyjnych (Lelental, 1998). Standardy więzień, metody postępowania ze skazanymi miały charakter niehumanitarny – kar „górną” i „dolną” więzy osadzeni nie przeżywali z powodu braku światła, żywności i chłodu oraz infekcji (Migdał, Raglewski, 2005). Idee oświecenia sprawiły, że funkcja odwetowa lub wyłącznie represyjna zasądzonej kary została zastąpiona wszechstronnym oddziaływaniem resocjalizującym, którego zadaniem jest przywrócenie społeczeństwu członka społeczności respektującego porządek prawny. Inicjatorem zmian w systemie penitencjarnym był John Howard (1726 – 1790), dla którego sprawa humanitarnego wykonywania kary pozbawienia wolności była celem życia (Ornowska Zduński 2014). Natomiast za „ojca” wychowania resocjalizacyjnego uważany jest Karl Krohne (1836 – 1913), dyrektor więzienia Moabit w Berlinie, który wskazał, że jednym z obowiązków więźnia powinna być praca (Samula, 2012).

Kobiety rzadziej popełniają czyny zabronione, stanowią około 3 – 4 % osób osadzonych (Centrlny Zarząd SW, 2022), a znikomy odsetek realizuje karę pozbawienia wolności wraz z dzieckiem. Zasady postępowania z kobietami realizującymi karę pozbawienia wolności będąc w ciąży bądź opiekując się dzieckiem reguluje kodeks karny wykonawczy (dalej kkw) (Kancelaria Sejmu, 1997).

W świetle standardów międzynarodowych, mając na względzie istotność przebiegu wczesnego okresu rozwoju dziecka na całe jego życie, należało zapewnić osadzonym matkom możliwość urodzenia dziecka, karmienia piersią i budowania więzi w okresie perinatalnym i wczesnym okresie życia. W chwili przyjścia dziecka na świat rozpoczyna się jego socjalizacja. Jej przebieg i efekty społeczne warunkują dalsze funkcjonowanie dziecka. Wpojone w rodzinie wartości, normy, zasady postępowania czynią jednostkę społecznie użyteczną. W oparciu o doświadczenia zdobyte w rodzinie dziecko buduje tożsamość przez pryzmat najbliższych mu osób. Wartości uważane za ważne, za dobre lub złe, przyjazne lub wrogie, święte lub nieistotne wyznaczają jego życiową drogę – budują biografię jednostki. Socjalizacja definiowana jest jako proces obserwowany z co najmniej trzech perspektyw: procesu, któremu jednostka poddaje się biernie, procesu przystosowywania się do życia społecznego lub procesu, w którym jednostka przystosowuje się do współdziałania z innymi członkami społeczeństwa (Przygoda, 2011).

W warunkach izolacji więziennej funkcja rodziny ograniczona jest do codziennego kontaktu matki z dzieckiem i ograniczonego kontaktu z innymi członkami rodziny, co w znaczący sposób zaburza relacje interpersonalne w podstawowej komórce społecznej. Funkcje nadzorujące jakość sprawowania opieki nad dzieckiem w Domu Matki i Dziecka (DMiD) pełnią funkcjonariuszki Służby Więziennej (dalej SW): wychowawczynie, psycholożki i dietetyczka, tworzące Zespół Opiekuńczo-Wychowawczy. Nadzór nad rozwojem antropometrycznym dzieci pełnią lekarz i pielęgniarka (Matysiak-Błaszczyk, 2004).

Kodeks karny wykonawczy określa cele wykonywania kary i sposoby oddziaływania na osobę osadzoną. W rozdziale VII, zatytułowanym Uczestnictwo społeczeństwa w wykonywaniu orzeczeń, pomoc w społecznej readaptacji skazanych, wskazuje na działania kulturalno-oświatowe, jako model współuczestniczenia stowarzyszeń, fundacji, organizacji i instytucji, kościołów i związków wyznaniowych oraz osób godnych zaufania, które w porozumieniu z dyrektorem jednostki penitencjarnej podejmują wielosektorowe oddziaływania zwiększające efektywność działalności resocjalizacyjnej, społecznej i kulturalnej, oświatowej, sportowej i religijnej (Kancelaria Sejmu, 1997). Osoby osadzone mogą również korzystać z dostępnego zatrudnienia i nauczania, traktowanych jako ergoterapia – terapia pracą/terapia przez pracę (gr. ergon – praca, aktywność, dzieło, czyn, osiągnięcie) oraz jako wszechstronna edukacja poprzez organizację przykładowych szkół zawodowych i bibliotek oddziałowych (Przygoda, 2011; Matysiak-Błaszczyk, 2004).

Biblioterapia jako oddziaływanie wspomagające zdrowie i rozwój osobisty

Biblioterapia jako metoda wspomagania rozwoju osobistego znana jest od starożytności. Nad wejściem do biblioteki Ramzesa II w egipskich Tebach widnieje napis „lecznica dla duszy” (XIII w p.n.e.). Podobnie w Kairze, w szpitalu Al-Mansur stosowano czytanie koranu jako elementu „leczenia duszy” (XIII w n.e.). W Europie czytanie chrześcijańskich tekstów religijnych wykorzystywano w programie leczenia pacjentów chorych psychicznie (Piotrowski, 2013).

Historia organizowania bibliotek oddziałowych w jednostkach penitencjarnych sięga około 200 lat, kiedy powszechnie zaczęto wprowadzać zmiany w polityce karnej, polegające na odstępowaniu od represji na rzecz resocjalizacji – powtórnego wychowania członka społeczności (Zybert, 2012).

Pierwsza definicja biblioterapii pojawiła się na Zachodzie Europy w 1961r., w drugim wydaniu Ilustrowanego Słownika Webstera. Biblioterapię zdefiniowano jako: „użycie wyselekcjonowanych materiałów czytelniczych jako pomocy terapeutycznej w medycynie i psychiatrii, poradnictwo w rozwiązywaniu problemów osobistych przez ukierunkowane czytanie” (Zybert, 2012). W literaturze pedagogicznej biblioterapia funkcjonuje jako istotny element wzbogacania osobowości, poszerzania wrażliwości i rozwijania empatii, zdolności rozumienia zagadnień moralnych, rozumienia i nazywania uczuć, poprawę umiejętności społecznych, samodoskonalenie (Szulc, 1994).

Pierwsza biblioteka więzienna powstała w 1827 r. w Richmond General Penitentiary, w Irlandii. Stwierdzono, że czytanie książek korzystnie oddziałuje na osoby osadzone i może być skutecznie wykorzystywane do zmiany ich postaw społecznych. Ten rodzaj działań wychowawczych, stosowanych dla zwiększenia skuteczności oddziaływań resocjalizujących prowadzony jest często łącznie z bajkoterapią i bajkopisaniem.

Bajka jest formą literacką o charakterze moralizatorskim, w którym spostrzeżenia natury etycznej zilustrowane są odpowiednim przykładem, postacie są typowe, o charakterystycznych cechach, morał zawarty jest na początku lub na końcu dzieła. Bajki relaksacyjne wspierają czytelnika w rozwoju osobistym, bajki psychoedukacyjne redukują napięcie emocjonalne, bajki psychoterapeutyczne mają na celu kompensowanie braków w zaspokajaniu potrzeb radzenia sobie ze stresem (Monist-Czerwińska, 2013). Wszystkie formy kontroli emocji są proponowane mieszkańcom DMiD w ramach zajęć z zakresu bajkoterapii.

Siłę oddziaływania czytelnictwa na zmianę postaw społecznych można ocenić czytając fragment listu skazanego mężczyzny: „Książki uwolniły mnie od rozpacz, pokazując, że zawsze jest nadzieja, usuwały nudę przez opowiadanie ciekawych historii, wzbogaciły mój umysł ukazując świat idei i ucząc mnie jak je przyjmować. Wskazały mi normy postępowania umożliwiające życie zgodne z prawem i stąd dostarczyły mi dumy i samozadowolenia. Uformowały moje życie ukazując różne możliwości, o których nie miałem nigdy pojęcia. Książki zmieniły mój świat w radość pokazując, że moje straty mogą zmienić się w zyski. Nauczyły mnie rozumieć słabości innych, co sprawiło, że moja nienawiść przemieniła się w zdolność przebaczenia. Ale najważniejsze, że książki dały mi wolność od przygnębienia spowodowanego żelaznymi kratami i kamiennymi ścianami” (Zybert, 1991).

