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KINESITHERAPY IN MOTORCYCLE RACERS WITH POLYTRAUMA

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ABSTRACT

Polytraumatic injuries, which include "open-book" - pelvic fractures – "fuel tank syndrome", pose a serious challenge for kinesitherapy. It is necessary to select the appropriate methods and means, aimed at improving the quality of life of these patients, incl. a renewed practice of motorcycling sports after the polytrauma. **Purpose:** to study the effectiveness of the kinesitherapeutic program for the recovery of motorcycle racers with polytrauma. **Methods:** the study follows the rehabilitation process of four motorcycle racers with polytrauma, all of which present with an "open-book" pelvic fracture. Functional methods, such as Manual Muscle Testing (MMT) and goniometry, Visual Analogue Scale (VAS), World Health Organization's questionnaire on quality of life (WHOQOL-BREF – Measuring Quality of Life) and statistical methods were applied in the evaluation of the achieved results. **Results:** data show a significant improvement in the overall assessment of quality of life after the individual kinesitherapeutic program. Determining the contribution of each domain in the overall self-assessment of quality of life shows the strongest influence in the "physical" domain. Physical pain has a significant impact, which is confirmed by the Visual Analogue Scale data. After the completion of the kinesitherapeutic procedures an increase was observed not only in the overall assessment but also in the assessment of all four domains of quality of life. These results are supported by the goniometry and Manual Muscle Testing data. **Conclusions:** the kinesitherapeutic program contributes to the restoration of self-sufficient performance of everyday and work activities.

Keywords: sport, traumatism, emergency, surgery, physical rehabilitation

INTRODUCTION Polytraumatism is a serious and common consequence in road traffic accidents, as well as in sports competitions with vehicles, incl. motorcycles [1]. The difference in the severity and type of injuries after motorcycle accidents in professionals and amateurs is due to the relatively protected environment in racing competitions, in which the possibility of substance abuse, automobile collisions and other external factors is eliminated. The main types of injuries in this sport are fractures of the head, extremities, spine, and pelvis, as well as soft tissue injuries [2]. In polytraumatic injuries the most complicated to rehabilitate is the pelvic fracture (3% of all skeletal fractures), especially the "open-book" fracture – "fuel tank syndrome" [3]. The recovery period in these patients is of long duration because of the presence of accompanying injuries of the internal organs, positioned in the pelvis [4]. The challenge, which kinesitherapy is facing in treating these patients, is to select the appropriate methods and means, aimed at improving the quality of life, incl. a renewed practice of motorcycling sports after the polytrauma. The implementation of strategies for reducing the increasing disability is possible through the inclusion of adapted physical activity programs for restoring the working capacity and renewing the practice of sports [5].

PURPOSE To study the effectiveness of the kinesitherapeutic program for the recovery of motorcycle racers with polytrauma.

MATERIAL AND METHODS The study follows the rehabilitation process of four motorcycle racers with polytrauma, all of which present with an "open-book" pelvic fracture: female with pelvic fracture and fracture of the left and right upper extremities in loco typico, rupture of the uterus, open trauma of the anterior abdominal wall; female with pelvic fracture, open scalp wound in the parietal bone area, middle ear trauma of the right ear, fracture of the left radius in loco typico, haemorrhage in the pelvis from the uterus; female with haemorrhage in the pelvis and trauma of the external genitalia; male with fractures of the pelvis, hip, and right lower leg, rupture of the bladder, haematuria, blood transfusion, anticoagulant therapy, abrasion wounds. Functional methods, such as MMT and

goniometry, VAS, WHOQOL-BREF – Measuring Quality of Life and statistical methods were applied in the evaluation of the achieved results [6].

RESULTS AND DISCUSSION Four patients with polytrauma and “open-book” pelvic fractures (mean age $26,2 \pm 30$ years) accepted to participate in the kinesitherapeutic program (fig. 1.) [7]. Two of the patients are women, one girl and one man. For two of the patients motorcycling is a professional sport and for the other two – a hobby [8]. After the accidents the patients were transported to an emergency medical centre, where they were diagnosed with their respective injuries after consults with various specialists and necessary examinations (laboratory, X-ray, etc.). The patients were admitted to the operating room due to the urgent need for surgical intervention of the injuries in the abdominal cavity, which cause severe life-threatening complications [9]. The girl was put on bed rest and was scheduled for the necessary consults with a pediatrician and pediatric gynecologist. Until the preparation of an individual surgical plan the pelvic fractures in the adult patients were stabilized with an external fixator for stabilising the pelvis (fig. 2.) [10].



Fig. 1. "Open-book" pelvic fracture



Fig. 2. Synthesisation of the pelvis after "open-book" pelvic fracture

The patients were hospitalised in the Clinic of Orthopaedics and Traumatology for ongoing treatment of the ascertained fractures and rehabilitation. The individual kinesitherapeutic program was prepared by a specialist kinesitherapist with the aim of achieving a maximum possible recovery and return to performing everyday life activities [11]. The kinesitherapeutic tasks are related to improving the psycho-emotional state; maintaining muscle balance; improving equilibrium, coordination and postural control; training in the performance of everyday life activities, as well as prevention of complications. The applied kinesitherapeutic means are: cryotherapy; massage; passive and active kinesitherapy; joint mobilisation techniques; breathing, general development, weight-bearing, balance, coordination, strength and relaxing exercises; gait training; etc.

Procedure: The first kinesitherapeutic task was to improve the general vitality of the patient, the cardiovascular and respiratory systems' function and to prevent complications. The complex incorporated light general development and breathing exercises, performed systematically several times a day. Bed rest was maintained for about 4 weeks. Active exercises for the lower extremities as well as turning in the bed, were added to the kinesitherapeutic program towards the end of the first week after the pain had subsided. The patients were placed into a sitting position after the 2nd week and verticalised after the 4th.

In the next period of 1-3 months the goal was to gradually recover the range of motion in the joints of the lower extremities, improve the muscle tone and strength of the limbs and body. The kinesitherapeutic program in this period included therapeutic gymnastics; training in walking; therapeutic massage; cryotherapy; hydrotherapy. From the physiotherapeutic means we applied a pulse electromagnetic field and electrical stimulation. In the training period the goal was to recover the patients' locomotion and range of motion in the joints of the lower extremities, as well as the muscle strength of the abdominal and back muscle groups, the gluteal and lower limb musculature [12]. The program in the training period included therapeutic gymnastics, therapeutic massage and hydrotherapy. Out of the physical means we applied a pulse electromagnetic field, ultrasound, electrical stimulation and interferential currents. The inclusion of fitball exercises in the kinesitherapeutic complexes increased the vital capacity of the respiratory and cardiovascular systems, improved the postural endurance, coordination and equilibrium. The effects from the fitball exercises concern the balancing of the musculature by means of activating the weaker muscle groups in order to improve the equilibrium. The application of resistance band exercises makes it possible to train all joints because the resistance bands rely not on gravity, but on the resistance, achieved through stretching the band. With fitness rehabilitation we managed to synchronise the work of certain muscle groups in order to perform the given movement correctly and avoid compensatory and substitute movements.

Before and after the completion of the rehabilitation all patients underwent functional examinations (MMT and goniometry) of the hip joints. The respondents answered questions from WHOQOL-BREF – Measuring Quality of Life and Visual Analogue Scale. Table 1 presents the mean values, standard deviations and the significance level of the results from the functional examinations and VAS before and after the kinesitherapeutic program:

Table 1. Results from the functional examinations and VAS before and after the kinesitherapeutic program

Indicators	Before rehabilitation (n=4), \bar{x}	After rehabilitation (n=4), \bar{x}
Goniometry	16.25°	90.5°
MMT	2	3.75
VAS	7.5	2.5

It is clear from the presented data that during the monitored period the patients improved their range of motion and recovered the muscle strength of the affected extremities to a great extent. Table 2 presents the results from WHO's questionnaire on quality of life before and after the kinesitherapeutic program [13]:

Table 2. Results from the WHOQOL-BREF questionnaire before and after the kinesitherapeutic program

Indicator	Before rehabilitation (n=4)	After rehabilitation (n=4)	p
Overall assessment	50,50	82,50	<0,001
“Physical” domain	5,50	19,00	<0,001
“Psychological” domain	9,00	19,20	<0,001
“Social relationships” domain	8,75	10,50	<0,001
“Environment” domain	27,50	34,00	<0,001

Data show a significant improvement in the overall assessment of quality of life after the individual kinesitherapeutic program. Determining the contribution of each domain shows the strongest influence in the “physical” domain. Physical pain has a significant impact, which is confirmed by the VAS data. While examining the connection between physical pain and overall quality of life we established a significant relation ($r = 0.65$; $p < 0.001$). The quality of life increases with the subsidence of physical pain, while performing certain activities. This can be explained by the presence of a life-threatening starting condition, the severity of the polytrauma, the multiple surgical interventions and the prolonged period of physical recovery.

After the completion of the kinesitherapeutic procedures an increase was observed not only in the overall assessment but also in the assessment of all four domains of quality of life. These

results are supported by the goniometry and MMT data before the beginning of the kinesitherapeutic procedures and after their completion. Only the patient with polytrauma and rupture of the bladder, accompanied by haematuria and the need for blood transfusion and anticoagulant therapy, continued having complaints, concerning the genitourinary system after the kinesitherapeutic process, which affects the quality of life, especially in the “social relationships” domain.

CONCLUSION The kinesitherapeutic program, applied in the observed pathology, contributes to the restoration of self-sufficient performance of everyday and work activities. The improvement in range of motion and muscle strength of the lower extremities, in addition to guaranteeing free movement, leads to an increase in the self-esteem of polytraumatic patients. Proof of this are the results from WHO’s questionnaire on quality of life, which show an improvement in all four domains – “physical”, “psychological”, “social relationships”, “environment”. The satisfaction with what has been achieved is important for both the patients and the team, involved in this long recovery period. The monitoring of the patients, regarding their return to hobby and motorcycling sport, lies ahead after a consult with an orthopaedist.

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CONTEMPORARY ASPECTS OF MANAGERIAL STRESS – A REVIEW

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SUMMARY: Managers play a crucial role in contemporary work-related stress research due to their function both as moderators and inducers of stress. A large body of available literature freely discusses the effects of management work on employee stress; however, the same is not true about its effects on the stress levels of the people executing it. A broadening of our knowledge about the factors that influence the stress profile of managers is paramount for providing adequate management options for stress-related conditions (by extension, for their employees as well). The main aim is to review the contemporary understanding of stress factors in management staff. Additional aims are the comparison of stress factors between employees and managers. A literature review of relevant scientific works was conducted via indexed scientific databases. A sorting of the different articles based on pertinence was done. It has been assumed that management personnel are disproportionately exposed to stressors, leading to an earlier age of retirement due to stress-related conditions. There is an interesting relationship between the dynamism and predictability of work, which has empirically been proven to be proportional but not necessarily correlating with the somatic health of the subjects. Many factors make any direct comparisons incomplete, such as the often cited (and challenging to standardise) cultural differences, level of management and various gender and family condition specifics.

Key words: Managers, Stress, Management, AI, Stress and distress, Executives, Workplace stress, Socially significant diseases, Gender and stress

INTRODUCTION

Workplace stress [1] is a topic of most contemporary studies in the field of labour medicine [2] and work psychology [3]. Its association with a large part of socially significant diseases, including those contributing to a large share of mortality [4], indicates the importance of continuing research on the topic. All contemporary theories on workplace stress management place the main burden of controlling stress (directly by interventions or indirectly by workplace process planning or by employing relevant stress prevention and treatment specialists) on managers and executives (the terms will be used interchangeably) [5-7]. The “privileged” position of managerial staff in the mentioned theories does not protect against stressors – and, on the contrary, it contributes to an especially disadvantageous stress profile [8]. Very few papers focus on executives, which impedes the implementation of specific measures or methodologies in managing stress in people of this particular social profile. The relationship between the quality of work/life of managers and the significance of this group as a stress factor for their employees should not be underestimated [9]. Expanding our knowledge on stress in managerial staff would significantly contribute to our repertoire of workplace stress control measures, regardless of the subjects' professional characteristics and work positions.

The main aim of this article is the study of contemporary perceptions of stressors in management staff. Additional objectives include the comparison of stressors in employees and executives.

MATERIALS AND METHODS

An article search was conducted using the indexed databases Google Scholar, PubMed, Elsevier with the keywords: Stress, Management, Stress in Managers, Managerial Stress, Management Personnel in various combinations. Of an article yield of about 164 papers, n=46 were considered relevant. The results were compared to the empirical work experience of the author collective, which will be published in follow-up studies.

RESULTS

Workplace stress sources in managers are relatively well described and differentiated into four main groups of work stressors: physical environment, individual level (a combination of a workplace role and development opportunities), group level (based on the relations therein) and level of organisation (a combination of workplace climate, structure, work design and objectives characteristics). A further seven categories of workplace stressors have been identified: work quality, relations, organisation structure, physical qualities, career development and role change. In contemporary theories of stress, specifically in managers, the following stressor categories are noted: task demands, physical demands, and interpersonal relations. Individual workplace stressors have been studied possibly more than any other group, with notable relevant factors such as role conflict, role ambiguity/uncertainty, overexertion and underexertion of roles. Age plays a vital role as an independent factor in stress perception, with younger managers reporting higher stress levels (often attributed to a lack of acclimatisation and a relatively lower level of freedom compared with more experienced managers) [10-12].

Despite cultural factors being one of the main factors of workplace stress [13], there have rarely been any studies comparing the stressors in managers of different cultural backgrounds. A comparison of 178 managers from the USA, 306 from India and 222 from Japan notes many similarities. The Japanese group, however, was notably different and reported adverse reactions to common stressors with a higher frequency than the other two groups [14].

The female gender predisposes to different stress factors in the workplace and outside of it [15]. Various female employment subsidies create a paradoxical culture of women being perceived as an induced or forced minority (also referred to as “tokenism”) [16]. This has a notable effect on the self-perception of female managers and the perceptions of both their superiors and their employees. Female managers may theoretically experience a larger quantity of stress and less social support at their workplace, as well as more physical and mental sequelae of distress. Research, however, does not support these claims, as no significant difference in workplace stressors was observed between the genders, and the female gender has a beneficial effect on support outside of the workplace [17, 18].

When comparing five variable factors on organisational sources of stress, notably conflicts, career development obstruction, alienation, overexertion and an unfavourable work environment, these factors are almost universally associated with higher levels of reported stress. In a direct comparison with the Big 5 model [19], the most significant share of reported stress levels belongs to neuroticism (defined as the tendency of an individual to feel negative emotions such as fear, sadness, shame, anger, guilt and repulsion). Contrary to previous conceptions that neuroticism has an invariably negative effect on the stress profile of an individual [20], contemporary research notes that the relationship is much more complex, includes lifestyle habits, incl. coffee consumption and screen-based behavior (21, 22) at least as it pertains to managers. The

significant difference is pointed out in the closer examination of alienation, where neuroticism has a notably higher negative influence when encountering more elevated levels of the factor [23].

Managerial self-efficacy [22] is the belief in one's ability to organise and execute a desired course of action. It is the feeling of competency in having control over one's environment. Despite the intuitive connection between self-efficacy and workplace stress, there are few relevant studies, some with conflicting conclusions. In practice, the effect of self-efficacy on stressors is very minor [24].

Few direct comparisons of stress in workers and managers exist, and they are often contradicting in their results. A Danish study notes that despite managers experiencing more personal demands, more conflicts and overall lower levels of social support, they have lower total levels of emotional stress (without a significant difference in behavioural, somatic or cognitive stress). Higher levels of work satisfaction, higher levels of satisfaction from their superiors, and higher levels of work freedom are noted as explanations [25].

DISCUSSION

Stressors in managers are, for the most part, similar to those in employees. The specific differences have yet to undergo extensive studies for their complete characterisation. Multiple factors specific to executives exist, but there is no consensus on their effects on the overall stress profile of the group. Direct comparisons between different social groups should be free from any preconceptions, and certain bodies of research would benefit from extending their scope due to the often reported paradoxical results in managers.

CONCLUSION

A differing stress profile in managers demands a different approach towards studying and managing stress in executives. More research needs to be conducted on an international level to understand stress in managerial personnel better.

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PHYSIOTHERAPEUTIC FITBALL FOR ADOLESCENTS WITH OBESITY

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ABSTRACT

Introduction: Overweight and obesity among children are prerequisite for the emergence of adverse somatic, psychological and social consequences, which manifest themselves in old age. The physiotherapeutic knowledge and practice offer methods and means for managing overweight among children. Nevertheless, childhood obesity is gaining momentum and reaching epidemic proportions.

Purpose: To research the importance of fitball as an emotional and therapeutic method for reducing overweight in adolescents.

Material and Methods: The study includes a total of 85 participants (n=85), 56% boys and 44% girls with an average age of 9.5 years, anthropometric, sociological and statistical methods.

Results: An increase in physical activity was observed - from 31.3% before the "Extended fitball" programme to 46.2% immediately after its completion. After completing the "Extended fitball" methodology the weight was reduced on average by approximately 2 kg. A reduction in the "body fat percentage" and "body circumference" indicators is established. One year after the participation of adolescents in the "Extended Fitball" programme we observed an increase (6.9%) in the appearance of new physical activities, performed seven or more times per week, as well as an increased interest in systematic practice of various sports. The adolescents' parents share a boost in their children's motivation for physical activities, as a result of the programme.

Conclusions: The "Extended Fitball" methodology can be used for long-term reduction of overweight in adolescents, as well as a preventive approach towards unwanted consequences, related to and resulting from childhood obesity.

Keywords: sport, physical rehabilitation, childhood obesitas

INTRODUCTION

In recent years, obesity has been identified as a problem of pandemic proportions. Nowadays more than 1 billion people around the world are obese - 650 million adults, 340 million adolescents and 39 million children. Unfortunately, by 2025 approximately 167 million people are predicted to have health problems as a complication of being overweight or obese and by 2030 - over 1 billion. Over the years, the discussion of this problem has touched various aspects. Modern terminology characterises it as " a chronic condition, characterised by an excessive accumulation of body fat, which poses a significant risk to the health of the individual" [1, 2]. Research shows that this is caused by and increased energy intake and an insufficient energy expenditure [3 , 4, 5]. WHO (1979) and the American Medical Association (2013) classify obesity as a disease. In some countries, however, it is considered a risk factor and a medical condition among children, as these patients do not necessarily present with accompanying illnesses, requiring urgent medical intervention [6]. Obesity has as an adverse effect not only on the condition of the cardiovascular system and the occurrence of arterial hypertension, ischaemic heart disease, heart failure, etc., but also on many other organs and systems. The consequences of this epidemic problem affect the metabolism, which is in the basis of many endocrine diseases, such as diabetes mellitus, ovarian polycystic syndrome, etc. Disorders in a woman's menstrual cycle, infertility and some of the complications during pregnancy are also associated with increased body weight [7].

According to WHO, every year around 15 million people worldwide suffer from cerebrovascular accidents, 6 million of which pass away and 5 million who survive and live with permanent disabilities. One of the reasons for this condition are chronic diseases, caused by overweight or obesity. Preventing overweight would limit the development of such conditions and reduce the number of patients with socially significant diseases. In addition to the risk reduction of neurological disease development, conditions related to psychiatric diseases and depressions are

also limited. Abdominal obesity also leads to the compression of internal organs, one of which are the lungs. The compression of pulmonary parenchyma hinders the respiratory function and often leads to obstructive sleep apnea and hypoventilation syndrome among obese people. This disrupts the quality of sleep of these patients, brings restlessness, increases the desire of consumption of foods, rich in carbohydrates and sugars, which further increases the weight.

It is mentioned the existence of a connection between the malignant nature of diseases and the increased body mass index. There is evidence that the incidence of endometrial cancer among obese women increases by 2 to 4 times. Similar statistics show the development of esophageal and cardia cancer. Compared to women the connection overweight-liver cancer is stronger in men. According to WHO, the risk of meningioma is 50% higher for obese people, in comparison to those with weight within the norm. Colorectal cancer is 30% more common in obese people than in people of normal body weight. Osteoarthritis is directly related to overweight, as increased body mass puts additional strain on the musculoskeletal system. In this regard there is also an increased incidence of disc herniations in the cervical and lumbar regions of the spine. Based on the above mentioned, it turns out that obesity is a leading factor in the occurrence of a variety of socially significant diseases such as diabetes, cardiovascular and respiratory diseases, arterial hypertension, cerebral circulation and kidney disorders, malignant diseases and disability [8, 9]. In some countries, being overweight poses a serious risk for increased mortality in the population. Being overweight affects the psycho-emotional state of children, adolescents and adults with consequences in their overall development [10]. Obesity treatment is a long and complex process, requiring a “dose of responsibility” on behalf of the patient and cooperation on behalf of the multidisciplinary team members. Effective rehabilitative recovery in vulnerable population groups, including children, undoubtedly requires a personalised patient approach. Building a relationship of trust between the physiotherapist and child-patient is a challenge, in which the communicative and pedagogical skills of the physiotherapist are of particular importance, especially in the training process of performing the exercises. The “Extended Fitball” methodology borrows 70% of the methods and means of classic fitball, in view of preserving the effects on emotion, concentration and increasing the children’s enthusiasm for tackling the set tasks. On the other hand, the different varieties of fitball improve the metabolism and the intensity of motor and secretory functions of the bile and large intestines, which are of importance in the treatment of childhood obesity. In the remaining 30% of the sessions we use the means of active physiotherapy and emphasise on fitness rehabilitation. This makes an increase in calorie burning possible during the training process, which further contributes to the fulfilment of the goal.

PURPOSE

To research the importance of fitball as an emotional and therapeutic method for reducing overweight in adolescents.

MATERIAL & METHODS

The study was conducted among 85 overweight and obese students who chose to attend the Medical Centre for Rehabilitation and Sport Medicine “Prostor” - Varna, to whom we applied the “Extended Fitball” methodology. The group of overweight and obese students was assessed as organised and suitable, with main reasons for selecting this contingent being:

- There are risk factors for obesity in this age group;
- There is an opportunity to change the lifestyle of the patients in this age, with view of preventing obesity and the diseases it could lead to;
- A large fraction of the students have reduced physical activity and harmful eating habits;
- The commitment of the parents in educating their children on a healthy lifestyle is insufficient.

The questionnaire survey was conducted through a direct individual questionnaire among the parents and participants. The representative sample was formed based on the selection criteria and included 85 overweight and obese children, living in the territory of Varna region, with an average age of 9.5 years, 48 of which were boys and 37 - girls. During the initial contact with the

parents of the children, who took part in the study, we explained the objectives of the study, the way it would be conducted and the use of the data from it. The respondents were informed of their right to refuse to participate without affecting their child’s treatment. The participants in the study are assured that the information they provide will be used for scientific purposes only. The respondents are familiar with the instructions for answering the questions and were asked whether they understand the sense of the questions through feedback. The results were processed using SPSS v.24.0 for Windows.

RESULTS AND DISCUSSION

The presented results are part of a study contained in the dissertation thesis “Extended Fitball as an Emotional and Therapeutic Method for Reducing Overweight” with author Stanislava Bogomilova (Protocol permission from the Commission for Scientific Research Ethics (KENI) MU-Varna № 52/ 10.03.2016). Approximately one-third (31.30%) of the participants in the “Extended Fitball” programme before its initiation and 46.20% of the participants immediately after its completion report physical activity and exercise 1 to 3 times per week. The prospective study established an increase in motor activity from 31.3% before the “Extended Fitball” programme to 46.2% immediately after its completion (fig. 1.). The questionnaire survey among the parents of the adolescent participants in the study shows an increase in weekly physical activity (from 1 to 3 times per week). They report that as a result of the programme their children’s motivation for physical activities, such as skating, cycling, dancing, jumping rope, etc., has been enhanced.

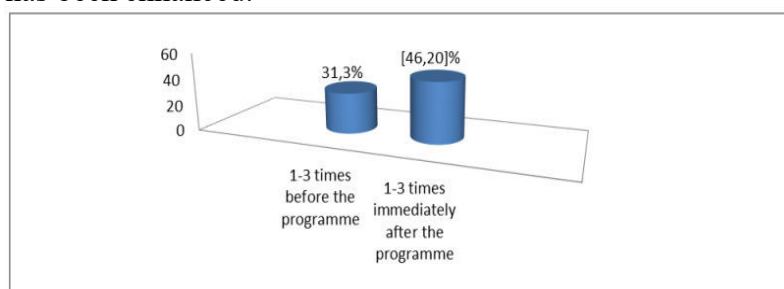


Fig. 1. Physical activity before and after the programme (n=85)

The same trend was observed when comparing the results immediately after the “Extended Fitball” programme and one year later. We observed an increase (6.9%) in new physical activities outside of the programme (seven or more time per week) with an increased interest in systematic practice of various sports.

Analysing the weight change of the adolescent participants in the study established an average reduction of about 2 kg immediately after the “Extended Fitball” programme. The “body fat percentage” and “body circumference” indicators show positive changes (fig. 2.):

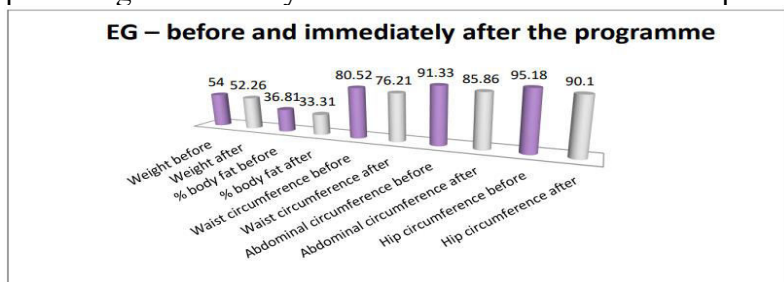


Fig. 2. Changes in the anthropometric indicators before and after the programme (n=85)

In order to verify the sustainability of the programme we examined the respondents one year later. Given the rapid growth of children at this age, the weight indicator changes regardless of the applied methodology and cannot be used as a criteria for the effectiveness of the programme. Changes in body fat percentage, as well as the body circumference indicators demonstrate positive changes.

The necessity for thorough knowledge on the problem, when preparing the physiotherapeutic plan, as well as the precise selection of the exercises, included in the methodology, and their dosage, is our main recommendation for achieving effectiveness with the programme. In order to achieve maximum results in overweight and obese children we recommend that the physiotherapists cooperate with other specialists - paediatricians, nutritionists, incl. narrow specialists, competent in the field of possible complications, that may occur as a results of the disease. In order for the applied methodology to be as effective as possible we recommend training children to perform the exercises at home.

The purposeful analysis of publications from available literature and the obtained results allowed us to develop an effective algorithm for behaviour in overweight and obese children. The effectiveness of the physiotherapeutic methodology is determined by the increase in the children's enthusiasm while performing the set tasks, which leads to the fulfilment of our main goal - reduction of body weight.

CONCLUSIONS

Physiotherapy is an important component of the overall rehabilitation process of overweight and obese patients. It uses a wide resource of methods and means of achieving a therapeutic effect. The creation of an effective algorithm for the treatment of obesity and its consequences should be the focus of a wide range of specialists - endocrinologist, nutritionists, physiotherapists, psychologists, etc., united in a multidisciplinary team, where the physiotherapists have a leading role due to their daily sessions with the patient, compared to the other specialists who meet the patient at greater time intervals. Physiotherapists have the necessary knowledge and skills to prepare and implement an algorithm for the prevention and treatment of overweight and obesity. A properly developed complex will stimulate the normal metabolic exchange, hormonal balance, physical working capacity and psycho-emotional state of the patient. The frequent physiotherapist-patient meetings definitely strengthen the relationship and trust, because the patients share about their current condition and because the physiotherapists have the competence to adjust the programme, based on this information. The application of an individual approach in the treatment process engages the patients' attention and increases their motivation. This guarantees the achievement of health, psychological and economic results, as well as an improvement in quality of life among patients, suffering from overweight and obesity.

Conflicts of interest. There have been no conflict of interest situations during the course of the research and the publication of the manuscript. The experimental work meets the ethical requirements concerning research and involving the participation of people asset for the Helsinki Declaration

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THE POSTAL STAMPS AS HEALTH PROMOTION TOOLS: ALZHEIMER'S DISEASE

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ABSTRACT

Health education (HE) is one of the main health promotion (HP) strategies targeting knowledge and competences building for health. HE is applying a variety of methods and tools. The postal stamps has been used as a tool for HE for many years. Worldwide dementia is one of the main causes of disability and it is the seventh leading cause of death. Concretely, Alzheimer's disease accounts for 60-80% of all dementia cases. The negative societal impact of Alzheimer's disease is huge– the family dynamics are broken, the need for medical and social care is growing.

The **aim** of this scientific review is to investigate and present the historical developments of the postal stamps as a HP tool for Alzheimer's disease.

Methods: A search and review of available full-text scientific publications in PubMed and Google scholar was performed, websites of associations related to the disease, and postal services were examined using the keywords "postal stamps" and "Alzheimer's disease".

Results: The Alzheimer's Stamp was first issued in 2008 in the US with the inscription "Care, support, research". Nine years later, the second Alzheimer's themed stamp was released, adding the ambition to raise funds for research - this type of stamp is called "semipostal". By April 2023, over 10.8 million copies were sold, raising \$1.4 million for Alzheimer's disease research.

Conclusion: The postal stamps with a mission still have their place as a vehicle for raising health awareness. For the last 15 years, the Alzheimer's stamp has proven itself as a successful HE tool, but also as a source of empathy and community support. This fact makes the stamp a strong HP tool.

Keywords: public health, health promotion, postal stamps, Alzheimer's disease

INTRODUCTION

Health promotion is an essential public health function. It enhances activities, which differ in focus from the dominant curative, high technology, or acute health services. Health promotion is essential part of the societal efforts to manage the health threats associated not only with pathogens, but also with lifestyle and socioeconomic factor. [1]

Health education is one of the main health promotion strategies. Its goal is to achieve better health for people by providing information on specific health topics, forming knowledge and skills for healthy behavior, and preventing premature mortality and disability. The moral obligation of the medical educators is to train for health improvement and disease prevention applying a variety of methods and tools.

The postal stamps has been traditionally used as a tool for health education. [2] A classical model of success has been the famous Christmas Seal, created in 1904 in Denmark and dedicated to the battle with tuberculosis - at these times one of the leading death causes. This postage stamp has been acknowledged as one of the most successful tool of raising health awareness and fundraising to fight the infectious diseases. [3]

Nowadays, the global burden of chronic diseases, like dementia, is growing. Worldwide, dementia is one of the main causes of disability and it is the seventh leading cause of death. [4] In 2017, the World Health Organization (WHO) identified dementia as one of the public health

priorities with the adoption of the Global action plan on the public health response to dementia 2017-2025. The global plan cover prevention, diagnosis and treatment activities, support for people caring for patients with dementia, and actions to increase awareness of the disease among the public. [5] Concretely, Alzheimer's disease accounts for 60-80% of all dementia cases. Clinically, the disease affects people over the age of 65 and the symptoms are rapidly progressing. The patients are experiencing cognitive and functional disabilities among which memory loss, depression, inability to perform routine daily activities, etc. The negative societal impact of Alzheimer's disease is huge – the family dynamics are broken, the need for medical and social care is growing. [6]

THE AIM of this scientific review is to investigate and present the historical developments of the postal stamps as a promoting tool for Alzheimer's disease health education.

MATERIALS AND METHODS

A search and review of available full-text scientific publications in PubMed and Google scholar was performed, websites of associations related to the disease, and postal services were examined using the keywords "postal stamps" and "Alzheimer's disease". The search was conducted in September, 2023.

RESULTS

The Alzheimer's Awareness Postage Stamp was first issued 15 years ago in October 2008 in the US. [2] (Fig.1.)