2. Cel pracy

Celem pracy jest wskazanie na użyteczność oddziaływania biblioterapeutycznego i bajkopisarskiego – jednej z form zajęć realizowanych w ramach twórczej resocjalizacji – na rozwój dziecka oraz zmianę postaw społecznych kobiet odbywających karę pozbawienia wolności.

3. Materiał i metody

Zgodnie z kkw w zakładach karnych stwarza się osobom osadzonym warunki do odpowiedniego spędzania wolnego czasu. W tym celu organizowane są zajęcia kulturalno-oświatowe, wychowania fizycznego i zajęcia sportowe oraz pobudzana jest aktywność społeczna osób osadzonych. Zachęca się one do korzystania z bibliotek oddziałowych i urzędzeń audiowizualnych, do uczestnictwa w imprezach charytatywnych, tworzenia zespołów prowadzących działalność kulturalno-oświatową, nawiązywania współpracy z odpowiednimi stowarzyszeniami, organizacjami i instytucjami realizującymi społecznie uznane cele (art.135 – 136 kkw) (Kancelaria Sejmu, 1997).

W marcu 2020 roku (04. 03. 2020r.) w województwie lubuskim zidentyfikowano pacjenta „0”, zakażonego wirusem Sars-Cov-2. Z powodu zagrożeń epidemicznych i braku skutecznych środków zaradczych decyzją Dyrektora Zakładu Karnego niezwłocznie zamknięto jednostkę dla podmiotów zewnętrznych, które w okresie przed pandemią realizowały zajęcia kulturalno-oświatowe we współpracy z Funkcjonariuszkami Służby Więziennej, zgodnie z obszarami oddziaływań wskazanymi w kkw. Dnia 13 marca 2020r. rząd ogłosił „twardy” lockdown w kraju – zamknięto podmioty edukacyjne wszystkich szczebli, galerie handlowe, wszystkie instytucje kultury, w tym biblioteki, wprowadzono zakaz przemieszczania się z wyjątkiem sytuacji uzasadnionych. Dnia 16 kwietnia dodatkowo wprowadzono nakaz zakrywania nosa i ust z uwagi na dynamiczne rozprzestrzenianie się patogenu i znaczący wzrost liczby zakażeń.

Placówki penitencjarne (zakłady karne, areszty śledcze), zakłady poprawcze, schroniska dla nieletnich, młodzieżowe ośrodki wychowawcze znalazły się w grupie ryzyka wystąpienia ognisk zakażeń, dlatego niezwłocznie wprowadzono zakaz kontaktu z osobami z zewnątrz, co w oczywisty sposób wpływało na kondycję psychiczną osób osadzonych. Jednostki penitencjarne wdrażały różne rodzaje aktywności, które umożliwiały redukcję lęku spowodowanego powszechnym zagrożeniem: pozwalanie na dłuższe niż reguaminowe rozmowy telefoniczne, udostępnianie komunikatorów do wideo-spotkań z członkami rodziny, nagrywanie na płyty CD własnych tekstów i książek mówionych (głośne czytanie i nagrywanie bajek), zajęcia jogi, pielęgnacja ogrodu, szycie maseczek dla służb pomocowych (Zinkiewicz, 2021).

Z uwagi na uciążliwość innych utrudnień W czasie pandemii w DMiD zbiory biblioteczek oddziałowych udostępniano matkom i dzieciom z zachowaniem wszelkich środków ostrożności, z uwagi na uciążliwość innych utrudnień związanych z pandemią COVID-19.

Dokonano analizy wielopłaszczyznowego oddziaływania czytelnictwa na matki i dzieci funkcjonujące w DMiD w Zakładzie Karnym w Krzywańcu. Obserwacje prowadzono w formie badań zdalnych, zleconych zespołowi profesjonalistek realizujących zadania służbowe (resocjalizację matek).

4. Wyniki

Obserwacje zachowań społecznych w DMiD w Zakładzie Karnym w Krzywańcu prowadzone były w odmiennych okresach badawczych: rok 2019 był czasem nieskrępowanej aktywności badawczej, rok 2020 – okresem całkowitego zamknięcia jednostki na osoby z zewnątrz z powodu światowej pandemii COVID-19 i braku środków zaradczych w postaci farmakoterapii i szczepionek. Natomiast w roku 2021 w pierwszym półroczu obowiązywały w DMiD restrykcje epidemiczne, zaś w drugiej połowie roku obostrzenia epidemiczne uległy poluzowaniu – wówczas realizowano badania w formie hybrydowej (zdalnie i osobiście). W roku 2022 powrócono do nieskrępowanej aktywności badawczej.

W przedmiotowym opracowaniu skoncentrowano się na biblioterapii i bajkopisaniu w okresie całkowitego zamknięcia jednostki na wizyty podmiotów zewnętrznych, tj na roku

2020 i pierwszej połowie 2021 roku. Okres twardego lockdownu był szczególnie stresogenny i dotkliwie odczuwany przez osadzone kobiety z uwagi na lęk o swoje zdrowie i zdrowie członków rodziny pozostających na wolności. Zdecydowano się na ocenę wyłącznie oddziaływania czytelniczego na zachowania matek i rozwój dzieci z uwagi na znaczący wzrost zainteresowania tą formą spędzania wolnego czasu w okresie pandemicznym.

Dostęp do bibliotek oddziałowych dla dobra dzieci i poprawy kompetencji opiekuńczo-wychowawczych matek nie jest ograniczany. Zajęcia z bajkoterapii i bajkopisania inicjowane są spontanicznie w ramach uatrakcyjniania funkcjonowania dzieci egzystujących w warunkach izolacji więziennej. Biblioteczki są na bieżąco uzupełniane o materiały dla dzieci, które są dostosowane do ich wieku i potrzeb rozwojowych. Księgozbiór zawiera również książeczki polisensoryczne, stymulujące rozwój sensoryczno-motoryczny dzieci. Pozycje czytelnicze dla matek są dostosowane do ich poziomu wykształcenia i deficytów wiedzy, a o ich zindywidualizowanym doborze decydują wychowawczynie. Wdrożenia wychowawcze matek, prowadzone są w taki sposób, by dzięki nim stymulować rozwój wszystkich dzieci. Książki dla matek to głównie poradniki związane z rozwojem dziecka i funkcjonowaniem rodziny, lektury szkolne, opowiadania obyczajowe, książki poradnikowe (związane z prowadzeniem domu: kucharskie, ogrodnicze, krawieckie, itp.).

Dla porównania oddziaływania czytelnictwa na rozwój dziecka i rozwój osobisty matek grupy porównawczej w okresie pandemicznym nie wyłoniono z uwagi na brak dostępu do bibliotek w pierwszym okresie pandemii i znaczne ograniczenia w dostępie do księgozbiorów w okresie stopniowego znoszenia obostrzeń epidemicznych (rok 2020 i pierwsza połowa 2021 roku).