Fig. 1. Alzheimer's stamp, 2008
Source: United States Postal Service [7]

The US Postal Service released the stamp on the 17 of October 2008. In the upper right corner of the stamp is the inscription "*Care, support, research*". The stamp value was 42 cents and was distributed nationwide. The design is done by Ethel Kessler and is an image of an elderly woman. The hand of the person who cares for her is placed on her left shoulder. In front of her face are dark clouds, a symbol of her confusion as a result of the disease, and behind the woman is sunlight - a ray of hope and care from relatives or caregivers. The stamp was designed to bring social awareness regarding Alzheimer's disease, to focus on those affected by the disease and those dedicated to caring for the sick.[7]

Nine years later, on the 30 of October, 2017 the second Alzheimer's themed stamp was released. The ambition was not only to raise public awareness of the disease and its severe social consequences, but also to raise funds to support research on the Alzheimer's disease. The stamp has an initial price of 60 cents, with a fixed percentage of the sale of each copy going to US health research institutes. This type of stamp is called "semipostal", which means that it raises funds for a specific cause. The image was the same as on the first stamp, but this time the face of the elderly woman is turned to the right (Fig. 2.) The idea was to distinguish the two stamps.[8]



Fig. 2. Alzheimer's Semipostal Stamp
Source: United States Postal Service [8]

The release of the stamps was a result of the active advocacy actions of two women who were directly affected by the disease. For decades, Kathy Siggins cared for her Alzheimer's-diseased husband. After his death in 1999, she learned that thanks to another stamp, funds were being collected to fight breast cancer. For the next 18 years, she dedicated her activities to the initiatives creating a stamp that would not only inform the community about Alzheimer's disease, but also be a tool of raising funds to fight the disease. [9] Kathy Siggins' cause attracted Lynda Everman, who spent 18 years caring for her father and husband both with Alzheimer's disease. In 2013, the two women united in their efforts – sending hundreds of letters and emails to the US Congress, collecting over 84,777 signatures in support of the initiative from across the country.[9] Additionally, they received support by the Alzheimer's Association and the specially issued Alzheimer's Disease Semipostal Stamp Act. [10]

In 2015, the US Senate approved the issuance of the stamp. An official ceremony on the 30 of October, 2017 at The Johns Hopkins Bayview Medical Center, in the presence of politicians and over 200 guests, marked the appearance of the Alzheimer's Semipostal Stamp. [11]

The stamp continues to be distributed today at a price of 75 cents. By April 2023, over 10.8 million copies had been sold, raising \$1.4 million for Alzheimer's disease research.[12]

CONCLUSIONS: In the era of the fast e-mail communication and the social networks, the snail mail with postal stamps is not that popular. Nevertheless, the postal stamps with a mission still have their place as a vehicle for raising health awareness and provoking empathy for significant health issues.

For the last 15 years, the Alzheimer's postal stamp has proven itself as a successful tool for health education. It has been established not simply as an educational tool about the disease, but also as a source of empathy and community support. This fact makes the stamp a strong health-promoting tool.

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IMPROVEMENT OF STROKE PATIENT'S GAIT AFTER BOTULINUM TOXIN APPLICATION – A CASE REPORT

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ABSTRACT. The purpose of this study to evaluate the effects of botulinum toxin type A (BoNTA) injection of the rectus femoris (RF) muscle on the electromyographic activity on the knee flexor and extensor and on knee and hip kinematics during gait in patients with hemiparesis exhibiting a Wernicke - Mann gait. The methods that we used were two gait analyses performed on several patients- before and three or four weeks after the injections. Kinematic and electromyographic parameters were discussed for the paretic limb. 3-D Gait analyses was carried out the Motion Analyses System with 4 optoelectronic cameras. About results we should say that BoNTA treatment improved gait velocity, strided length and cadence with an increase of knee angular velocity of toe-off and maximal knee flexion in the swing phase. In Conclusion, our results showed that BoNTA treatment strongly modified the EMG amplitude and frequency of the injected muscle without changing the EMG activity of synergist or antagonist muscle.

Key words: botulinum toxin type A, EMG, m.rectus femoris, knee flexor, knee extensor, kinematics gait, hemiparesis, Wernicke – Mann gait

Introduction. Human locomotion is a phenomenon of the most extraordinary complexity in which so great are the multitude of individual motions occurring simultaneously in the three planes of space [1]. Reduced peak knee flexion in the swing phase of gait, known as hemiparetic gait, Wernicke – Mann), is a common abnormality in patients with hemiparesis. Inappropriate activity of the rectus femoris muscle (RF), due to spasticity, has been widely reported as a cause of hemiparetic gait. Rehabilitation with BoNTA has been shown to be effective in patients with hemiparesis with lower limb spasticity [2]. EMG is a useful tool for the evaluation of abnormal patterns of muscle activation in patients with neurological disorders and EMG techniques may be used to evaluate the effects of BoNTA.

Spasticity of some muscles especially muscle rectus femoris is one of the main causes of Wernicke – Mann gait in patients with upper– motor neuron syndrome and leads to gait disabilities [3] Hemiplegic gait treatment with rehabilitation and BoNT A has been effective on clinically assessed spasticity as well as certain parameters of the gait cycle (knee flexion during the swing phase and gait velocity)

Hemiplegic gait, Wernicke-Mann type represents spastic pattern of hemiplegic leg, hip into extension, adduction and medial rotation, knee in extension, ankle in drop foot with ankle plantar flexion and inversion (equinovarus) which is present during both stance and swing phase. In order to clear the foot from the ground the hip and knee should flex but the spastic muscles won't allow, so the patients hikes hip and bring the affected leg by making a half circle i.e. circumducting the leg. Hence the gait is known as “Circumductory gait” [3]

Wernicke-Mann gait is also characterized by a decrease in peak knee flexion during the swing phase of gait and is commonly observed in patients following stroke [4] One of the principle causes of the gait is spasticity of the rectus femoris muscle (RF). RF spasticity increases the knee extension moment in pre-swing and decreases knee flexion velocity at toe-off both of which potentially decrease peak knee flexion in swing [4]

Electromyography (EMG) is useful tool for the evaluation of abnormal patterns of muscle activation in patients with neurological disorders, helping in clinical decision making. Recently, Phadke et al.(2012) highlighted the problems related with EMG amplitude normalization for the evaluation of the effects of BoNTA in patients with neurological lesions. The main cause being

that patients with neurological lesions may demonstrate varying levels of strength. Since BoNTA blocks neuromuscular junctions of the injected muscle, this may also decrease strength. Method which does not require amplitude normalization is frequency analyses of the EMG signal. This technique aims to decompose EMG signal into its individual frequencies. The pattern of muscle fiber activation is provided by the frequency of the EMG signal. This informs on the shapes and conduction velocities of the action potentials of the motor unit [5] Continuous wavelet transform (CWT) has been used to evaluate muscle activation in the gait of patients with neurological diseases.

This study was designed to evaluate the need of rehabilitation of patients after stroke in order to improve their gait, range of motion and spasticity of muscle rectus femoris. It was designed to research if botulinum toxin type A injection on the spastic muscle of patients after stroke is effective. It aimed to determine clinical efficiency of BTX-A treatment on Wernicke - Mann gait and to provide more information on the physiopathology of this condition.

MATERIALS AND METHODS

1. Participants. One subject with chronic hemiparesis following stroke and Wernivke – Mann gait was enrolled in the study. The age of participant was 53 years. Hemiparesis on the right side.
2. Clinical Examination of patients: Neurologic impairments (upper- and lower-limb motor function, muscle tone, sensitivity, range of motion, deep tendon reflexes) were assessed using the Stroke Impairment Assessment Set (SIAS). The Duncan - Ely test¹⁰ was also performed to specifically evaluate rectus femoris spasticity.
3. Gait assessment. The patient was carried out one gait analysis session on 2 separate days: before BoNTA injections into spastic RF and four weeks after. Gait parameters were recorded using 8 optoelectronic cameras (Motion analysis Corporation, Hadassah hospital, Jerusalem, Israel) which measured the 3D coordinates of 30 reflective markers.
4. Amplitude. The linear envelope of the EMG signals was calculated after full wave rectification and low pass filtering at 10Hz [6]
5. Muscle activation time. The TKEO was applied to the EMG signals in order to calculate the duration of muscle activation throughout the entire gait cycle [6]
6. Frequency. In order to extract information relating to changes in frequency and time from the EMG signal [6], a frequency analysis was performed using CWT.
7. Botulinum toxin injection. An average dose of 164+-50U of BoNTA was injected into three anatomical points of the spastic RF muscle.

RESULTS

1. Outcomes on the number of steps

The patient enrolled in this study, there was a significant change. The procedure was well tolerated by the patient without any side effects. The outcomes related to the number of steps have significantly improved after the BoNTA from 15 to 17.

The injection of botulinum neurotoxin into rectus femoris contributed to positive effects on NIHSS, with outcomes increased from 48 (before the manipulation, 36-57) to 50, and on muscle spasticity, with outcomes in the Duncan-Eli test reduced by 1 unit. The outcomes of the Ashworth scale decreased from 3 (before, 1-3) to 1 (after BoNTA, 0-3). The step velocity has also increased. The average walking speed increased by 0,5 m/s. The frequency of the steps mildly increased after the intervention by 78 ± 9 steps/min compared to the values measured in normal gait before the manipulation 65 ± 6 steps/min. The time for activation of the spastic muscles decreased significantly, and the time for activation of rectus femoris muscle decreased from 75 to 73.

2. Outcomes on the range of motion of the KJ

The range of flexion of the KJ after BoNTA injection increased to 3+/5 in the manual muscle testing (MMT) from 1/5 before injection during the SwP of the gait cycle. At the end of the stance phase, flexion range of 77° was achieved, corresponding to one-third of the values measured in normal gait. The flexion velocity of the KJ decreased at the beginning of the swing phase and reached negative values close to those of the extension. Then the flexion range increased again, so the knee velocity expressed a double concave. After the BoNTA injection, the flexion range of the knee improved, and this double concave disappeared. The flexion range and velocity of the knee during the stance phase increased from 85 ° ± 63 ° before to 110 ° ± 75 ° after BoNTA. The angle of the KJ measured with a goniometer increased by 5° after the injection.

3. Outcomes on the knee strength

The strength of the knee joint in stroke patient before and after the injection was measured comparatively. In patient before injection, the strength of the knee indicated low values measured in the manual muscle testing, which is associated with the contraction of RF of the quadriceps femoral muscle to slow knee flexion at the end of the stance phase. The strength of the knee joint before BoNTA was greatly reduced in patient measured by MMT 1/5. After the injection of BoNTA, the strength increased significantly 3+/5.

4. Outcomes on the time of action of RF

The time of action of the medial and lateral head of m. quadriceps femoris and RF was monitored. It was noticed that the activation time of the examined heads of the quadriceps femur before BoNTA had increased for the medial and lateral heads and was almost constant for rectus femoris. The time of action of RF after injection is reduced, and that of the medial and lateral heads is more noticeably reduced. After averaging the outcomes of all studies, it was found that the time of action of RF decreased significantly after the injection from 68% ± 17% to 58% ± 13% and respectively for the other two heads from 60% ± 14% to 47% ± 18%.

5. Outcomes on the energy expenditure through walking

We compared that the energy expenditure through walking of the patient in the study before the manipulation (2.2 ± 1.1J/kg) was greater than the energy expended by the patient through walking after the injection (2.1 ± 0.5J/kg). An insignificant reduction in the net energy expenditure was observed when patient walked after the injection (1,9 ± 1,1 J/kg). The patient was with mild knee flexion, but still incomplete, before the injection (from 3/5 by MMT to 4-/5 by MMT), improvement was observed after treatment and the energy expenditure in walking after manipulation was reduced 4.2 ± 1.2 to 3.1 ± 1.3 J-kg-1-m-1.

6. Indicators of the knee joint

The outcomes of the kinematic indicators showed that the maximum flexion of the knee increases during the active hemiparetic gait ($P = 0.00001$) (+3.4 °), increases also after the intervention of m. rectus femoris ($P = 0.0002$) (+5.2 °). No relation is found between the percentage ratio of improvement in the knee flexion in fast hemiparetic gait and improvement in the knee flexion in maximal velocity after the intervention ($R = 0.36$; $P = 0.023$).

DISCUSSION

The present study shows the beneficial effects of BTX-A injection into the rectus femoris on Wernicke-Mann gait in person with stroke. The treatment improved knee joint displacement, angular speed, and power. These improvements, and the decrease in the rectus femoris tone, decreased the vastus lateralis and biceps femoris activation time. Although it might have been preferable to perform a double-blind randomized controlled trial to assess the effects of BTX-A, this would have been prohibitively expensive and long given the number of patients required and the cost of the motion analysis measurements.

Spasticity of the lower limbs is a major cause of disability in patients with chronic disorders of the pyramidal tract after stroke. Until now, no satisfactory treatment has been available. Medications seldom produce useful reductions in spasticity without side effects such as sedation and generalized weakness. Rectus femoris can be particularly resistant to drug treatment. Surgical procedures. Including section of nerve roots of the spinal cord and amputation of the femoral head, may be disfiguring, are not without risk, and spasticity can recur. Intrathecal infusion of baclofen by implanted pumps reduces spasticity, but this treatment requires close monitoring of the patient and the pump. There is a need of an easily administered treatment and rehabilitation that will control muscle spasm without producing generalized weakness or systemic effects, and injected botulinum-A toxin may meet these criteria.

CONCLUSION

In Conclusion, our results showed that BoNTA treatment strongly modified the EMG amplitude and frequency of the injected muscle without changing the EMG activity of synergist or antagonist muscle. The reduction in RF activation frequency could be the result of increased slow fiber activity. With regard to these results, it seems that the frequency analysis of EMG signals during gait could be a relevant method to detect the effectiveness of BoNTA in the injected muscle. Rehabilitation and injecting BoNT A in spastic muscles in patient with hemiparesis after stroke seemed to delay the angle of peak spastic torque, whereas the voluntary force decreased and to improve social life of patients. In this study, after stroke patient selection, rehabilitation using BoNT A injection into the spastic muscle in hemiparetic gait type Wernicke - Mann led to improvements in impairments, functional aspects of gait, social life and discomfort. This study shows the beneficial effect of Rehabilitation and BTX-A in spastic muscles injection on Wernicke – Mann gait that was shown in patient with stroke. This study shows the importance of the rectus femoris in the physiopathology of hemiplegic gait. Future studies should also focus on the long-term benefits of BTX-A.

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THE TECHNIQUE OF DRY NEEDLING THROUGH THE EYES OF THE KINESITHERAPIST

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ABSTRACT

Trigger point dry needling has been known since antiquity and has been practiced alongside with classical acupuncture. Nowadays, the public and patients' interest in this practice grows rapidly, which imposes the training of competent specialists.

Purpose: to study the awareness and attitude of kinesitherapy students, regarding the dry needling technique, and their readiness for implementing it in their future practice.

Material and methods: *Material:* 45 kinesitherapy students in the educational qualification degree "Bachelor", Faculty of Public Health, Medical University - Varna. *Methods:* documentary analysis, sociological and statistical methods. The instrument of the study is a questionnaire, consisting of 20 multiple-choice questions. The research was developed with the software SPSS v.24.0 for Windows.

Results and discussion: the awareness of the respondents, regarding the nature of the concept "dry needling", increases with almost 50% after conducting the training course in Eastern Medicine and Unconventional Methods. The respondents do not approve the practice of dry needling by people, who are not medical specialists and have no legal capacity. They accept the necessity to participate in a postgraduate course, in order to apply this unconventional method safely, in favor of the sick person.

Conclusion: the comparatively short period of education and easy application of the dry needling technique, place kinesitherapy specialists in first position (together with the medical doctors) for overcoming patient complaints. The combination of kinesitherapeutic methods and means with dry needling as a complex therapy makes kinesitherapists leading specialists in dealing with pain of myofascial origin.