4.1 Czytelnictwo matek grupy badanej

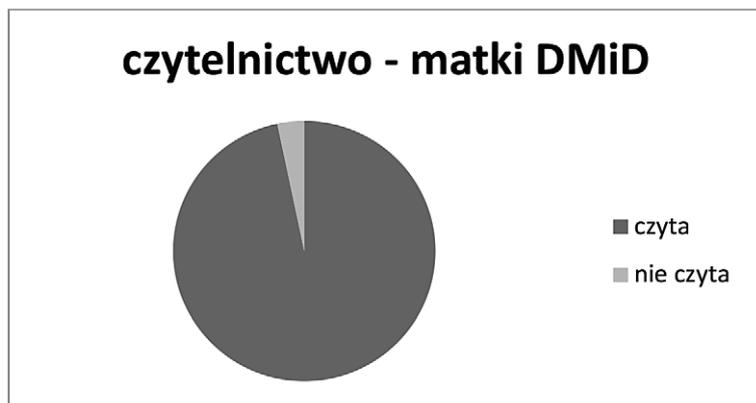
W ocenie czytelnictwa grupy badanej brano pod uwagę deklaracje matek dotyczące liczby czytanych książek rocznie. W okresie obowiązywania restrykcyjnych obostrzeń epidemicznych wychowawczynie udostępniały tygodniowo od dwóch do pięciu książek dla matek i dziesięć książeczek dla dzieci.

Dom Matki i Dziecka realizuje kampanię Cała Polska czyta dzieciom i Mała książka – Wielki Człowiek. Matki są zachęcane do realizowania tych zadań, bowiem czytelnictwo i poświęcanie czasu wyłącznie dziecku wywiera istotny wpływ na rozwój społeczny dzieci.

W opracowaniu oceny czytelnictwa Polaków, prowadzonej przez Bibliotekę Narodową w latach „covidowych” 2020/2021 odnotowano tylko jedną wzmiankę o literaturze dla dzieci w wieku przedszkolnym. Z badań tej instytucji wynika, że nawet rodzice, którzy sami nie czytają książek mają świadomość, że dzieci powinny mieć kontakt z literaturą dostosowaną do wieku i podają posiadanie w domowych księgozbiorach książek dla dzieci w wieku 4-6 lat (Zasadzka, Cymkowski, 2023). Pominięta została ocena stanu czytelnictwa i posiadania w domowych księgozbiorach książek dla dzieci najmłodszych – w tym książeczek polisensorycznych, przeznaczonych dla niemowląt i małych dzieci mimo, że na rynku dostępny

jest szeroki asortyment pozycji dedykowanych dzieciom najmłodszym, które odgrywają udokumentowaną, znaczącą rolę w stymulacji rozwoju dzieci.

Księgozbiór dla dzieci – mieszkańców DMiD pozyskiwany jest od darczyńców, świadomych potrzeb rozwojowych dzieci do trzeciego roku życia.



Rysunek 1. Deklarowane czytanie książek przez matki grupy badanej, weryfikowane przez wychowawczynię [opracowanie własne]

Twardy lockdown spowodowany pandemią COVID-19 wprowadzony na całym świecie spowodował zamknięcie wszystkich podmiotów związanych z kulturą – w tym bibliotek.

Prawdopodobnie biblioteki oddziałowe w jednostkach penitencjarnych pozostawały jedynymi podmiotami udostępniającymi czytelnikom księgozbiory. Ostrożności epidemicznej wymagało dostarczanie książek matkom i dzieciom – bezpośrednio pod pokój oraz zachowanie kwarantanny książek, z uwagi na fakt utrzymywania się koronawirusa na powierzchniach papierowych przez kilka dni. Osobom z objawami infekcji (katar, kaszel, temperatura) książek nie udostępniano.

Również inne środki ostrożności stosowane były przez osoby dystrybuujące książki (maseczki, przyłbice, rękawiczki ochronne, stosowano środki do dezynfekcji rąk).

W czasie całkowitego zamknięcia jednostki na wizytowanie osób i podmiotów zewnętrznych – od marca 2020 do czerwca 2021 – czytelnictwo w grupie badanej zwiększyło się o 62 % w stosunku do roku 2019. Po zakończeniu okresu ścisłego zamknięcia jednostki penitencjarnej – w okresie badawczym od lipca 2021 do chwili obecnej nie odnotowano spadku zainteresowania czytelnictwem matek osadzonych mimo otwarcia się jednostki na inne propozycje zajęć kulturalno-oświatowych (między innymi organizowano warsztaty teatralne, malarskie, rzeźbiarskie, muzyczne, plastyczne, a także kulinarne, krawieckie, kosmetyczne, fryzjerskie itp.).

Zjawisko zainteresowania się czytaniem książek można zinterpretować jako rozmiłowanie się w czytelnictwie.

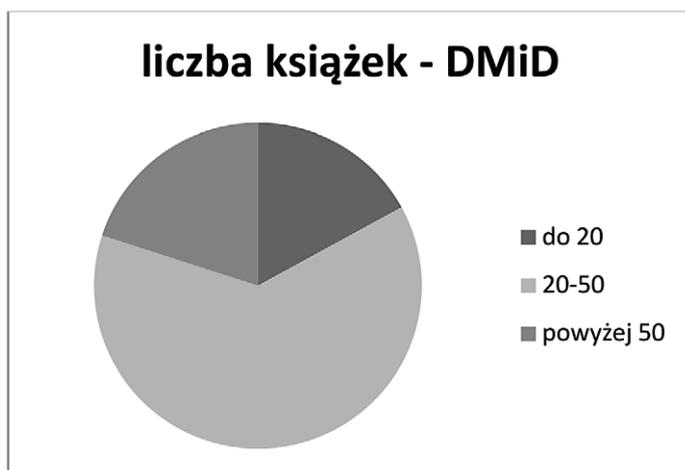
4.2 Liczba książek przeczytanych przez matki rocznie

Oceniono liczbę książek przeczytanych przez matki rocznie w okresie całkowitego zamknięcia DMiD na wizyty podmiotów zewnętrznych.

W sondażu diagnostycznym oceniano liczbę książek przeczytanych przez matki grupy badanej w ciągu roku stosując kryteria do 20 książek, między 20 a 50 pozycji przeczytanych rocznie i powyżej tego limitu. Czytelność populacyjną Polaków w wieku powyżej 15 lat, badane przez Bibliotekę Narodową w sondażu zadaje pytanie o przeczytanie minimum jednej książki w roku (Zasadzka, Cymkowski, 2023).

W prowadzonych badaniach celowo zastosowano podwyższenie liczby przeczytanych rocznie książek z uwagi na fakt, że w ramach czynności wychowawczych matki-mieszkanek DMiD są zachęcane przez wychowawczynie do czytania pozycji dostosowanych do konkretnych deficytów edukacyjnych celem ich zredukowania. Z przeczytanego tekstu matki są odpytywane, co pozwala na skontrolowanie przyswojonej wiedzy. Postępowanie takie daje pewność, że pozycja została przeczytana, a świadomość, że treści zostały przyswojone umożliwia wychowawczyniom egzekwowanie pożądanych zachowań matek wobec dzieci. Z kontrolowanych wypożyczeń książek z biblioteki oddziałowej wynika, że matki-mieszkanek DMiD czytają jedną książkę tygodniowo. Matki poprawiają nie tylko umiejętność czytania, ale przede wszystkim stan wiedzy dotyczącej istotności jakości sprawowania opieki nad dzieckiem celem optymalizacji jego rozwoju.

Dane dotyczące wykształcenia badanych kobiet pozyskano od Funkcjonariuszek SW. Wynika z nich, że badana grupa składała się głównie z osób legitymujących się wykształceniem podstawowym i średnim (7,3 % podstawowe, 74,4 % gimnazjalne, 14,1 % zawodowe, 4,2 % wyższe). Biorąc pod uwagę, że w grupie badanej ponad 80 % matek legitymuje się wykształceniem podstawowym i gimnazjalnym, a co trzecia z nich ma trudności z czytaniem i rozumieniem tekstu – tym bardziej na podkreślenie zasługuje wskazanie korzystnej roli oddziaływania Zespołu Opiekuńczo-Wychowawczego na poświęcanie czasu na naukę czytania – obszaru zaniedbanego u matek na wczesnym etapie edukacji. Matki, które chcą uzyskać nagrodę zgodnie z Systemem nagród i kar kkw (Kancelaria Sejmu, 1997) mogą również „wcielić się” w rolę nauczycielki i czytać dziecku matki mającej trudności z czytaniem lub uczyć/nauczyć ją czytania – co jest wysoko oceniane przez Funkcjonariuszki SW, jako świadomość odpowiedzialności za dobrostan drugiej osoby.



Rysunek. 2. Liczba książek czytanych w grupie badanej – potwierdzona obserwacjami wychowawczyń, odnotowany w kwartalnych ocenach postępu resocjalizacji [opracowanie własne]

4.3 Czytanie dziecku

Ocena częstotliwości czytania książek dziecku w grupie badanej jest możliwa do weryfikacji – wiarygodne informacje pochodzą z obserwacji zachowań społecznych matek, które podlegają regularnej ocenie Zespołu Opiekuńczo-Wychowawczego w ramach realizacji czynności służbowych, oceniających przebieg procesu resocjalizacji. Ocenie psychologicznej, pedagogicznej, antropometrycznej podlega również rozwój dziecka funkcjonującego w warunkach DMiD. Funkcjonariuszki potwierdzają spostrzeżenia badaczki o korzystniejszych umiejętnościach komunikacyjnych dzieci grupy badanej: dzieci posiadają duży zasób słownictwa, około 21 – 24 miesiąca życia większość z nich sprawnie konstruuje zdania złożone z dwóch do pięciu słów. W tym miejscu należy zauważyć, że jest to efekt codziennego czytania dziecku, wielokrotnego powtarzania znaczenia słowa czytanego, utrwalania słownictwa, stałego rozwijania umiejętności komunikacyjnych.

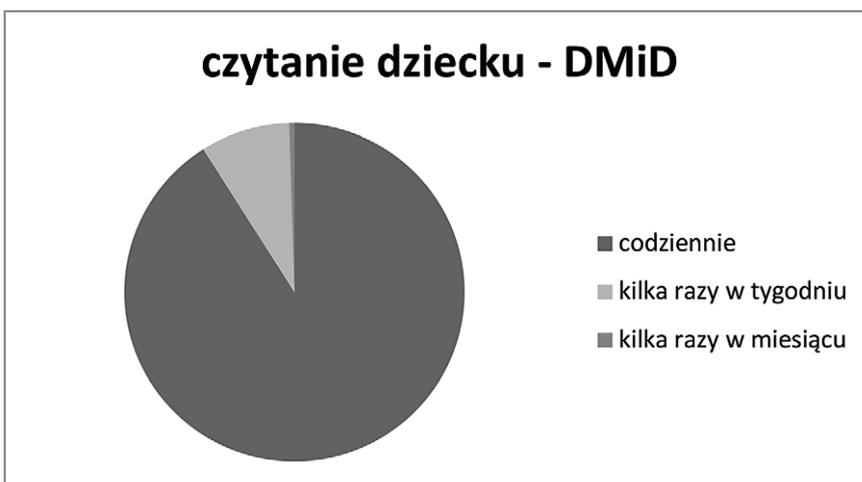
W ocenie czytelnictwa realizowanego dla dzieci brano pod uwagę kilkustronicowe książeczki przeznaczone dla dzieci do trzeciego roku życia (obrazkowe i polisensoryczne) oraz książki z wieloma bajkami, o liczbie stron większej niż 100 – stymulujące wyobraźnię.

Co dziesiąta matka czyta dziecku do 20 książek rocznie (średnio pół książki 100-stronicowej przeczytanej tygodniowo), co trzecia matka czyta dziecku 20 – 50 książek rocznie (średnio 48 książek, co daje wynik przeczytania jednej książki tygodniowo). Większość matek czyta powyżej 50 książek rocznie (czyta książkę 100-stronicową więcej niż jedną tygodniowo).



Rysunek 3. Liczba książek czytanych dziecku rocznie, potwierdzona obserwacjami wychowawczyń [opracowanie własne]

Zwraca uwagę przeważający odsetek matek czytających książeczki dziecku codziennie i kilka razy w tygodniu. Odpowiedzi „kilka razy w miesiącu” udzieliła jedna matka, która realizowała karę pozbawienia wolności z dwójką dzieci o szczególnych potrzebach rozwojowych (wcześniaki o znacząco skróconym wieku płodowym, wymagające intensywnej rehabilitacji).



Rysunek 4. Częstotliwość czytania dziecku w grupie badanej [opracowanie własne]

4.4 Pisanie bajek

Samodzielne tworzenie bajek uważane jest za oddziaływanie terapeutyczne w zakresie odreagowywania napięć skutkujących uporaniem się z trudnymi emocjami.

W grupie badanej podejmowane są próby pisania bajek przez prawie wszystkie matki. Jedna matka nie podjęła próby napisania bajki, z uwagi na obciążające obowiązki macierzyńskie – realizowała karę pozbawienia wolności z bliźniętami (wcześniakami). Najciekawsze prace są nagradzane ich wydaniem w publikacji finansowanej przez Służbę Więzienną lub podmioty wspierające jej działalność. W tworzenie bajki zaangażowana jest matka i dziecko – poprzez kreowanie postaci, analizę ich relacji, tworzenie środowiska, w którym funkcjonują bohaterowie bajki. Nierzadko twórczyniami dzieła jest kilka matek z dziećmi. Umiejętności w

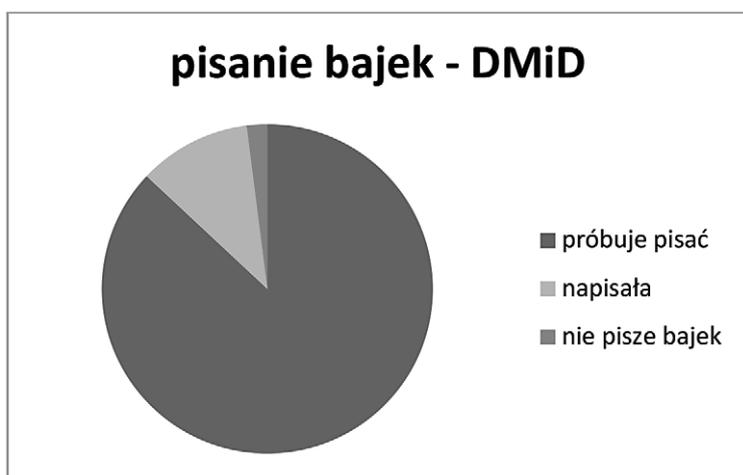
ten sposób zdobyte są wykorzystywane w innych oddziaływaniach arteterapeutycznych, np. teatroterapii, poprzez konstruowanie scenariuszy do sztuk, prezentowanych na krajowych i międzynarodowych konkursach sztuki więziennej.

Bajkopisanie jest również formą podtrzymywania kontaktów z dziećmi pozostającymi poza Zakładem Karnym. Okoliczności, kiedy matka realizuje karę pozbawienia wolności żartobliwie nazywane są „macierzyństwem na odległość”. Bajkę zilustrowaną samodzielnie matki wysyłają rodzeństwu pozostającemu na wolności bądź przekazują dzieciom w trakcie widzeń na terenie jednostki. W ten sposób podtrzymywane są relacje matki pozostającej w izolacji więziennej z pozostałymi członkami rodziny. W tym miejscu należy przypomnieć o szczególnym okresie badawczym – pandemii COVID-19, który wymusił ograniczenie kontaktów międzyludzkich, w tym ograniczenie widzeń w jednostce, co było szczególnie stresogenne dla kobiet, bowiem potęgowało dolegliwości izolacji, wzmagane lękiem o zdrowie własne i członków rodziny funkcjonujących w warunkach wolnościowych.

Pisanie bajek i opowiadanie ich wraz z dzieckiem nie tylko kształtuje prawidłowe relacje w diadzie matka-dziecko, ale również stymuluje rozwój mowy dziecka, poprzez częste powtarzanie słownictwa, tym samym utrwalanie jego znaczenia. Skutkuje to obserwowaniem osiągania wczesnych, sprawnych umiejętności komunikacyjnych dzieci między sobą oraz z osobami dorosłymi, w tym z badaczką, z którą kontakt jest sporadyczny (5 – 6 razy w roku) – większość dzieci mogłaby przyjąć postawę wycofaną, nieufną, tymczasem podejmują konstruktywny dialog podczas zajęć kulturalno-oświatowych.