Keywords: dry needling, acupuncture, kinesitherapy, physiotherapy

INTRODUCTION

The dry needling technique is a micro-invasive method, which is applied by physiotherapists (according to the legislation) for myofascial pain treatment (American Physical Therapy Association). Trigger point dry needling has been known since antiquity, has been practiced alongside with classical acupuncture and has been mentioned in the book "The Yellow Emperor's Canon of Internal Medicine". The target points in dry needling have been established and classified several decades ago parallel with the acupuncture points: called "Ashi points" – trigger, motor, "sensitive" points. In the beginning of the 19th century, dry needling was created and practiced in the USA by specialists in traditional and medical acupuncture. This approach is based

on classical Chinese acupuncture and it is integrated with the theory of Janet Travell, based on Western medicine. The actual development of the method has been implemented during the period 1970-1990, based on clinical observations. In 1979, Karel Lewit published his own experience with dry needling in „The needle effect in the relief of myofascial pain“, which gives a push in the development of dry needling in Europe and worldwide [1]. He introduces acupuncture needles for dry needling application, as they are safer and non-traumatic. After the year 2000, dry needling started to gain more popularity, which lead to the organization of many training courses. These courses however are shorter and with a considerably smaller horarium in comparison to acupuncture courses (up to 30 study hours) [2].

The clinical goal of dry needling is to remove the pathological myofascial tension and to alleviate the myofascial pain. The main objects are local structures like muscles, tendons, connective tissue and somatic pain in these tissues. Dry needling is a method of choice for pain alleviation in musculoskeletal problems, incl. postoperative endoprosthesis of the affected joints for accelerating the rehabilitation process [3]. It can be applied by medical doctors and physiotherapists [4]. The growth of the public and patients' interest in dry needling in Bulgaria and the lack of clarity in the Bulgarian legislation sets a number of questions: what does this method represent, who has the right to be trained, to practice and teach it, etc. [5]. *The purpose* of this article is to study the awareness and attitude of kinesitherapy students, regarding the dry needling technique, and their readiness for implementing it in their future practice.

MATERIAL AND METHODS

45 kinesitherapy students, with an average age of 21,3 years, in the educational qualification degree “Bachelor” in the Faculty of Public Health, Medical University – Varna, participated in this study. The study was conducted in the time period: February 2022 – May 2023. For the fulfillment of the purpose of this study, we applied a documentary analysis, sociological (direct individual questionnaire) and statistical methods. The instrument of the study is a questionnaire, consisting of 20 multiple-choice questions. Questions No. 1-2 concern age and gender. Questions No. 3-20 are thus distributed: field “awareness” (question No. 3- 8), field “attitude” (question No. 9-14) and field “behavioral readiness” (question No. 15-20). The research was with the help of the software product SPSS v.24.0 for Windows.

RESULTS AND DISCUSSION

The study was conducted among kinesitherapy students in educational qualification degree “Bachelor”, second year of education during the fourth semester, when “Eastern Medicine and Unconventional Methods” is foreseen as a freely selectable discipline. Those of the students, who accepted to participate in the study, were given an informed consent form and clarification of the essence of the study. All forty-five students answered the questions of the questionnaire before the start of the Eastern Medicine and Unconventional Methods training course. After the respondents completed the lecture course and practical exercises, they were given the same questionnaire. The answers of the questions from the questionnaire, received before and after the Eastern Medicine and Unconventional Methods training course, were processed statistically with the help of the software product SPSS v.24.0 for Windows.

The awareness of the respondents, regarding the nature of the concept “dry needling”, increases with almost 50% after conducting the training course in Eastern Medicine and Unconventional Methods. The students share their impressions from the comparative method of presenting acupuncture and dry needling (what is common and what is different between them), as an effective approach for information absorption about the role, place and importance of dry needling. After the course completion, an increase in the awareness is established (from 27,5%

to 60%), regarding the specialists, who are not medical doctors, and their right to perform the technique of dry needling in Bulgaria (fig. 1.).

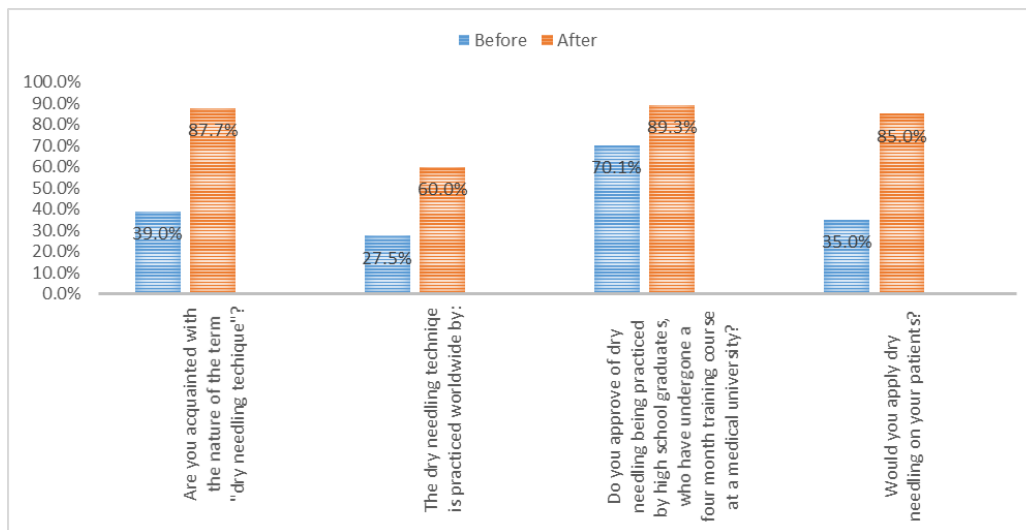


Fig. 1. Results from the “Dry needling technique” questionnaire

The respondents do not approve the practice of dry needling by people, who are not medical specialists and have no legal capacity. The awareness of the kinesitherapy students, regarding the dry needling method, helps in clarifying the real risk of abuse, incl. acupuncture practice by people, who have not undergone training and are not certified. This attitude of the respondents, regarding dry needling, corresponds with the conducted analysis from the National Certification for Acupuncture and Oriental Medicine (2003) about the use of the method [6, 7]. The data from the analysis establish vicious dry needling practices, which leaves patients with the impression that dry needling by its nature is like acupuncture:

- The same acupuncture needles are used, which according to the Federal Food, Drug and Cosmetic Act (FDA) are object of strict regulations as medical devices, class II;
- Not only painful but also non-painful conditions are relieved;
- Not only trigger but also acupuncture points are treated.

Zhou K publishes an article in the Journal of Acupuncture in Medicine (2015), in which he discusses the connection between dry needling and acupuncture [8]. In the applied editorial the conclusion is that dry needling, applied in the treatment of musculoskeletal dysfunctions, is a style of western acupuncture, which is a form of the acupuncture practice, although it differs from the traditional acupuncture.

In their answers, the respondents unite around the opinion that the practice of dry needling by people, who have passed through the corresponding training in postgraduate education at medical universities, is a holistic approach to musculoskeletal pain. This opinion is also confirmed after finishing the training course, as an increase of 20% in the positive answers is observed. Due to the training course, the kinesitherapy students consider that, they need to apply dry needling as a complementary method in the complex therapy of patients with pain, affecting the musculoskeletal system [9, 10, 11].

After completing the training course in Eastern Medicine and Unconventional Methods, the respondents accept dry needling as a new method in the field of their profession that would contribute to a faster pain recovery among their patients [12]. Furthermore, an increase is observed in the motivation of the students (from 35% to 85%) to undergo dry needling treatment, as well as to apply it on patients in their future work (fig. 1.). They accept the necessity to participate in a postgraduate course, in order to apply this unconventional method safely, in favor of the sick person.

CONCLUSION

The practice of dry needling finds its place in the therapy of patients with mostly musculoskeletal dysfunctions and less in patients with chronic disorders from other kind. The comparatively short period of education and easy application of the dry needling technique, place kinesitherapy specialists in first position (together with medical doctors) for overcoming this type of patient complaints. The combination of kinesitherapeutic methods and means with dry needling as a complex therapy makes them leading specialists in dealing with pain of myofascial origin. The risk from abuse, incl. acupuncture practice by kinesitherapists (acupuncture remains in the field of medical doctors) can be overcome with dry needling training during the student course of education and a postgraduate course for upgrading their skills and acquiring legal capacity. In this sense, it is necessary for the legal framework for education and for professionals, who can practice dry needling in the Bulgarian medical practice, to be adapted to this new public need.

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COMPARATIVE ANALYSIS OF THE FREQUENCY OF SPINAL DISEASES IN STUDENTS IN THE CITY AND THE VILLAGES IN 2023

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SUMMARY:

Purpose: The purpose of the study is to compare the frequency of spinal curvatures in children living and studying in urban and rural areas. Through this research, we would determine the impact of computerization and a sedentary lifestyle on the spinal development of children in cities compared to adolescents in rural regions.

Materials and methods: The examinations were conducted by medical doctors specialized in Physical and Rehabilitation Medicine (PRM) in the medical offices of the respective schools with the consent of the principals, class teachers, parents, and the regional inspectorate of education. The examinations took place during the 2022/2023 school year in 3 schools in the medium-sized city of Kazanlak, Bulgaria, and in 12 schools in a rural region - the municipality of Pavel Banya, Bulgaria

Results: The study results showed a lower rate of initial changes in spinal diseases in children in rural regions, but a higher rate of expressed scoliosis in rural versus urban areas.

Conclusions: The introduction of modern technologies into the everyday life of students and their increasingly less active lifestyles in recent years has led to a boost in spine diseases, especially among the urban population. PRM specialists are the responsible doctors for restoring the preventive examinations for spinal curvatures in the school. Our study found that children living in urban areas would benefit from increased participation in sports-related extracurricular activities. Conversely, children residing in rural regions tend to have a greater inclination towards physical activity but are at a higher risk of developing expressed cases of scoliosis due to inadequate access to specialized medical care and preventative measures. Our team believes that the implementation of annual school screening, not only in urban areas but also in rural regions, can be effectively carried out by PRM specialists in all regions of the Republic of Bulgaria. This approach would have a significant positive impact on the social, economic, and health aspects of the population of the Republic of Bulgaria in the long run.

Keywords: scoliosis, screening, preventive examinations, prevention. rural regions, urban regions

INTRODUCTION

Spinal deformities are one of the most common diseases in children with significant medico-social importance worldwide. Years of research in this area have proven beyond doubt that annual screening of learners is the best approach to overcoming the long-term effects of the disease. Early detection of structural changes in the development of the spine contributes to their more effective treatment and minimizes the need for surgical treatment /1*,2*/

In Bulgaria, in the last 30 years, scoliosis is most frequently diagnosed by parents rather than school or personal doctors, and often at a significantly late stage. That is due to the lack of annual screening in schools by medical professionals. In rural areas, this screening has been completely

suspended. The long-standing tradition of early detection and prevention of scoliosis in Bulgaria through the joint efforts of health and school authorities has been interrupted.

School Scoliosis Screening (SSS) is carried out worldwide, but in a few countries, is being regulated at the state level. In Europe, SSS dates from the beginning of the 20th century, and in the USA - after 1960. Currently, less than half of the states have statutory screening. Japan is one of the few countries where scoliosis screening is mandatory. Back in 2012, only three provinces and one municipality in China, which had a population of one billion, conducted preventive school examinations. Unfortunately, scoliosis screening has been neglected lately and this is becoming a worldwide trend. The primary reason behind this trend may be the introduction of numerous "innovative" methods to treat the complications arising from spinal distortions like operative stabilization of the spine, extirpation of disc herniation, stabilizing corsets and belts, etc.

The optimal age to perform scoliosis screening at school is still debatable. Screenings for scoliosis in most countries of the world are carried out as part of school health screening programs between the ages of 10-14/4*/. In our screening, we included children aged 7 to 10 years, although in younger children the initial changes may be only transient. According to our team, the earlier preventive examinations begin, the more beneficial the efforts of the physical therapist are for the child's health.

AIM

Our study aims to determine whether there are differences in the frequency of spinal curvatures in rural and urban adolescents. The study was conducted through preventive examinations during the 2022/2023 academic year in schools of the territory of the medium-sized city of Kazanlak, Bulgaria, and the small municipality villages - Pavel Banya, Bulgaria.

TASKS

The task of the research is to investigate the effects of immobilization on children living in urban areas and the impact of inadequate medical services in rural regions. Through our study, we aim to gather crucial data that can be presented to health authorities to develop an appropriate policy for preventing spinal diseases in adolescents.

MATERIAL AND METHODS

The examinations were carried out by specialists in physical and rehabilitation medicine (PRM) in the doctors' offices of the respective schools. The object of research was 3 schools in the city of Kazanlak and 12 schools in the territory of the small municipality of Pavel Banya. The examinations took place with the written consent of the school principals, class teachers, parents, and the regional inspectorate of education and were held completely free of charge for the students.

Preventive examinations were performed through functional assessment, inspection, palpation, and anthropometric measurements. Students from 1st to 8th grade were examined. For the quick systematization of the examination results, the students were generally divided into 3 main groups: no distortions; initial distortions; and expressed distortions. The criteria for initial distortions in our examinations were conditions such as imbalance in PVM, minimal difference in waist triangles and folds, unilateral limitation of lateroflexion, functionally bent posture, difference in shoulder joint posture, prominent scapula, and flat feet. For expressed scoliosis, we adopted the following criteria: visible curvature of the spine in the frontal plane, substantial rigidity of the PVM, a significant difference in the waist triangles, unilateral or bilateral limitation of lateroflexion, kyphosis, higher standing of the shoulder joint and scapula, flat feet, rotation of the pelvis, shortening of the lower limb, palpable pain.

Our approach to diagnosing spinal disease was as follows: we prepared an official list of affected children, which we provided to the school administration. The contact details of the doctors and

the medical center were provided if requested by the parents. Most of the diagnosed children with spinal deformities were admitted for treatment at the medical center, and the rest either did not want further diagnosis and treatment or chose another physiotherapy center. A thorough examination was performed on these children. X-rays and plantograms were performed at discretion. It was explained in detail to the parents and children about the necessary hygiene of the day and school regime, as well as the need to regularly visit the physiotherapy center at least 2 times a year for follow-up and treatment of spinal curvature. We organized physical therapy groups of 4 children each for general strengthening exercises for those with initial changes. The patients were referred for physiotherapy in outpatient settings, with which a 10-day course of treatment was carried out - completely free of charge for the children through the conduct of group and individual physical therapy in health facilities or the gymnasiums of the schools themselves.

RESULTS

The results show a significant difference in the incidence of spinal curvatures between rural and urban populations. We found that among children in villages, deviations in the development of the spine are less often diagnosed. At the same time, however, children's expressed spinal distortions are more often detected - those that are visible even through the child's clothes, but the disease is not noticed either by parents or teachers.

During the academic year 2022/2023, **942** students were examined in 3 schools in the city of Kazanlak, of which **140** were children with initial distortion, and **3** were with expressed scoliosis. During this academic year, in the small municipality of Pavel banya, examinations were held in 12 rural schools. **538** students were examined, of which **54** children had initial malformations, and **7** students were diagnosed with expressed scoliosis.

In percentage ratio, children with initial changes in the rural region are **10.4%** of all examined, and children with expressed scoliosis are **1.3%**

In the city, the percentage of children with initial changes is higher - **14.8%**, but expressed scoliosis is much less - **0.3%**.

DISCUSSION

Expressed scoliosis can be accepted as a distortion with a Cobb angle greater than 10 degrees /3*5*/ Most scoliosis screening studies around the world show that expressed scoliosis is less than 2% of students screened. In a large region of Istanbul, the result shows 0.48% pronounced spinal curvatures /5*/. The Chinese study conducted in Chongming Island - Shanghai Municipality in 2012 showed 2.52% expressed scoliosis/3*/ and another study in 2019 in Zhejiang Province showed 3.9% expressed spinal curvatures /4*/.