Z uwagi na korzystniejszą komunikację również częściej inicjowane są zabawy grupowe, z szeregiem wzajemnych interakcji dzieci i matek z dziećmi.

Podjmując szereg prób pisania bajek matki systematycznie doskonali warsztat pisarski, spełniają się również jako ilustratorki swoich dzieł, dodatkową zachętą do tej formy resocjalizacji jest nagroda w postaci wydania pozycji. Matka dwójki dzieci jako jedyna nie próbowała napisać bajki z uwagi na absorbujące obowiązki pielęgnacyjne.



Rysunek 5. Bajkopisanie jako terapia wspomagająca kontrolę emocji matek, rozwijająca umiejętności komunikacyjne i umożliwiająca podtrzymywanie relacji z dziećmi funkcjonującymi w warunkach wolnościowych [opracowanie własne]

4.5 Przykładowe fragmenty prac osób osadzonych

Zajęcia kulturoterapeutyczne: artystyczne, biblioterapia, bajkoterapia wraz z edukacją dotyczącą roli bibliotek i czytelnictwa w rozwoju dzieci i młodzieży, twórczość artystyczna – literacka, dramatopisarska, zajęcia teatralne są realizowane w DMiD w ramach twórczej resocjalizacji. Aktywność ta służy ..głównie kontroli emocji, co w okresie całkowitego zamknięcia miało szczególny wpływ na funkcjonowanie kobiet i stabilizację stresu spowodowanego zagrożeniem epidemicznym.

We wszystkich więzieniach i aresztach śledczych w krajach rozwiniętych urządzono biblioteki i czytelnie, zaopatrzone w książki o wszechstronnej tematyce, mając na względzie korzystne oddziaływanie biblioterapeutyczne wspierane bajkopisaniem.

Przykłady treści zajęć kulturalno-oświatowych z wykorzystaniem biblioterapii „przenikają się” wzajemnie z innymi obszarami wszechstronnego oddziaływania terapeutycznego. Po zajęciach z zakresu edukacji ekologicznej jedna z osadzonych napisała bajkę o drwalu (w ramach zajęć z zakresu biblioterapii i bajkoterapii). Tytuł pracy: *Drewniane serce drwala*. [...] cyt. „Drwal co dzień rano wyruszał w las, by ścinać drzewa [...] Uwielbiał patrzeć, jak potężna, wieloletnia sosna powala się z łomotem na ziemię [...] Pewnego ranka [...] drzewo poruszyło się i... Witaj drwalu – powiedziało [...] Nagle drwal stanął. Jego nogi zaczęły wchodzić w miękką ziemię zamieniając się w korzenie [...] Będziesz tutaj stał drwalu, aż zamienisz się w drzewo [...] Nadszedł koniec tej bezmyślnej wycinki. Leśna Wróżka pomogła nam zrobić tak, byś już nigdy żadnej z nas nie skrzywdził”. Z treści bajki wynika, że osadzona przemyślała skutki niszczenia środowiska funkcjonowania człowieka, zatem odniesiono sukces zarówno w poprawie edukacji ekologicznej jak również w oddziaływaniu bajkopisarskim.

Przykładem korzystnego oddziaływania ekologicznego i bajkopisarskiego może być kolejny przykład wiersza, napisanego w ramach zajęć z biblioterapii i bajkoterapii po zajęciach z zakresu edukacji ekologicznej. Tytuł pracy: *Niegrzeczny Tomek* cyt. „Na wycieczkę się wybrali, by podziwiać świat w oddali [...] Kiedy ptaszki oglądali, Tomek krzychał gdzieś w oddali. Cała grupa oglądała, jak sarenka przebiegała. Oczywiście, jak to Tomek, już rozwalął mrówkom domek”. W dalszej części utworu autor wskazuje na konieczność ukarania wandalę przyrody: cyt. „Mała pszczołka szybko wstała, złego Tomka wnet dojrzała. Ominęła całą grupę, użądliła Tomka w pupę [...] I do końca tej wycieczki Tomek płakał do chusteczki”.

W ramach projektu artystycznego „...Gdy zamykam oczy maluję w mej duszy miłosierdzie...” powstały utwory bardzo osobiste, dowodzące głębokich przemyśleń dotyczących sytuacji biograficznej, w której znalazły się osoby osadzone. Cyt. „Święci Aniołowie w walce nam pomogą, byśmy ludzie grzeszni szli prawości drogą”, lub cyt. „wiemy, że za nasze grzechy jesteśmy skazani [...], ale gdy dusza nasza u twych bram stanie, niech chóry anielskie wyjdą jej na spotkanie”.

Przytoczone przykłady oddziaływań biblioterapeutycznych i bajkopisarskich wskazują na korzystne refleksje wywołane wielością pracy wychowawczej z zakresu kulturoterapii, które

skutkują nie tylko zastanowieniem się nad określonymi, niekorzystnymi zachowaniami, ale również decyzją osoby osadzonej o zmianie dotychczasowych postaw społecznych, spowodowanych motywacją wychowawczą do wdrażania zachowań korzystnych/ społecznie pożądaných.

Wszelkie oddziaływania modyfikujące postawy społeczne realizowane są zgodnie z zasadą: przed bramą zakładu zostaje kobieta skazana. Do oddziału Zakładu Karnego – Domu Matki i Dziecka – przyjmowana jest matka z określonymi deficytami wraz z dzieckiem, które nie jest osobą osadzoną mimo iż towarzyszy matce. Wielość oddziaływań wychowawczych profesjonalnych ma na celu ukształtowanie nowej osoby: nowej córki, nowej matki, nowej żony, nowej pracownicy. Resocjalizacja ma za zadanie swoiste „rozstanie się” z osobą naruszającą porządek prawny poprzez zaproponowanie postaw akceptowanych społecznie poprzez wyposażenie jej w takie umiejętności, które warunkować będą dokonywanie właściwych wyborów. Stała motywacja do ich wdrażania przez całe życie stanowi sedno pracy wychowawczej Funkcjonariuszek Służby Więziennej DMI D w Zakładzie Karnym w Krzywańcu.

Więcej opracowań wyników badań dotyczących warunków funkcjonowania mieszkańców Domu Matki i Dziecka w Zakładzie Karnym w Krzywańcu znajduje się w pozycji COVID-19 and Its Impacts on Health, Helping Professions and New Technologies Textbook of Scientific Works – monografia pokonferencyjna (Zemlik 2021).

5. Podsumowanie

Trzeba tłumaczyć, komentować, wydawać, drukować, odbijać, stereotypować, rozdawać, ogłaszać, objaśniać, czytać innym, rozpowszechniać, dawać wszystkim, dawać tanio, dawać za cenę kosztu – wszystkich poetów, wszystkich filozofów, wszystkich myślicieli, wszystkich tych, co tworzą z wielkości duszy.

Viktor Hugo (1802 – 1995)

Biblioterapia, bajkoterapia i bajkopisanie znajdują zastosowanie w resocjalizacji twórczej, która kreuje nowego członka społeczności, respektującego porządek prawny. Pozostaje pytanie czy w świetle standardów międzynarodowych więzienie winno być postrzegane jako jednostka prospołeczna? Z pewnością postrzegana winna być jako służba publiczna (służba pożytku publicznego), wdrażająca wszelkie formy wsparcia, ukierunkowane na wykreowanie wartościowego członka społeczności. Intensywne oddziaływanie na matkę skutkuje wyższym poziomem rozwoju dziecka.

Świat mediów posługuje się obrazem. Narracja słowna jest bardziej inspirująca dla odbiorcy: obliguje do koncentracji na czytanej treści, oddziałuje na wyobraźnię, skłania do refleksji.

W przedstawionych wynikach wskazano na wszechstronną troskę o rozwój biopsychospołeczny dziecka funkcjonującego w warunkach izolacji więziennej matki, wskazano obszary korzystnego stymulowania jego rozwoju, który nie jest zaniedbywany społecznie i legislacyjnie w tym obszarze.