From these worldwide studies, it is evident that in big cities the percentage of pronounced scoliosis is low, and in the provinces, the percentage of expressed scoliosis is higher. In this sense, our study in Bulgaria does not stand out (expressed scoliosis in the villages 1.3% and 0.3% in the city). Our team points out that, this problem worldwide and in Bulgaria, is based on the fact that children in villages and the countryside do not have access to specialized medical care and spinal curvature remains undiagnosed for a long period of time.

However, in previous world surveys, the statistics do not include children with initial changes. But especially, these children should be diagnosed and treated against intensifying the distortion. From our research, it is evident that in villages children have fewer initial distortions (10.4%), probably due to a more physically active lifestyle. In the city of Kazanlak, children with initial distortions are (14.8%), which we associate with the increased computerization and more sedentary way of life of the middle-town population.

CONCLUSION

The entry of modern technologies into the everyday life of students and their increasingly less active lifestyle in recent years has led to a boost in spine diseases. This applies especially to children growing up in an urban area. The complete neglect of the problem by parents and doctors in villages leads to more frequent expressed scoliosis in rural regions. PRM specialists are the doctors who have the responsibility to restore preventive examinations for spinal curvature in schools, both in cities and in the villages. We recommend that these preventive examinations must be performed every year, by which we would have the opportunity to carry out direct control over at-risk students, as well as we would report the effect of the executed prevention and rehabilitation.

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MUSCULOSKELETAL DISORDERS AMONG DENTIST – STUDY IN BULGARIA

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ABSTRACT

Musculoskeletal disorders (MSDs) are a very common problem among work-related disabilities and injuries among dental practitioners.

Purpose: This study aims to investigate the prevalence of MSDs among dental practitioners.

Methods: Data related to musculoskeletal symptoms were recorded using a modified Nordic Musculoskeletal Questionnaire, and posture analysis was performed using a "Dynabak" wearable body-type electronic device with built-in sensors (sensors) and in accordance with the standard BDS EN 1005-4:2005+A1.

Results: The results showed that the overall prevalence of MSDs was 88% and was in three or more body areas. Most often, pain is reported in the back, neck, right and left arm, and the highest proportion of unacceptable positions are registered when moving the elbow (left and right).

Conclusion: The prevalence of musculoskeletal complaints among dental practitioners is high.

Keywords: musculoskeletal disorders (MSDs), dentists, Nordic musculoskeletal questionnaire (NMQ), dental ergonomics

INTRODUCTION

In their workplace, dentists are exposed to numerous risk factors. Among the leading ones is the uncomfortable working posture leading to the occurrence of musculoskeletal disorders (MSDs). Many researchers document in their results a high risk of musculoskeletal disorders (MSDs) in dental practitioners [1].

Cited by Gandolfi work-related musculoskeletal disorders (WMSD) affects dental specialists at least once in a lifetime [2]. The systematic review by Hayes et al (2009) reported a prevalence of WMSD among dental professionals ranging between 64% and 93%, and the results of the systematic review by Soo et al (2023) among dentists showed that the annual prevalence of musculoskeletal disorders anywhere on the body varies between 68% and 100% [3,4]. Similar are the results of the study by Halkai et al (2022) [5].

According to Kumar et al "The incidence of musculoskeletal disorders among dental professionals is increasing..." [6]. Concerns about proliferation are also growing on this one species cumulative traumas that can lead to loss of productivity and worsened quality on life, temporary absence from work, and sometimes to long-term disability, disability and early retirement [3,5].

THE PURPOSE of the study is to investigate the prevalence of musculoskeletal disorders among dentists.

MATERIALS AND METHODS

The study included 25 dentists. It was held in December 2022 at the Faculty of Dental Medicine of MU-Sofia. Data were collected using a modified Nordic Musculoskeletal Questionnaire, and assessment of the type and frequency of non-ergonomic movements - using a "Dynabac" T-shirt type device with built-in sensors and interpreted in accordance with the standard BDS EN 1005-4:2005+A1 ("Safety of machines. Human physical characteristics"). The evaluated movements

are: frontal - left and right; sagittal - left and right; extended elbow - left and right; body - forward/backward; lateral to the body; torso rotation. The statistical analysis was done using the Statistical Package for Social Sciences (SPSS) version 20. The study was approved by the Research Ethics Committee at MU-Sofia.

RESULTS

Results of a survey on the prevalence of MSDs. The dentists who participated in the study (N=25) were mostly women (56%) with an average age of 31.7 (± 7.9) years, masters (100), single (76%), urban residents (88%) with a total (36%) and special work experience (48%) between 4 and 10 years.

The presence of musculoskeletal problems in the previous 12 months was reported by 88% of the participants, and all of them had problems in three or more areas of the body, distributed (88% for each listed area) as follows: in the right and left hand (in the areas of the right elbow or left arm), right leg (thigh and lower leg areas) and left leg (ankle area), as well as the lower buttock area. The second most common problem is pain in the upper neck area (52%) and the third most common problem is in the back area (lower back/upper area) (24%).

During the last 7 days, the dentists have difficulty doing their work normally (at working place, at home) most often due to problems in 4 out of 7 areas: in the back (28% each for the upper and lower areas), neck and right hand (16% each) with areas of the highest relative share the base of the neck, elbow, palms and fingers, as well as in the area of the left hand in the area of the palm and fingers (12%).

Through the last ones 4 weeks, the respondents have reduced levels of activity (at working place and at home) most often due to problems in 6 out of 7 areas. The leading cause is problems in the back and with the largest relative share of registered problems in the area of its upper part (20%). The second leading cause is pain in the right hand - wrist area (16%). Pain in the neck (upper area) and left arm (again the wrist) are in third place with 12% each. With the smallest relative share are the problems in the left foot (foot and toe area - 8%), followed by the right foot (foot and toe area - 4%).

Respondents have difficulty doing their work normally (at work, at home) in the last 12 months, most often due to problems in the back (the area in its upper part - 32%) and neck (32% in the areas of the upper part and the base), left leg area (knee area) – 20%, followed by right leg area (knee area) – 16%. In the last two places are the right arm (12% each in the shoulder, wrist, palm and fingers areas), and with 8% each are the left arm (shoulder area) and buttocks (bottom area). The observed small differences in the proportions determine the absence of a statistically significant relationship between the presence of complaints in the last 12 months and all socio-demographic characteristics of dentists (gender, age, education, marital status, place of residence, total work experience, work experience in the specialty, office/remote work, availability and degree of physical activity, number of working hours and days per week).

Results of measurements with "Dynabac" T-shirt type device with built-in sensors

With frontal movement of the left and right hand, the relative share of the time in an unacceptable position of the total research time is the highest compared to the time in an acceptable and conditionally acceptable position, respectively for the left hand - 51.2% and the right hand - 55.0%. The proportion for an acceptable position for this type of movement is relatively lower

and is respectively for the left hand - 14.4% and the right hand - 34.3%. Conditionally acceptable positions have a relative share as follows, left hand - 16.3% and right hand - 10.7%.

In the sagittal movement of the hands, the highest proportion of time is in a conditionally acceptable position (left hand – 34.6% and right hand – 43.8%). Followed by the unacceptable positions - for the left hand this proportion is 26.1%, and for the right hand it is 30.6%. Acceptable positions for sagittal hand movement have the lowest proportion, respectively for the left hand – 21.6% and the right hand – 25.6%.

The distribution of respondents depending on the performed movements and position (acceptable/conditionally acceptable/unacceptable) shows that the most common unacceptable positions are at the elbows (right elbow – 100.0%, left elbow – 87.5%) and frontal movement of left hand (71.4%). The most common acceptable positions were lateral body movement (87.5%), torso rotation (70.6%) and forward/backward body movement (56.3%).

A comparison of the results of the questionnaire for subjective assessment of complaints and the results of sensory measurements was performed. The results show that in the group of dentists who reported any musculoskeletal complaint (regardless of the area of the body), in the first three places are unacceptable positions associated with an extended elbow - right and left and frontal movement of the left arm, the proportions are respectively 100.0%, 87.5% and 69.2%. I.e. all who have any complaint also have an unacceptable position with the right elbow, in 3/4 with the left elbow and in 2/3 with the left hand frontally.

CONCLUSION:

Generally, 88 % of dentists have suffered from musculoskeletal pain in the last 12 months. They had problems in three or more areas of the body. Pain is most often reported in the back, neck, right and left hand. The observed small differences in the proportions determine the absence of a statistically significant relationship between the presence of complaints in the last 12 months and all the socio-demographic characteristics of the dentists. The highest proportion of unacceptable positions was recorded in the movement of the elbow (left and right). Among the workers who indicated a complaint, the most common unacceptable positions are when moving the elbows and moving the hands (frontally). In the movement of the hands (frontal and sagittal), acceptable and conditionally acceptable positions were most often registered. Most often, acceptable positions are observed in forward/backward, lateral, and torso rotation movements.

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ANALYSIS OF TEMPORARY MORBIDITY AMONG TELEWORKING PROFESSIONALS

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SUMMARY The health status assessment creates a realistic opportunity to explore the impact of work environmental factors on the teleworkers. On this basis, the specific measures can be identified to improve health status and address the negative impact of specific factors related to work activity. The aim of the analysis presented is to assess the health status of teleworkers based on the incidence of temporary disability. **Methods** The analysis is based on the submitted and posted sick leave documents for 2022 for an average number of employees – 476.5. The used statistical method is Batix-Lekarev. The analysis of the health status is based on the characteristics of those working on different attributes and their variations. **Results** The distribution by sex indicates that 160 of the respondents are female and 347 are male. There were 25 primary hospital admissions diagnosed with COVID-19 and 34 with the diagnosis unspecified infection. These three groups of diseases account for 75% of all occupational losses for the year. The average duration per case is less than the accepted average of 10 days. **Discussion:** The leading causes of temporary incapacity for work in 2022 according to the analysis are the following: certain infectious and parasitic diseases, diseases of the respiratory system, diseases of the musculoskeletal system and connective tissue. According to the analysis may be concluded that work environment factors (home office or present) specific to individual occupational groups are not determinants of diseases – causes of loss of work capacity.

INTRODUCTION

Telework refers to any form of work organization in which work that could have been performed on the employer's premises is accomplished elsewhere by an employee on a voluntary and planned basis using information and communication technologies.[1] In recent years, a few studies have explored the impact of telework on workers' health and experience of working conditions. According to Lasfargue et al., telework is associated with longer working time, increased perceived workload and better quality of personal life, with less fatigue and stress [2] The COVID-19 health crisis and lockdown led to a sudden increase in telework for many employees. COVID-19 is a contagious human-to-human infectious disease caused by a coronavirus, SARS-CoV-2, to which the majority of the population was not immune. [3] A recent review investigated the relationships between telework and health. The authors identified benefits (stress reduction, greater flexibility, better work–life balance/control) and health problems (musculoskeletal problems, psychological problems) [4]. The health and occupational uncertainty that pertains to the epidemic crisis context is suspected to have been an important source of personal stress, as well as the collision of personal and work lives [5]. The COVID-19 pandemic has profoundly changed the working conditions of hospital staff (increased mental, emotional and physical workload, changes in work organization with the implementation of sudden telecommuting), which makes them most vulnerable to anxiety disorders [6,7]. Telework, also known as remote working, is gaining popularity and becoming a common feature in the economy, due not only to advances in digital technology but also to changing attitudes about where and when work should be performed and

how performance should be measured [8]. As the lockdown began, working from home was required by all of those who could reasonably be expected to do so, and offices and other workplaces were closed down [9]. The majority of the respondents had not used teleworking before the lockdown, but more than half teleworked 5 or more days per week during lockdown. More than half reported sharing their workspace with others in the household. [10] The assessment of the health status of workers and especially its follow-up makes it possible to reveal what changes have occurred and in what direction - towards improvement or towards deterioration. The assessment of health status creates a more realistic opportunity to examine the impact of work environment factors on workers' health. [11] On this basis, the specific measures can be identified to improve health status and address the negative impact of specific factors related to work activity. The aim of the analysis presented here is to assess the health status of workers based on the incidence of temporary and permanent disability. The conclusions of the analysis should serve for a more targeted justification of measures to protect the health and working capacity of workers in specific occupational working environment. The health status assessment creates a realistic opportunity to explore the impact of work environmental factors on the health workers. On this basis, the specific measures can be identified to improve health status and address the negative impact of specific factors related to work activity.

METHODS The analysis and assessment of the health status is based on the data recorded in the following sources of information: company data on the number and characteristics of employees by: gender and age, sick leave granted for temporary disability in 2022, expert decisions provided by commissions. The analysis is based on the submitted and posted sick leave documents for 2022 for an average number of employees – 476.5. The assessment of the indicators of temporary disability is carried out by comparison with indicative-normative groups according to a statistical system of Batix-Lekarev, which refer to a one-year period.

RESULTS

The analysis is based on the submitted and posted sick leaves for 2022. The analysis of the health status is based on the characteristics of those working on different attributes and their variations, which are:

- Gender - the average number of employees is 476.5. The surveyed contingent 347 men and 160 women.
- The distribution of employees by age groups shows that the majority of the employees are in the age group 26-35 years - 42 % and the age group age group 36-45 - 38 % of employees.

The distribution by sex indicates that 160 of the respondents are female and 347 are male. There were 25 primary hospital admissions diagnosed with COVID-19 and 34 with the diagnosis unspecified infection. These three groups of diseases account for 75% of all occupational leaves for the year. The average duration per case is less than the accepted average of 10 days. The incidence of temporary disability is an indicator of health condition of the active (working) population and an aggregate of the incidence of diseases of the working population that prevent the performance of work and have a reversible transient nature. In the analysis of temporary incapacity for work for 2022, a number of statistical indicators - incidence, frequency of days and average duration per case, as well as statistical methods for examining persons in temporary of persons in temporary incapacity for work - relative share, gender, age, size enterprises, as well as the sick by type of disease. Cases and days with reasons for caring for a sick child, sick family member, normal pregnancy, childbirth and maternity, quarantine, as these are not related to

working conditions and no link could be sought between working conditions and the specific illness, i.e. they have no bearing on the overall incidence of the disease. The analysis of incidence of temporary incapacity for work has been made by person and case, which gives a more comprehensive picture of the health status of workers. According to the data from the sick lists for 2022, 110 persons were sick. Registered 172 primary sick notes with 935 days of temporary incapacity for work. Overall, the actual incidence of temporary incapacity for work (TIC) by routine indicators for the surveyed one year period - 01.01.2022 to 31.12.2022 is within the range of:

Table 1 Intensity indicators: measured in units

1.Intensity (absolute) indicators: measured in units		
Incidence rate per 100 employees (HR)	Frequency of lost days per 100 employees (Kt)	Medium duration of per case (K pr)
very low - up to 60 low (60-80) medium (80-100) high (100-120) very high (over 120)	very low - up to 600 low (600-800) medium (800-1000) high (1000-1200) very high (over 1200)	10 days (according to literature)

Table 2 Intensity indicators: measured in units

2 Intensity indicators: measured in units		
For frequent and long sick	For the short-term /up to 3 days/	For the primary Disability
low - up to 3% medium - 3-6% high - over 6%	low - up to 40% medium - 40-60% high - over 60%	very low - up to 3 per 1000 low - 3-4 per 1000 medium - 4-5 per 1000 high - 5-6 per 1000 very high - over 6 per 1000

- Very low for incidence rate - 35.68 cases per 100 workers (up to 60 cases per 100 persons)
- Very low for the incidence rate (Kt) - 193.70 cases per 100 workers (1000-1200 days per 100 persons).
- The average duration per case is 5.43 days/case - below the average value. The value taken

as a guide for the average duration per case with HF - 10 days.

- Proportion of persons with frequent and long illness - 1.68 - low indicator.
- Proportion of short-term temporary disability - 50.59 - high indicator.
- Proportion of workers with long-term incapacity for work is 1.26- low.
- 6 workers with permanent incapacity for work with expert decision.
- Frequency of persons with diseases detected during periodic medical examinations - 112.33- high indicator.

The results of the analysis of the data on the incidence of temporary incapacity for work provide the Occupational Health Service with a good health status. It can be concluded that the work environment factors specific to the individual occupational groups are not determinants of the diseases - causes of loss of work capacity. The incidence of temporary incapacity for work (TIC) for 2022 shows a very low level for the 'incidence' indicator and

very low for the 'severity' indicator. Only for the indicator 'relative share of short-term temporary incapacity for work' is reported at high levels.

DISCUSSION Our study highlights the leading causes of temporary incapacity for work in 2022 according to the analysis are the following: certain infectious and parasitic diseases, diseases of the respiratory system, diseases of the musculoskeletal system and connective tissue. According to the analysis may be concluded that work environment factors (home office or present) specific to individual occupational groups are not determinants of diseases – causes of loss of work capacity. Most community exposures were not associated with teleworking. Further studies are needed to better characterize the constellation of activities, including possible work and community exposures concomitantly occurring that could increase risk for infection, particularly while asymptomatic transmission occurs.

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CHARACTERISTICS OF INTERNATIONAL PROJECTS FOR COLLABORATION BETWEEN VARNA MEDICAL UNIVERSITY (BULGARIA) AND ISRAELI UNIVERSITY HOSPITAL RAMBAM (HAIFA) FOR THE LAST DECADE (2013-2023)

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Introduction: The international relations and mutual projects between universities world-wide is always a benefit for any institution. Especially when it refers a wide spectrum of various initiatives, giving an impulse for both, practical and scientific realization of promising ideas, plans and programmes.

Thus, for example, the Medical University of Varna-Bulgaria, having a very active collaborative portfolio in and out of Bulgaria, started and maintains a very intensive cooperation with the University Hospital Rambam in Haifa-Israel for the last decade.

Depiction: The history of bilateral contacts between Varna Medical University and Haifa University Hospital Rambam includes over couple of decades, starting from the last few years of 20-th century, when the first Bulgarian postgraduate doctors, sent to qualify in this unique hospital in Israel for one, two or more years, with full fellowships, provided by the President of the International Medical Association Bulgaria (IMAB) in collaboration with the Israeli Medical Association (IMA).

Since then, and until now, over 20 young Bulgarian doctors have been sent to qualify in different clinics of Rambam-Haifa.

In addition, several groups of professors from Varna Medical University, again organized and lead by the President of IMAB, each year in the period 2013-2020, paid working visits to Rambam, meeting their colleagues, attending seminars and discussions of mutual ideas in topical round-tables. The accent of these visits was a round in the underground fortified special hospital for emergency in critical war and natural disaster situations (the biggest in the world and most high-tech equipped), where regular workshops are organized every semester each year.

On the reverse, a number of Rambam professors visited Varna Medical University for workshops, seminars and lectures, thus expanding the international cooperation between the two institutions.

Highlights: the terroristic attack on Israeli tourists in Bourgas airport (18 July 2012) dramatically changed and gave a sudden and unexpected direction of the international collaboration between Varna Medical University and Rambam University Hospital.

The leading role for such kind of exclusive collaboration belongs to the Honorary Consul of Israel in Bulgaria (also, President of IMAB), who immediately after the terroristic attack took over the activation, establishment and realization of special coordination projects and topical workshops in Varna with Israeli institutions and their know-how experts.

New projects: starting from 2013, Varna Medical University began the organization of the Annual Workshop on Natural Disasters, Catastrophic Events and Terrorism, under the patronage and chaired by the Rector of the Medical University, with the Hon.Consul of Israel as chief moderator, and with participation of leading experts from Israel, including a special team from Rambam Trauma Unit and Counter-Terrorism Department.

These annual workshops (2013-2019) were the first established in Bulgaria international practical forums, dedicated to Natural Disasters, Catastrophic Events and Terrorism, with participation of a group of top experts from Israeli institutions (Rambam Trauma Unit, Hadassah Emergency Center, Israeli Inst. Forensic Medicine, Israeli David Magen, Israeli Ministry of health) and in addition several colleagues from the EU, NATO and neighbouring Balkan countries.

The Bulgarian institutions, involved and participating in the annual workshops, included Varna Municipality, Bulgarian Red Cross, Ministry of Defense, Fire Department, Emergency Medicine, Ministry of Interior, Bulgarian Union of Physicians, University hospitals from Varna, Sofia, Bourgas, Plovdiv, Pleven, Stara Zagora, Veliko Tarnovo, Rouse.

The accent of the annual workshops in Varna was the 2017 forum, with a very active demonstrative practical demonstration, including full coordination between all the participating units: military, police, Red Cross, medical, counter-terroristic, unit for natural disasters and catastrophic events, helicopter and ambulances, medical staff of the University Hospital “St.Marina” (the location of the workshop).

The demonstrative practical workshop was supervised by the Director of the Israeli Inst. Counter Terrorism Prof. Boaz Ganor (Herzliya-Israel) and the Director of the University Hospital Rambam Prof. Michael Halberthal (Haifa-Israel), who gave a very high evaluation of the preparedness of the Bulgarian teams, participating in the practical drill.

The annual workshops on Natural Disasters, Catastrophic Events and Terrorism, organized and realized by the Medical University of Varna, are the main tool for education, preparedness and know-how in the current time of world confrontation, military and environmental problems.

Although and due to the Covid-19 crisis the organization of these practical workshops was stopped for the last few years, there is a high need of restart and continuation of such very important forums, which is in the agenda of the Dept. International Relations, Medical University, Varna-Bulgaria, in cooperation with the Int.Med.Assoc.Bulgaria, Hon.Consulate of Israel, Varna Municipality and the corresponding institutions in Bulgaria.

In addition to the annual workshop on Natural Disasters, Catastrophic Events and Terrorism, the two institutions, Varna Medical University and Rambam University Hospital, have a number of additional collaborative projects, such as exchange of biannual topical seminars (Varna and Haifa), publications of new medical issues in the journals of both institutions, online consultations, sending of Bulgarian patients to Rambam for additional specialized diagnosis and therapy, donations of medical products and equipment, etc.

In conclusion: the international projects for collaboration between Varna Medical University (Bulgaria) and Israeli University Hospital Rambam (Haifa) are the best example of very successful inter-institutional programme, proving its excellency and promising results for over a decade.

Applications: photos from the collaborative projects Varna-Haifa:

1. Bourgas airport, 18 July 2012 – terroristic attack on a bus with Israeli tourists
2. Underground evacuation hospital facility, Rambam, Haifa, Israel
3. Workshop on natural disasters, catastrophic events and terrorism, Varna Medial University
4. International team of participants in the 2-nd Workshop in Varna
5. Participants in the Workshop





Data taken from the files of the Hon.Consulate of Israel in Bulgaria

ANALYSIS OF SUICIDAL SITUATIONS IN SILISTRA REGION UNDER THE PROJECT "IMPROVED SERVICES FOR MENTAL HEALTH" FOR 2011-2021

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ABSTRACT

Suicidal behavior is one of the parameters used to assess the mental health and social well-being of society. **Objective:** To analyze the state, trends and features of suicidal situations and suicidal acts in the Silistra region for 2011-2021. **Materials and methods:** Retrospective analysis of data from registration, reports, analyzes of Regional Health Inspection Silistra for 2011-2021. Data from the "Card for registration of a suicidal act", filled out at the scene of the accident by teams of Emergency Medical Center-Silistra and in medical facilities in Silistra Region. Documentary method, statistical processing and graphic presentation. **Results:** The total number of suicidal acts in the Silistren region is 543 for 2011-2021 16.69% ended fatally, unsuccessfully - 83.3% of the cases. The motives for taking suicidal actions are divided into 20 groups, 10 of which are conflict situations. Preponderance has a conflict with his wife 18.88%, parents 12.41%, and children 4.37%. There is not a conflict with a teacher. **Conclusions:** A persistent trend for two times higher suicide risk in females 61.14%, in males 38.85%. The ratio of persons under the age of 18 who committed suicide to persons over the age of 18 who committed suicide is 1:5. The most common method of suicide attempt is drug poisoning 53.4% among persons in the Silistra region.

INTRODUCTION

Suicides represent one of the problems of ever-increasing social importance. Suicidal behavior is one of the parameters by which the mental health and social well-being of society is evaluated. In Bulgaria, the social significance of suicides is constantly growing. As a result of realized suicide attempts, 3-4 people of different ages die every day in the country, about 1500 people a year. Suicide mortality ranks first in the structure of mortality due to the so-called "external causes", i.e. the cases of dying not due to somatic diseases [1,2,3].

In the country, the national health policy includes the implementation of adequate suicide prevention within the project "Improved services for mental health". For this purpose, experts from all Regional Health Inspections (RHI) were trained, as well as two-stage training of general practitioners, psychologists and social workers for early detection of anxiety and depression in primary care.

PURPOSE To analyze the state, trends and characteristics of suicidal situations (actions) in the Silistra region through a retrospective analysis for 2011-2021.

MATERIALS AND METHODS We used data from registration, reports, analyzes "Card for registration of a suicidal act", filled out at the scene of the accident by teams of CSMP-Silistra and in medical facilities in the Silistra district, visual materials and health portal publications.

The results were processed with SPSS v. 20.0, using variational, comparative and correlation analyses. We accept $p < 0.05$ as the level of significance.

RESULTS Silistra is a district in the Republic of Bulgaria. As of 12/31/2020, according to National Institute of Statistics data, the district's population is 106,852. As of 31.12.2021 23,460 persons were served in Emergency medical center and affiliates. Cases of suicidal acts are accepted here and registration and notification with a "Card for registration of a suicidal act" filled out at the scene of the incident by Emergency medical center Silistra teams.

We are looking at registered suicide situations by year in the Silistra region for 2011-2021. The total number of suicidal acts in 2011-2021 in the Silistra region is 543 – 89 (16.39%) ended with a fatal outcome, unsuccessful - 454 (83.60%) of the cases.

In the period 2011-2021 a permanent trend of increased suicide risk in females is coming out - 332 women (61.14%), 211 men (38.85%). Suicide attempts in men are less in number, but more often end in death. A statistically significant difference was found between suicidal acts of men and women ($p < 0.05$), and it was found that there was a moderate relationship between **suicidal acts and female gender** ($r = 0.321$; $p < 0.05$).

Suicidal acts by age groups in Silistra region for 2011-2021 shows that the relative share of persons under 18 years of age is 16.94%, persons over 18 years of age at 83.05%. The ratio is 1:5 for the entire period, and during 2021 is 1:9. A statistically significant difference is found between suicidal acts according to age ($p < 0.05$), finding that there is a strong correlation between **suicidal acts and age over 18 years** ($r = 0.503$; $p < 0.05$).

Place of residence is not a determining factor for taking suicidal actions. The share of the inhabitants of the villages is higher 54.64% compared to the cities 45.24% for the whole period, and in the last year 2021 for the villages it reaches 69.81%

We examine the structure of committed suicidal acts by groups of **working and non-working, students and unspecified**. For the entire period, the unemployed lead 29.99%, followed by housewives 14.41%, students 16.26%, working 11.21%, other unspecified 4.06%.

According to education for the last 5 years of the 2017-2021 survey, the leading group among persons who have taken suicidal actions is that of persons with an average of 35.62% and mainly 33.04%, but there are those without education 6.86%, and bachelor 1,71%. In 2021, persons with primary education will reach 40%.

The professions of persons for 2017-2021 are represented by five types, among them: doctor occupies - 1.98%, musician - 0.78%, driver - 0.78%, economist - 0.39%, social worker - 0.39%.

According to nationality, the whole study group is presented of Bulgarian citizens - 100% and Citizens of a foreign country are none. **Ethnicity** - Bulgarians - 107 people (42.12%), Turks - 84 (33.07%) people, Roma - 63 (24.08%) people.

Social status of persons with suicidal acts in the Silistra region for 2011-2021 is considered in 6 groups - Family is 43.83%, non-family 36.27%, divorced 6.26%, child of divorced parents 5.34%, married again 1,47%, widower 0.55%. In 2021 a greater number of married persons took suicidal actions - 51%, followed by the unmarried - 36%, widowed - 9% and divorced - 4%. No significant difference was found ($p > 0.05$).

The methods of suicide attempts are examined in 6 groups for 2011-2021. The most common way to attempt suicide in Silistra region is drug poisoning. In 2011-2021 53.4% of the persons who committed suicide chose drug poisoning as a method, followed by hanging - 16.28%, self-poisoning with chemical means - 15.71%, self-injury with a cold weapon 8.33%, and throwing from a height - 5.49% each. There are 1.37% recorded suicide attempts by firearms, no throwing under a vehicle, no electrocution, drowning and burning single cases.

Overdose, drug poisoning in suicide attempts is in first place for both men and women. An essential factor is access to medication in primary health care or without a prescription. The most commonly used are hypnotics and tranquilizers, but analgesics also play an important role. Pharmacological drug overdose is a common and common method used in suicide, both to cause death and to facilitate the use of more lethal means such as jumping from a height, drowning, or hanging (Fig.4). A significant difference was found in the chosen method of suicide attempt, with self-poisoning with medication prevailing ($p < 0.05$).

There are 10 types of conflict situations that we have studied with a preponderance of conflict with spouse, parents and children. The comparative assessment for the entire period with the last one in 2021 shows an improvement in indicators. There is no apparent motive for 37% (2021) of the individuals, for 11.53% for the entire period. Psychotic or mental disorders are fundamental in motives for suicidal situations. Depression and suicide are closely related, with 10-15% of patients with severe and recurrent depression subsequently dying by suicide. Between 40 and 70% of depressed patients have suicidal thoughts, and more than 90% of people who die by suicide have suffered from a mental disorder, most commonly depression. Indicators of high suicide risk include direct and indirect suicidal statements [9,10]. That is why we looked for the presence of mental illness in the event of a suicidal act in the Silistra region for 2011-2019. We found that 56.99% did not have it and 9.79% did. 1.74% have more than one disease, 31.46% have no data.

The outcome of the suicide attempt of 543/five hundred and forty-three/people for 2011-2021 is considered in two variants - successful. 89 attempts or 16.39% ended in death, and 454 people remained alive 83.6%.

The way out of the situation and the presence of residual bodily injuries are considered for 5 years 2017-2021. Remained alive without damage 64.9%, survived with bodily damage 13.38%, and died 21.65%. As cards and reports of suicidal acts are completed by the CSMP emergency teams at the scene of the incident and in the ED/Emergency Departments upon admission of the patient and there is no information on the final outcome of the disease, it should be assumed that this figure is not final and the actual death toll is higher.

DISCUSSION. According to studies, about 80% of those who committed suicide visited a doctor in the last year before the suicidal act, with more than half of them in the last month. Sometimes they seek help from a psychiatrist, but often they also turn to their GP or psychologist. The objective assessment of the situation, the recognition of the suicidal potential and the provision of adequate help require specialists working with at-risk patients to have an excellent knowledge of the signals foreshadowing danger, the risk factors for the development of suicidal behavior. Disorders of emotions, feelings and mood; their prevention and psychotherapy is an important element that must be known and ways of influencing them must be sought [2,9]. In general, in the Silistra district, the leading motives for taking suicidal actions are - psychotic factor or mental disorder -17.3%. According to various data, between 40% and 95% of people who have attempted suicide suffer from a mental illness. Among mental illnesses, the most -depression plays a major role in suicidal behavior [8]. Certain psychosocial factors are also associated with suicide risk and suicide attempts. These include recent life events, such as the loss of a loved one, separation, divorce, job loss, and even the loss of a pet, as well as chronic or long-term problems such as relationship difficulties, unemployment, and problems with the justice system. The most common method of suicide attempt among persons in Silistra region for all years is drug poisoning 53.4%. In the study in the Silistra region, the suicide risk for females is twice as high as for males: 61.14% for females, 38.85% for males. Other authors give the opposite characterization. By gender, men commit suicide 3-4 times more often than women, and the frequency of attempts is higher in

women. The number of completed suicides is significantly higher in men than in women, although women make more suicide attempts. The difference in mortality between the two sexes is due, on the one hand, to the chosen methods of suicide, which in women are usually "softer" and allow more time for intervention, and on the other hand, to the fact that women are more likely to seek timely professional help [8]. According to literature data, the unmarried, divorced or widowed are at a higher risk of suicide. Our study confirms these data. For the entire period, 43.83% were married, 36.27% unmarried, 6.26% divorced, children of divorced parents.