Największe zaniedbania występują w najbliższym środowisku matki naruszającej prawo jako zaniedbanego dziecka: w rodzinie i środowisku, które powinno służyć jej bezpośredniemu wsparciu. Wskazuje to na konieczność intensyfikacji pracy interdyscyplinarnej i transdyscyplinarnej w najbliższym otoczeniu każdego dziecka, by nie dochodziło do zaniedbywania obowiązków macierzyńskich, edukacyjnych, społecznych, skutkujących wejściem na drogę naruszania porządku prawnego, słowem wdrażania wszelkich aktywności prospołecznych w zakresie profilaktyki kryminalnej.

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Topics 7

Theology

ODPOWIEDZIALNOŚĆ ZA WYCHOWANIE DZIECI I MŁODZIEŻY W ŚWIETLE NORM KANONICZNYCH

RESPONSIBILITY FOR EDUCING CHILDREN AND YOUNG PEOPLE IN THE LIGHT OF CANONICAL NORMS

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Streszczenie

Wychowanie ma na celu wszczęcie dziecka i umacnianie w nim wybranego światopoglądu, przekonań, systemu wartości oraz zasad obyczajowych, moralnych i etycznych. Kościół katolicki nie pozostaje obojętny na temat wychowania i chce, żeby było ono ukierunkowane na wartości nadprzyrodzone, które są ważne w życiu i powołaniu każdego człowieka. W czasie kiedy destrukcji ulega system wartości prawodawca kościelny wskazuje konkretne osoby odpowiedzialne za wychowanie chrześcijańskie i są to rodzice, szkoła i kościół.

Słowa kluczowe: ICD-11, prawo kanoniczne, kanoniczny proces małżeński

Abstract

The purpose of education is to transmit to the child beliefs, a system of values and moral and ethical principles. The Church is not indifferent to the subject of education and wants it to be oriented towards supernatural values, which are important in the life of every human being. When the value system is destroyed, the Church legislator points to specific persons responsible for Christian upbringing and these are the parents, the school and the church.

Keywords: ICD-11, canon law, canonical matrimonial process

Wstęp

Zgodnie ze słownikową definicją, wychowanie jest świadomym i celowym działaniem zmierzającym do osiągnięcia względnie stałych skutków w postaci zmian rozwojowych w osobowości wychowanka (Okoń, 1998). Wychowanie ma na celu wszczęcie dziecka i umacnianie w nim wybranego światopoglądu, przekonań, systemu wartości oraz zasad obyczajowych, moralnych i etycznych (Sarnecki, 2001; Gwóźdź, 2015). W świetle nauczania soborowego, osoby ochrzczone mają prawo do wychowania chrześcijańskiego, które zdąża nie tylko do pełnego rozwoju osoby ludzkiej, ale ma również na uwadze stopniowe wprowadzanie człowieka w tajemnicę zbawienia. Cały proces wychowawczy winien być więc zorientowany na kształtowanie osoby w kierunku jej ostatecznego celu przy równoczesnym ukierunkowaniu go na dobro całego społeczeństwa, którego jest członkiem i w którego obowiązkach będzie brał udział (GE, 1 – 2). Nauka ta została powtórzona w Kodeksie Prawa Kanonicznego z 1983 roku, gdzie można przeczytać, że „prawdziwe wychowanie powinno zmierzać do integralnej

formacji osoby ludzkiej, zarówno w odniesieniu do celu ostatecznego, jak i w odniesieniu do dobra wspólnego społeczności, dzieci i młodzież powinny być wychowywane tak, by mogły harmonijnie rozwijać swoje przymioty fizyczne, moralne oraz intelektualne, zdobywać coraz doskonalszy zmysł odpowiedzialności i właściwego korzystania z wolności oraz przygotować się do czynnego udziału w życiu społecznym” (KPK, kan. 795).

W ramach opracowania, przy wykorzystaniu metody analitycznej, kolejno opisane będą cele wychowania oraz przedstawione zostaną podmioty i instytucje realizujące zadanie wychowania dzieci i młodzieży czyli rodzice, Kościół i szkoła. Podstawowym źródłem opracowania stanie się Kodeks Prawa Kanonicznego (KPK) promulgowany w 1983 roku z późniejszymi zmianami. W celu dokładniejszego omówienia tematu wykorzystane zostaną również dokumenty Soboru Watykańskiego Drugiego takie jak Deklaracja o wychowaniu chrześcijańskim *Gravissimum educationis* (GE) i Konstytucja duszpasterska o Kościele w świecie współczesnym *Gaudium et spes* (GS), a także List do rodzin *Gratissimam sane* (GrS), Posynodalna Adhortacja Apostolska *Christifideles laici* (ChL) papieża Jana Pawła II, Karta Praw Rodziny, Wymagania i pasja. O wychowaniu chrześcijańskim papieża Franciszka oraz literatura pomocnicza.

1. Wychowanie i jego celowość

Wychowanie należy do jednego z ważniejszych elementów w życiu każdego człowieka. Wychowanie jest nie tylko nauką podstawowych czynności, ponieważ uwzględniając nabycie umiejętności radzenia sobie w życiu, współżycia z innymi we współczesnym świecie, ma wymiar moralny, etyczny, duchowy i edukacyjny. Ukształtowanie młodego człowieka i jego światopoglądu, w którym fundament stanowi prawdziwy obraz człowieka, staje się szansą na społeczeństwo pełne ładu i harmonii, czyli społeczeństwo w którym każdy człowiek może rozwijać siebie i innych. Punktem wyjścia i celem wychowania jest więc ostatecznie sam człowiek (Solecki, Borda, 2018), a opisane wyżej szeroko rozumiane wychowanie staje się głównym celem każdej rodziny, chociaż w przekazaniu wartości dzieciom i młodzieży korzysta ona ze wsparcia innych instytucji (Kornaszewska-Polak, Gwóźdź, Wójtowicz, Szymczyk, 2019). Na wychowanie składa się bowiem wiele procesów społecznych, w ramach których człowiek rozwija swoje zdolności, postawy i zachowania. Można powiedzieć, że wychowanie stanowi zorganizowaną działalność społeczną, której celem jest ukształtowanie odpowiedniej postawy człowieka. Proces wychowania staje się dążeniem w kierunku wybranym przez wychowawców, a system wychowania jest uzależniony od przyjętej antropologii (Solecki, Borda, 2018). Prawodawca świecki zwraca uwagę na konieczność troski o fizyczny i duchowy rozwój dziecka, a następnie o rozwój jego osobowości, uzdolnień i postawy społecznej połączonej z poczuciem odpowiedzialności. W obowiązującym w Polsce Kodeksie rodzinnym i opiekuńczym prawodawca zapisał, że „rodzice wychowują dziecko pozostające pod ich władzą rodzicielską i kierują nim. Obowiązani są troszczyć się o fizyczny i duchowy rozwój dziecka i przygotować je należycie do pracy dla dobra społeczeństwa odpowiednio do jego uzdolnień” (KRO, art. 96. § 1; Kroczek, 2013). Wszystkie działania wychowawcze swoje źródło

powinny mieć w całościowej koncepcji człowieka czyli uwzględniać kim jest i dokąd zmierza, co chrześcijaństwo dopełnia otwierając człowieka na Boga (Solecki, Borda, 2018).

2. Podmioty i instytucje zobowiązane do realizacji obowiązku wychowania

Pierwszymi osobami, od których każdy człowiek ma prawo otrzymania odpowiedniego wychowania są rodzice oraz wszyscy ich zastępujący. Z tego prawa rodzice nie mogą zrezygnować, ponieważ z woli samego Boga jest ono niezbywalne, a ewentualna próba wyrzeczenia się go stanowiłaby naruszenie porządku naturalnego ustanowionego w akcie stworzenia. Prawo rodziców do wychowania potomstwa jest potwierdzone i respektowane w różnych systemach prawnych (PDPC, art. 26; Konstytucja RP, art. 18; Karta Praw Rodziny, 10; Warchołowski, 2010; Kroczyński, 2013; Gwóźdź, 2015).