Factors that can reduce the risk of suicide are called protective or protective factors. Knowing them plays an important role both in assessing the current risk and in developing a correct strategy for its reduction. They include positive, social support, spirituality, religiosity, a sense of responsibility towards the family, children at home, pregnancy, life satisfaction, positive coping and problem-solving skills, positive therapeutic relationships [12,13,14,15].

CONCLUSION. In recent years of slow and painful economic transition, stress has become an inescapable companion of people. It occurs both in the family and in the workplace. No one is spared from him. Job loss, uncertainty about tomorrow, exploitation by some employers in the private sector, non-compliance with working hours, which sometimes last 10-12 hours, affect a person extremely adversely. Continuous layoffs due to job closures put people in conditions of fear, uncertainty and tension, i.e. of chronic stress. We can cure anxiety and depression because they are treatable conditions. Psychotherapy and drug treatment, sports and favorite activities are carried out. Education and adaptation to stress should begin in the school years. The relationship between parents and children, the participation of psychologists in schools to talk with them, are of great importance and have a good effect, and lead to easier coping with stressful situations. Suicide prevention should be the concern of the whole society. Greater access to and greater trust in psychiatrists is needed, as is timely treatment of mental illness. There needs to be specialist hotlines that are known and that anyone in crisis or suffering can access, turn to at any time of the day and night and share their problems, fears, intentions. Although not an easy task, the prevention of these conditions must be carried out. Since in many countries the suicide rate is lower than in our country, there is a lot to take and learn. With the improvement of people's well-being, the elimination of poverty, the successful treatment of incurable somatic diseases, the fight against this negative social phenomenon will also improve [10,16].

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DEPENDENCE BETWEEN EMOTIONAL INTELLIGENCE OF STUDENTS FROM MU-SOFIA AND THEIR EMPLOYMENT IN ECONOMIC ACTIVITY HEALTHCARE

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ABSTRACT

Emotional intelligence (EI) is essential for healthcare professionals. It plays a vital role in fulfilling the professional duties of those employed in the health care system regarding clinical decision-making, development of critical thinking, and providing high-quality patient care.

Purpose: To analyze the EI of students from the Medical University of Sofia depending on their employment in the Economic Activity Healthcare.

Methods: A descriptive, cross-sectional study was conducted with a sample of 312 students from MU-Sofia majors. The results were analyzed using descriptive and analytical statistics based on N. Hall’s questionnaire.

Results: The analysis of EI showed that 31.1% of the students have a low level of EI, 56.1% have an average level, and 12.8% have the highest level. There is an increase in EI among students with age but without a reliable dependence. The average degree of EI among those working in Healthcare is 55, statistically significantly higher than that of those not working – 47. The highest average degree of EI is the students of the nursing specialty – 52; in second place are dental doctors – 51; and in third place are future midwives and physician assistants (49.5).

Conclusion: There is a tendency to increase EI levels among the MU-Sofia students employed in Healthcare. They show medium to high levels of EI, an essential characteristic for practicing this profession. Their careers relate to working in a dynamic environment, daily patient communication, interaction with medical staff, intensity, and working under pressure. It is necessary to include EI management methods in the training of medical professionals to provide high-quality services to patients.

Keywords: emotional intelligence, medical students, healthcare students

INTRODUCTION

Emotional intelligence (EI), called EQ, the coefficient for emotionality, represents the ability to identify and control one’s emotions and perceive and correctly interpret people’s emotions in the surrounding environment. Many believe that the key to success in life is being able to perceive emotions and interact with them safely and healthily, which applies to everyone involved. EI is a far more critical tool for monitoring and measuring human well-being than IQ. It is a relatively new and modern discipline that has entered modern science rapidly in the last decade.

EI is essential, especially for those employed in the Healthcare sector. The daily work of medical staff is characterized by expressing a sense of empathy, compassion, and care for patients. EI is a crucial element for the effectiveness of the work and training of medical professionals. Carminati L. et al. (2021) conducted a comprehensive review of the literature regarding EI and medical professionals, contributing to the understanding that the correlation between emotion management and EI of employees working in the Healthcare sector is vital to coping with difficult

workplace situations. Scientists say that doctors could introduce a new approach to the correct interpretation and integration of emotions, thereby improving patients' behavioral and mental characteristics, which in turn lead to an increase in the overall condition and quality of the health care system. [2]

A study carried out in Turkey based on EI questionnaires found the need for students' prior training in this field. Medical students who already possess the necessary knowledge related to EI do far better in complex life and work situations. Cerit, E. et al. (2014). [3] The career of healthcare professionals is in direct interaction with the emotions of patients. Therefore, it is essential for individuals employed in the Healthcare sector to recognize their feelings and exercise control over others and their own emotions. A study in Queens, Nassau, and Suffolk counties in New York, USA, found a direct link between self-compassion and EI. It examines how much nurses show compassion to their patients, as this feeling is not innate. Heffernan M. et al. (2010). [6]

EI contributes to the well-being of the individual and the improvement of the clinical decision-making process, professional skills, critical thinking, and the effective use of medical knowledge. A study by Kaya H. et al. (2018) found a direct correlation between self-motivation in the initial training period and the improvement of critical thinking skills at the end of the training period nurses. [7] The ability to think critically is a long and continuous process. It has been scientifically proven that emotionally intelligent people tend to do better in various life situations and feel more confident when facing the challenges of the emotional world.

PURPOSE: The study aims to analyze the EI of students from MU-Sofia depending on their employment in Economic Activity Healthcare.

MATERIALS AND METHODS:

Study population: Students from MU-Sofia during the academic year. 2021/2022. **The sample** comprises all students willing to respond to an online Google form. **Study period:** From November 2021 to December 2021.

Instrumentation: Test for emotional intelligence according to the methodology of N. Hall (Fetiskin N.P. et al. (2002)[5]). The test contains 30 statements that respondents evaluate on a 7-point scale: I disagree entirely; I fundamentally disagree; I partially disagree; I can not decide; Partially agree; Mostly agree; Completely agree. Each preferred answer is assigned a weight on the scale: from - 3 to + 3 points. The sum of the points is calculated. The integrative level of EI is determined by the following quantitative indicators: High level of EI – over 70 points incl.; Average level of EI – from 40 to 69 points and Low level of EI – up to 39 points incl.

Statistical methods: Cronbach's Alpha; Descriptive statistics: Absolute and relative frequency; Indicators of Central Tendency and Dispersion – Arithmetic Mean \pm Standard Deviation and Median (Mean Degree); Kolmogorov-Smirnov method; Independent samples t-test; ANOVA; Coefficient χ^2 (Kruskal-Wallis method). The SPSS v.20 statistical package was used for the statistical analyses. The level of significance $\alpha = 0.05$ (5%). The power of the study is 85%.

RESULTS:

The studied sample includes 312 students from MU-Sofia studying in the specialties: Medicine – 107 (34.3%); Dentistry – 22 (7.1%); Nurse – 64 (20.5%); Midwife – 72 (23.1%); Medical assistant – 22 (7.1%); Kinesitherapy – 18 (5.8%); Health Care Management – 7 (2.2%). The frequency distribution by gender is men – 54 (17.3%) and women – 258 (82.7%). There are 200 (64.1%) unemployed persons in the Healthcare and 112 (35.9%) employed persons. The distribution by age group is up to 20 years. – 153 (49%), from 21 to 30 years. – 84 (26.9%) over 31 years. – 73 (23.4), and two students did not indicate their age. Ninety-seven students (31.1%) have a low level of EI. One hundred seventy-five students (56.1%) have an average level of EI. Forty students (12.8%) have a high level of EI. Medical and healthcare students will interact with different people daily in their future professions. Therefore, they need to develop different skills and knowledge to ensure a high quality of patient care. People with high and medium levels of EI are more aware of their internal emotional state than others. They have emotional flexibility and can manage their emotions. Understanding the emotions of others, the ability to empathize, and the ability to influence the current state of another person, as well as the readiness to provide support, are also characteristics of people with high EI.

The questionnaire reliability test calculated Cronbach's Alpha = 0.874 on 30 items. The reliability of the survey and the credibility of the ratings is 87.4% based on 30 statements.

The Kolmogorov-Smirnov test for EI by gender variable categories, labor activity in the Healthcare, and age groups shows Normal distribution ($p > 0.05$). Therefore, the data must be processed by Parametric methods. The number of students in some specialties is small, so it is necessary to use a Non-parametric test to compare the data.

The mean EI score for women (50) was slightly higher than that for men (48.5). Researchers Doroshkevych D. and Ilyash O. (2020) use N. Hall's test also proves that women have more emotional intelligence than men. [4] The mean value of EI in men (44.98 ± 20.127) was lower than that in women (47.94 ± 19.497), but no statistically significant difference was demonstrated ($t = 1.009$, $p = 0.314 > 0.05$). Women are proven to be more emotional and impressionable than men. However, the difference is not credible here due to the students' future professions, which require very high self-motivation, emotional awareness, and patient compassion.

The average degree of EI is highest among students over 31 years old. (53), followed by students aged between 21 and 30. (52) and is lowest among the youngest, up to 20. (47). The average value of EI is highest among students over 31 years old. (51.15 ± 18.754) and is much lower in the age groups from 20 to 30 years. (46.51 ± 22.465) and up to 20 years. (46.08 ± 18.114). There is no sufficient evidence for a dependence of EI and age ($F = 1.773$, $p = 0.172 > 0.05$). Emotionally intelligent people are perceived as more confident and able to understand, control, and manage their emotions, which has developed over the years. Budler, L. C. et al. (2022) also discuss that EI increases with increasing age. [1]

The average degree of EI among those working in the Economic Activity Healthcare (55) is significantly higher than that among non-workers (47). The average value of EI among those not working in the Healthcare (45.45 ± 18.323) is significantly lower than that among those working (50.97 ± 21.34), and a statistically significant difference is proven ($t = 2.407$, $p = 0.017 < 0.05$). Medical and healthcare professionals must be concerned with maintaining, improving, and

restoring human health. Working with sick people requires high motivation and controlling one's emotions. At the same time, managing patients' emotions is very often necessary. During their training, future doctors and health professionals must acquire a lot of knowledge and skills and develop essential values and skills that shape them as individuals. Practicing activities related to the future profession is precious for building professionalism. A health professional must possess self-confidence, competence, and, above all, responsibility.

The highest average degree of EI is for nursing students (52); in second place are dental doctors (51); in third place are future midwives and medical assistants (49.5), followed by doctors (47), physiotherapists (46) and the lowest average degree is for Masters in Healthcare Management (38). There is insufficient evidence of a difference between the average degrees of Emotional Intelligence in the studied majors (Kruskal-Wallis test: $\chi^2 = 4.935$, $p = 0.552$). The profession of a nurse and midwife is extraordinary; it is associated with emotional and physical stress. It requires vocation, love, and dedication for health and life. The profession of physician assistants is also gaining in importance. These three occupations are most often and closest to those needing health care.

CONCLUSIONS:

Those working in the Healthcare system are extraordinary people. The intensity of their work and mental workload is very high. This requires both physical and mental endurance. Students at MU-Sofia mostly have an average and high level of EI, which indicates their choice of a profession related to caring for people's health and life.

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THE QUALITY OF WORK LIFE OF MEDICAL NURSES IN BULGARIA – EVALUATION AND DESCRIPTION

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ABSTRACT

It is established that the quality of work life (QWL) influences the productivity of employees in healthcare organizations, as well as their intention to leave. However, reliable information on the quality of work life of nurses (QNWL) in Bulgaria is severely limited.

Purpose: The aim of this study was to assess and describe the Quality of Work Life (QWL) among nurses working in hospitals for active treatment in the Plovdiv region, Bulgaria.

Methods: This study employed a descriptive research design, specifically a cross-sectional study. Data were collected using Brooks' survey on the quality of professional life of nurses. A sample of 821 nurses from 18 hospitals for active treatment in the Plovdiv region, Bulgaria, was recruited. The results were computed and reported using SPSS version 20 for Windows.

Results: The results indicate a moderate Quality of Nursing Work Life (QNWL) with a score of 180.41 ± 24.06 . There is a need to address issues related to the amount of the salary, the poor image of the profession, staff shortages, career development, and the negative impact of shift schedules on the personal lives of nurses.

Conclusion: The findings indicate the need for improvement in all dimensions of Quality of Nursing Work Life (QNWL) and can guide efforts towards enhancing it.

Keywords: quality, nurse, life, work, QWL, QNWL, Quality of Nursing Work Life Survey

INTRODUCTION:

Quality of nursing work life (QNWL) is defined as "the extent to which nurses are able to meet important personal needs through their work experience within their organization while achieving the organization's goals" [1].

Hospitals with low quality of work life experience higher rates of absenteeism and nurse turnover than average, negatively impacting the hospital's effectiveness in providing planned high-quality healthcare services. Improvements in the quality of work life lead to increased work productivity, efficiency, safety, and quality of care, as well as reduced burnout, absence, and stress. It also plays a significant role in reducing nurse turnover and stabilizing the nursing team [2,3,4,5,6,7].

THE PURPOSE of the study is to assess and describe the Quality of Work Life (QWL) among nurses working in hospitals for active treatment in the Plovdiv region, Bulgaria.

MATERIALS AND METHODS:

In June-July 2022, a cross-sectional study was conducted among 821 nurses from 18 hospitals in the Plovdiv region, Bulgaria. Brooks' survey on the quality of nursing work life, specifically the Brooks' Quality of Nursing Work Life Survey (BQNWL), was used for the study [1,8]. The

reliability analysis of the BQNL questionnaire in this studied population demonstrated a high internal consistency coefficient with a Cronbach's α of 0.89, and the Cronbach's α values were > 0.58 for each subscale. Statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 20.

RESULTS:

The overall average score for QNL is 180.41 ± 24.06 , reflecting a moderate quality of nursing work life. The level of QNL in the Work/Life Balance subscale is moderate (27.96 ± 5.16). Moderate levels of QNL are also observed in the Work Process (40.81 ± 6.27) and Social Environment (18.58 ± 3.66) subscales. An exception is the Work Environment subscale, where a high level of QNL is reported (93.05 ± 14.03).

Analyzing the overall quality of work life, the smallest number of respondents have a low level of work life quality – only 1.1% of them. The majority of respondents, 50.7%, have a moderate level of work life quality, while 48.2% of those surveyed have a high level of work life quality. Distribution of nurses based on QNL levels in the Work/Life Balance subscale shows that the majority of respondents (57.2%) have a moderate level of work life quality, while 38.7% have a high level of work life quality. The smallest number of respondents have a low level of work life quality – 4% of them.

In the Work Process subscale, the distribution of nurses based on QNL levels is as follows: the smallest number of respondents have a low level of work life quality (1.8%). The majority of respondents (69.9%) have a moderate level of work life quality, while 28.3% have a high level of work life quality.

Distribution of nurses based on QNL levels in the Work Environment subscale indicates that there are no nurses with a low level of QNL, and those with a high level constitute the highest relative share – 86.6%.

Distribution of nurses based on QNL levels in the Social Environment subscale shows that nurses with a low level of QNL are 4.5%. The majority of respondents (67.5%) have a moderate level of work life quality, while 28% have a high level of work life quality.

Description of the nursing professional life

The results are presented for the entire group participating in the study. Following the questionnaire author's strategy to facilitate analysis, the QNL responses were combined into two groups - agree and disagree [8].