Prawodawca kościelny uznaje, że „na rodzicach spoczywa najpoważniejszy obowiązek i przysługujące im w pierwszej kolejności prawo troszczenia się, stosownie do swoich możliwości, o wychowanie potomstwa zarówno fizyczne, społeczne i kulturalne, jak i moralne oraz religijne” (KPK, kan. 1 136; Krukowski, 2005). Naturalnie zadanie wychowania ma być wypełniane przez rodziców słowem i przykładem, wydaje się więc oczywistym, iż najlepszym środowiskiem do realizacji tego zadania, jest rodzina zbudowana na fundamencie małżeństwa rozumianego zgodnie z nauczaniem Kościoła jako nierozdzielny przymierz osób, skierowanego ze swej natury do wzajemnego dobra oraz właśnie zrodzenia i wychowania potomstwa (KPK, kan. 1055; GS, 48). Jak widać obowiązek wprowadzenia w dojrzałość osoby ludzkiej oraz ukazania tejże osobie tajemnicy jej tożsamości czyli powołania do życia w wiecznej komunii, która to komunია winna być urzeczywistniana już w czasie ziemskiego życia, został wpisany w samą naturę małżeństwa. Relacje przedstawionych wcześniej praw i obowiązków zamykają się więc tutaj w kręgu stałych, wzajemnych zależności osób w nim się znajdujących czyli rodziców i dzieci im powierzonych (GS, 48 – 50). Obowiązek zapewnienia chrześcijańskiego wychowania spoczywa na rodzicach nawet wtedy, gdy z różnych przyczyn pozostają oni w separacji (KPK, kan. 1 154). Przrzeczenia dołożenia wszelkich starań, aby dzieci zostały ochrzczone i wychowane w Kościele katolickim wymaga się również od osób, które pragną zawrzeć związek małżeński z osobą należącą do innego wyznania lub religii. W przypadku małżeństw osób o różnej przynależności wyznaniowej i religijnej wypełnienie tego obowiązku niejednokrotnie napotyka na różne trudności, jednak nie może być lekceważone (KPK, kan. 1 125 n. 1; Gwóźdź, 2015; Gwoździwicz, 2023).

Mimo, iż prawo i obowiązek rodziców do wychowania potomstwa jest nadrzędny względem wszystkich innych podmiotów życia społecznego, oczywistym jest, iż mogą i powinni oni korzystać z środków pomocniczych w ramach wypełniania swojego zadania. Ze względu na wolność wychowania rodzice mają prawo wyboru instytucji lub osób ich wspomagających, co zostało ujęte w kanonie, w którym można przeczytać, że „rodzice oraz ci, którzy ich zastępują, mają obowiązek i zarazem prawo do wychowania potomstwa; rodzice katolicy mają ponadto obowiązek i prawo dobierania takich środków i instytucji, za pomocą których, uwzględniając miejscowe warunki, mogliby lepiej zadbać o katolickie wychowanie swoich dzieci” (KPK, kan.

793 § 1). Instytucją wspierającą rodziców w procesie wychowania potomstwa jest kościół, który swoją działalność dzieli na dwa obszary czyli wychowanie czysto ludzkie oraz formację duchową czyli wychowanie moralno-religijne. Zdaniem kościoła bowiem dzieci i młodzież powinny być tak wychowywane, aby miały możliwość jednoczesnego rozwijania przymiotów fizycznych, moralnych, intelektualnych i kulturalnych, skoro wychowanie powinno objąć pełną formację osoby ludzkiej (Kroczek, 2013). Kościół wspomagając rodziców w ich zadaniu realizują swoją misję i prawo. Prawo to wypływa z samego prawa Bożego, bo „ze szczególnego tytułu prawo i obowiązek wychowania należy do Kościoła, któremu została zlecona przez Boga misja niesienia ludziom pomocy, aby mogli osiągnąć pełnię życia chrześcijańskiego” (KPK, kan. 794 § 1). Już w 1929 roku Pius XI pisał, że „Kościół posiada prawo, którego zrzec się nie może, a zarazem obowiązek, od którego nie może być zwolniony, czuwania nad całym wychowaniem swoich dzieci” (DiM, 1c) i to nie tylko w kwestiach nauczania religii, ale na każdej płaszczyźnie życia związanej z religią i moralnością (DiM, 1c; Gwóźdź, 2015), bo Kościół musi dawać swoim dzieciom wychowanie, które będzie przepojone duchem Chrystusowym umożliwiającym osiągnięcie pełni człowieczeństwa oraz budowanie świata w sposób najbardziej humanitarny (GE, 3; ChL, 61).

Prawodawca kościelny zapisał, że „obowiązkiem duszpasterzy jest czynić wszystko, by każdy wierny mógł otrzymać katolickie wychowanie” (KPK, kan. 794 § 2). Zadanie wychowania może być realizowane przez osoby duchowne i wówczas może przybierać różne formy, gdyż będzie się wyrażało zarówno w przykładzie własnego życia, w głoszonych homiliach i w naukach przekazywanych w ramach prowadzonych przez siebie grup duszpasterskich czy stowarzyszeń oraz nauczaniu katechetycznym i duchowych ćwiczeniach (Gwóźdź 2015; Cenelmor, Miras, 2022). W tak zwanym katalogu praw i obowiązków proboszcza ujęta jest norma odnosząca się do troski o katolickie wychowanie dzieci i młodzieży w powierzonej mu parafii (KPK, kan. 528). Także biskup diecezjalny powinien troszczyć się by „były starannie przestrzegane przepisy kanonów dotyczące posługi słowa, zwłaszcza homilii i nauczania katechetycznego, tak żeby wszystkim była przekazywana cała nauka chrześcijańska” (KPK, kan. 386). Realizacja tego zadania będzie przejawiała się między innymi w zainteresowaniu i konkretnym działaniu na płaszczyźnie zakładania, prowadzenia oraz badania działalności szkół w jego diecezji. O odpowiednie wychowanie naturalnie troszczy się Kościół powszechny, w którym to szczególną rolę pełni papież nauczający wszystkich wierzących podstawowych treści chrześcijańskiego powołania (ChL, 61). Kościół będąc społecznością ludzi dążących do doskonałości, dojrzałości i odpowiedzialnego funkcjonowania w świecie, nie może zrezygnować z zaangażowania w edukację i wychowanie, które w różnych formach realizuje na różnych szczeblach (Milerski, 2006).

Ważną instytucją silnie wspierającą rodziców w procesie wychowania jest szkoła. Wpływ procesu wychowania, jakie ma miejsce w szkole dostrzegany jest także przez Kościół. W Deklaracji o wychowaniu chrześcijańskim *Gravissimum educationis* ojcowie soborowi zapisali, że „między wszystkimi środkami wychowania szczególne znaczenie ma szkoła, która mocą swego posłannictwa kształtuje z wytrwałą troskliwością władze umysłowe, rozwija

zdolność wydawania prawidłowych sądów, wprowadza w dziedzictwo kultury wytworzonej przez przeszłe pokolenia, kształci zmysł wartości, przygotowuje do życia zawodowego, sprzyja dyspozycjom do wzajemnego zrozumienia się, stwarzając przyjazne współzycie wśród wychowanków różniących się charakterem i pochodzeniem, ponadto stanowi jakby pewne centrum, w którego wysiłkach i osiągnięciach powinny uczestniczyć równocześnie rodziny, nauczyciele, różnego rodzaju organizacje rozwijające życie kulturalne, obywatelskie, religijne, państwowe i cała społeczność ludzka” (GE, 5). Z racji uznania wielkiego wpływu szkoły na wychowanie dzieci i młodzieży, również Kościół zwraca uwagę na to, że rodzicom zagwarantowany musi być jej wybór, choć jak zostało to już wcześniej wspomniane, będzie ona stanowiła tylko i wyłącznie narzędzie pomocnicze o czym napisano w kanonie, w którym można przeczytać, że „spośród środków wychowania wierni powinni w szczególności sposób cenić szkoły, które są dla rodziców główną pomocą w wypełnianiu obowiązku wychowania” (KPK, kan. 796 § 1). W tym samym kanonie zwrócono uwagę na to, że szkoła będąc dla rodziców narzędziem pomocniczym wymaga ich współpracy z pedagogami mającymi bezpośredni kontakt z dziećmi (KPK, kan. 796 § 2; Karta Praw Rodziny, art. 5c).

W celu zapewnienia dzieciom katolickiego wychowania w kan. 798 prawodawca kościelny określa powinność wysyłania dzieci do tych szkół, które takie wychowanie zapewniają, a w sytuacji braku możliwości realizacji tego postulatu, konieczność troski o zapewnienie im tego wychowania w inny sposób (KPK, kan. 798). Nie nakłada się więc wprost obowiązku wysyłania dzieci do szkół katolickich, jednak kwestia utrzymania przez daną szkołę odpowiedniego systemu wartości nie może pozostać poza wiedzą i władzą rodziców. Kościół ma prawo zakładania i kierowania szkołami na wszystkich poziomach, od szkół podstawowych do średnich, gdyż szkoły wyższe i uniwersytety podlegają pod inne kanony. Prawo to wypływa z wolności religijnej i wolności sumienia wiernych, którzy będąc rodzicami muszą mieć możliwość wyboru dla swoich dzieci szkół zapewniających katolickie wychowanie (GE, 6). Zadanie wychowania chrześcijańskiego realizowane jest również przez niektóre instytuty zakonne, które w celu wypełnienia swojej misji, za zgodą biskupa diecezjalnego, mogą zakładać i prowadzić własne szkoły (KPK, kan. 801). Zakładane szkoły katolickie są wsparciem dla rodziców, ale również wielkim wkładem w rozwój całej kultury i społeczeństwa (KPK, kan. 800 § 2; GE, 8).

Odpowiedzialnością za wychowanie chrześcijańskie w szkołach obciążono biskupa diecezjalnego, który, jak zaznaczono w kan. 802 § 1, w sytuacji, gdy na podległym mu terytorium nie ma szkół zapewniających wychowanie przepełnione chrześcijańskim duchem, powinien zatroszczyć się o to, aby takie szkoły powstały (KPK, kan. 802 § 1). Szkoły katolickie, które funkcjonują na terenie diecezji, oddane są jego czujności tak, że ma prawo ich wizytowania oraz wydawania odpowiednich przepisów odnoszących się do ich ogólnej struktury (KPK, kan. 806). Warto w tym miejscu wspomnieć, że aby szkoła mogła zostać uznana za katolicką musi spełniać między innymi takie warunki jak oparcie na zasadach doktryny katolickiej przekazywanej wiedzy oraz wychowania, wyróżnianie się zdrową nauką i prawością życia nauczycieli w niej pracujących (KPK, kan. 803 § 2), kierowanie rozwojem

młodzieży w stronę możliwości łączenia życia w kulturze ludzkiej z przesłaniem zbawczym czyli takie poznawanie przez nich świata, życia i człowieka, które jest oświetlone światłem wiary. Dodatkowo szkoła musi spełniać warunki formalne takie jak między innymi kierowanie nią przez kompetentną władzę kościelną i publiczną osobę prawną oraz uznanie jej za katolicką przez odpowiednią władzę kościelną (KPK, kan. 803 § 1). Ze względu na misję, którą Kościół otrzymał od Chrystusa, władzy kościelnej podlega też nauczanie religijne w szkołach, które nie są katolickie. Uwzględniając miejscowe warunki biskup diecezjalny zachowując normy wydane przez Stolicę Apostolską powinien troszczyć się o wydanie norm dotyczących prowadzonych katechez oraz odpowiednich pomocy dydaktycznych (KPK, kan. 775).

W celu ciągłego wzbogacania zakresu wiedzy, przy jednoczesnym zaangażowaniu w służbę Ludowi Bożemu w jego drodze do transcendentnego celu, Kościół ma również prawo zakładania i prowadzenia uniwersytetów oraz innych instytutów szkoły wyższej (kan. 807-821). Te uniwersytety służą między innymi przygotowaniu osób, które będą później pełniły role katechetów i wychowawców dzieci i młodzieży. W poczuciu odpowiedzialności, wszyscy wychowawcy powinni, szczególnie poprzez przykład swojego życia, ale i kompetencję oraz uczciwość zawodową, służyć człowiekowi uwzględniając pełny wymiar jego wartości (ChL, 62; GE, 7).

Zakończenie

Z racji powołania wszystkich ochrzczonych do prowadzenia chrześcijańskiego życia, już w drugiej księdze Kodeksu Prawa Kanonicznego, w której zawarte są między innymi prawa i obowiązki wszystkich wiernych, można znaleźć kanon podkreślający prawo każdego ochrzczonego do uzyskania wychowania chrześcijańskiego, które to ma pomóc mu osiągnąć dojrzałość osoby ludzkiej oraz poznać i odpowiednio przeżywać tajemnicę zbawienia (KPK, kan. 217). Wychowanie to będzie obejmowało zarówno płaszczyznę czysto naturalną, polegającą na trosce o taki rozwój osobowości wychowanka, który w przyszłości umożliwi mu korzystanie z wszystkich osiągnięć społeczności ludzkiej oraz odnalezienie swojego miejsca w społeczeństwie i kulturze, a jednocześnie odstąpi przed nim płaszczyznę nadprzyrodzoną czyli jak zostało to wyżej wspomniane, pouczy o tajemnicy zbawienia oraz wprowadzi go w praktykę życia chrześcijańskiego umożliwiającego realizację swojej ludzkiej tożsamości osiągającej swoje spełnienie w budowaniu pełnej jedności życia z Bogiem (Krukowski, 2005). Prawo konkretnego wiernego do otrzymania takiego wychowania staje się jednocześnie dla innych wiernych podstawą obowiązku jego przekazania.

Nikt poza rodzicami nie ma prawa narzucania dzieciom i młodzieży wychowania, które byłoby niezgodne z przekonaniem rodziców i ich wolą, dlatego trzeba uwzględnić zakres praw Kościoła i państwa w tej materii, które to instytucje mają pomagać rodzicom realizować ich decyzje (Wroceński, 2008). Odwołując się jednak już do prawa naturalnego zarówno Kościół musi szanować prawa rodziców w tym zakresie jak i państwo, które nie może pełnić funkcji decyzyjnych, ale tylko gwarancyjno-organizatorskie w stosunku do woli rodziców (Warchołowski, 2010; Kroczyk, 2013). Wszystkim tak samo powinno zależeć, na tym, aby

„podjąć całe to potencjalne bogactwo, jakim jest każdy człowiek rozwijający się pośród rodziny (...), nie pozwolić mu zginąć albo ulec degeneracji, natomiast zaktualizować je w coraz dojrzalsze człowieczeństwo” (GrS, 16). Praktyczne problemy współczesnych rodziców dźwigających trud wychowania chrześcijańskiego dzielony ze wspomagającymi ją instytucjami stale jest w obrębie zainteresowań Kościoła, który dostrzegając ogrom zadania jakim jest przekazywanie wiedzy, ale też wartości i ideałów podkreśla, że wychowanie może być też pasją i radością (Franciszek, 2013), mimo, że bardzo często dzisiaj rodzice, wychowawcy, katecheci i sama młodzież stają wobec zupełnie nowych wyzwań kulturowych, zmian cywilizacyjnych w których często dostrzegalny jest element negatywnej i systematycznej destrukcji tradycyjnych wartości, czego konsekwencją jest poczucie zagubienia podstawowej orientacji zarówno działań, jak i postaw, ocen i wyborów. W kontekście wymienionych trudności zadanie wychowania staje się być jeszcze bardziej wymagające, ale też cenne i wartościowe (Drożdż, 2016).

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