The work-life balance dimension is defined as the interface between the professional and personal lives of medical nurses. Regarding the work-life balance dimension, 39.1% of the respondents report not having enough energy for other activities after completing their work shift. Over half (51.9%) also believe that the shift schedule has a negative impact on their life. However, 61.3% manage to balance work and family needs. The employer's policy regarding paid annual leave is considered suitable for 71.4% of them. A significant majority (78.9%) of the respondents consider it important to have on-site childcare facilities, and 82% believe on-site care for sick children is essential. A considerable number (75.6%) of these respondents also find on-site care for elderly parents important.

The work process dimension consists of the composition of nursing work and describes the actual tasks performed by nurses (work design). Workload, staffing, and quality of care were

areas of concern. 87.7% of medical nurses reported a heavy workload, 66.1% have insufficient nursing staff in their units, and 61.8% perform many tasks unrelated to nursing. Additionally, 43.6% lack the freedom to make decisions related to patient care. Despite these results, only 28% face significant difficulties in fulfilling their daily responsibilities. The majority of medical nurses have sufficient time to do their work well (71.6%), receive adequate (80.5%) and quality (84%) assistance from support staff, provide high-quality care to patients (89%), and feel satisfied with their work (71.6%).

The work environment dimension includes the environment in which medical nurses work and examines the impact of the work environment on the systems of nurses and patients (work context). For a large proportion of the respondents (93.8%), it is important to have training programs for nurses in the hospital where they work. However, only 53.3% believe that their job offers career development opportunities. 67.1% receive support to participate in qualification courses and continuing education programs. 78.6% of the medical nurses find that the rules and procedures at work facilitate their job, 85.4% have adequate materials and equipment to ensure adequate patient care, 90.7% feel that their head nurse provides appropriate leadership, and 89.5% receive feedback on their work from her. Unfortunately, only 69.1% have the opportunity to participate in decision-making by the head nurse. A significant proportion of medical nurses ($\geq 94\%$) are capable of communicating effectively with both their head nurse and doctors. A very important finding is that the majority of nurses feel respected by doctors (87.6%) in their work environment and believe that their achievements are recognized by their supervisor (86.5%). However, fewer nurses share the opinion that senior management shows respect to medical nurses (78.4%). Safety and security in the work environment were a significant concern for medical nurses. A considerable portion of medical nurses (80%) report having a safe work environment. Only 65.9% of the respondents believe that the hospital's security department provides a secure environment and feel protected from physical, emotional, or verbal violence at their workplace. The respondents also agreed that friendships with colleagues (93.4%), teamwork (87%), the feeling of belonging (71.5%), communication with other related health professionals (77.7%), and the presence of a dedicated break area for nursing staff (97.3%) are important.

The social environment dimension is defined as the effects of broad societal influences and changes on nursing practice. In this study, medical nurses believe that their work affects the lives of patients and their families (79.4%). Only 20% of them agree that society has an accurate perception of their profession (image of the profession). Overall, 66.4% disagree that their salary matches their work (considering the current labor market conditions). A considerable proportion believes they are not at risk of dismissal or layoff (79.2%) and could find similar work in another organization with approximately the same remuneration and benefits (77.3%).

CONCLUSION:

The level of QWL based on the overall mean score has been determined, reflecting a moderate quality of nurses' work life. The findings highlight the necessity to improve the Social

Environment dimension of QNWL among nurses by addressing their concerns about their salary and the negative image of the profession in society. Enhancing QNWL is associated with resolving issues related to insufficient nursing staff and difficulties during the execution of their daily responsibilities, creating opportunities for career development in the workplace, to optimize organizational factors to reduce the negative impact of shift schedules on nurses' personal lives and prevent burnout.

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STUDY OF PERMANENT DISABILITY IN MEDICAL SPECIALISTS

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ABSTRACT:

The high percentage of working medical professionals with permanently reduced working capacity is a serious problem in the field of public health.

The aim of our study is to investigate the frequency of working health professionals with permanently reduced working capacity in hospital care

Methods: Study of permanent incapacity in 2022 in MBAL with an average list composition - 1310 medical specialists. The methods used are: documentary and statistical analysis

The results of our study showed a 5.85% morbidity rate with permanent incapacity when compared with the Batiks-Lekarev statistical system.

Conclusion: We found a high frequency of medical professionals with permanent incapacity

Key words: medical professionals, health status, permanent incapacity, public health.

INTRODUCTION: In the course of our research, we asked ourselves the question: What is the health of medical professionals, are they able to cope with the great professional challenges of diagnosing and treating their patients, as well as with future health crises? The relevance and significance of the problems we mentioned were confirmed in the recommendations for strengthening the health and work capacity of health workers in the strategic document "National Program for Safety and Health at Work 2022-2024" [1], outlined in the new "Strategic Framework of the EU 2021-2027 - Safety and health at work in a changing world of work".

Medical professionals in hospital care are exposed to various ergonomic, physical, chemical, biological, organizational and psycho-social risk factors [2]. In our previous studies, we found high rates of morbidity with temporary and permanent disability [3] and the presence of causal - investigative dependence between the influence of specific risk factors and negative changes in the health status of doctors in medical facilities [4,5,6,7].

PURPOSE: To investigate the frequency of working health professionals with permanently reduced working capacity in hospital care

METHODS: Study of permanent incapacity for work for a one-year period in a multispecialty hospital for active treatment in North-Eastern Bulgaria among 1310 medical specialists. The methods used are: documentary and statistical analysis

RESULTS: The evaluation of the indicators of diseases with temporary incapacity was carried out by comparing with indicative-normative groups according to the statistical system of Batiks-Lekarev, which refer to a one-year period:

Table 1

Extensive (relative) indicators: are measured in percentages		
For frequent and long-term sufferers	For the short-term morbidity with temporary incapacity (up to 3 days)	Morbidity with permanent disability
low - up to 3% medium - 3-6% high - over 6%	low - up to 40% medium - 40-60% high - over 60%	many low - up to 3 in 1000 low – 3-4 per 1000 average – 4-5 per 1000 high – 5-6 per 1000 many high - over 6 in 1000

Our results showed a high frequency of morbidity with permanent incapacity - 5.85% and a high relative share of frequently and long-term ill persons - 7.14%. For the year 2022, 77 persons with a recognized permanently reduced working capacity / type and degree of disability were certified and re-certified in the studied medical facility. The main causes of permanent incapacity among doctors are malignant diseases and consequences of cerebrovascular disease, etc. More than 70% of them have a reduced working capacity of more than 90%.

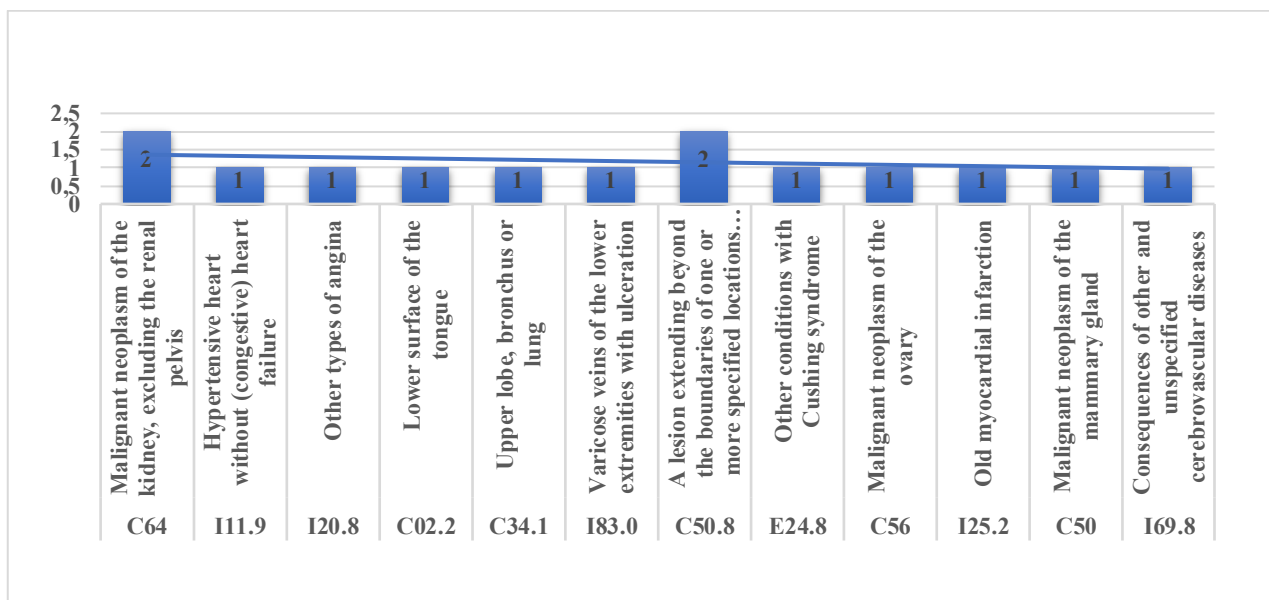


Figure 1. Number of cases according to ICD 10 of doctors with an expert decision of the territorial expert medical commission

Health care specialists (nurses, laboratory assistants and midwives) with an expert decision of the territorial expert medical commission make up 50% of the total number of workers with permanent incapacity for work. The leading diagnoses are: malignant diseases (mammary gland carcinoma, mixed, small cell and large cell (diffuse), multiple myeloma, etc.), followed by diseases of the cardiovascular system, etc.

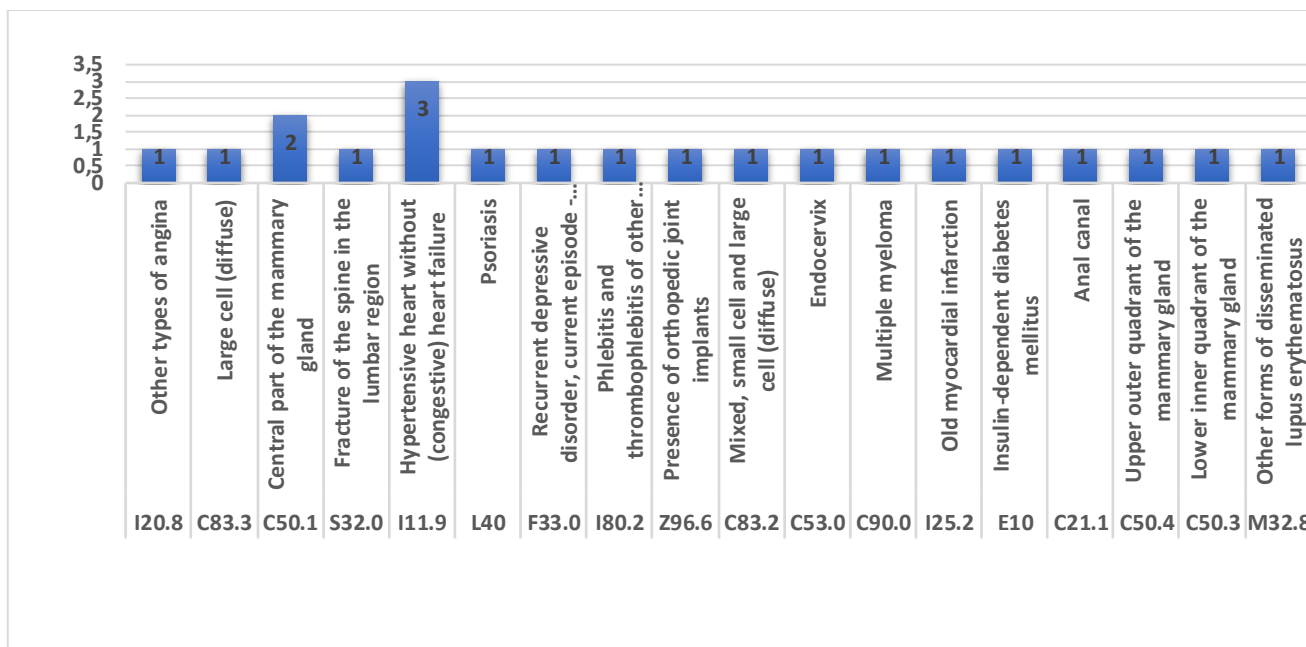


Figure 2 Number of cases according to ICD 10 of health care specialists with an expert decision of the territorial expert medical commission

CONCLUSION: The high rates of permanent disability among medical specialists in hospital care reflect the state of negative health for those working in the health care sector. It is necessary to conduct more in-depth studies and analyzes regarding the synergistic and cumulative effect of the various risk factors on the health status and working capacity of healthcare workers. On the part of the management in medical institutions, individual measures should be taken to adapt the workplace based on the expertise of the permanently reduced working capacity, observing the contraindicated working conditions and the recommendations for further monitoring and rehabilitation.

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EFFECT OF CHRONIC STRESS ON AUTONOMIC CARDIOVASCULAR CONTROL PATTERN

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ABSTRACT

Stress-induced dysfunctional autonomic cardiovascular control during exposure to chronic stress is an early indicator of the occurrence of Cardiovascular Diseases (CVD). The aim of our study is to determine the impact of chronic work stress on the pattern of autonomic cardiovascular control. The functional state of the Cardiovascular System and the autonomic cardiovascular control were investigated using a computer diagnostic method and a Heart Rate Variability Analysis (HRVA) system in 58 employees and 30 controls. We found a significant decrease in the vagally-mediated measures of HRVA: X, pNN50, SDD and HF, and an increase in the sympathetically-mediated measure of HRVA: LF/HF in employees compared to controls. Chronic stress at work in employees induces a dysfunctional pattern of autonomic cardiovascular control, studied through the measures of HRVA, which is an indicator of the occurrence of early forms of CVD.

INTRODUCTION:

Our research interest is aimed at determining the stress-induced pattern of autonomic cardiovascular control, which is a precursor to the occurrence of early forms of Cardiovascular Diseases (CVD). Chronic stress causes a change in the values of the Heart Rate Variability Analysis (HRVA) measures, which show the pattern and change in autonomic cardiovascular control. A decrease in vagally-mediated measures of HRVA: HF, rMSSD and pNN50 at high levels of occupational stress was found in a large-scale contemporary study by de Looft et al., 2018 (1). Sympathetic hyperreactivity, investigated by LF/HF and reduced values of SDNN – an indicator of cardiovascular dysfunctional state were reported by Kang et al., 2004 (2) and Pagani et al., 1991 (3) during exposure to high occupational stress.

The aim of our study is to determine the impact of chronic work stress level on the pattern of autonomic cardiovascular control.

MATERIAL AND METHOD:

Material

Two groups of individuals were included and examined in the study: employees from the state administration and controls. The employee group consisted of 58 individuals, (mean age/SD, 45.91/8.44 years; mean job tenure/SD, 22.91/8.44 years) of which 32 were male and 26 female. The control group of individuals consisted of 30 individuals (mean age/SD, 39.47/10.68 years; mean job tenure/SD, 17.47/10.76 years), of which 18 were male and 12 female.

Methodological design

Investigation of the functional state of the Cardiovascular System (CVS) and the autonomic cardiovascular control, by means of a computer diagnostic method and a system for the Analysis of Heart Rate Variability.

To study the functional state of the CVS and the autonomic cardiovascular control, a computer diagnostic method and a system for the Analysis of Heart Rate Variability (HRVA) have been applied (4-6). The methodological system consists of a PC-IBM, specialized hardware and software that allow the following functional tests to be performed: Cardiogram, Histogram, Scattergram, Spectral Analysis of Heart Rate Variability, Mental and Health Risk. HRVA indicators are determined from 10-minute ECG recordings between 9-11 a.m. in a sitting position of the body after a one-hour rest period.

In order to achieve the aim of the study, the following are applied:

Time-domain based measures of HRVA:

X (mean value of RR intervals) (msec), respectively mean value of heart rate (beats/min); SDNN (standard deviation of normal NN RR intervals) (msec); SDNN5 (standard deviation of 5 consecutive RR intervals) (msec); pNN50 (the percentage of difference between adjacent NN RR intervals that is greater than 50 msec) (%); rMSSD (root mean square of the differences between any two consecutive normal RR intervals) (msec); SDDSD (the standard deviation of the differences between adjacent NN RR intervals) (msec);

Frequency-domain based measures of HRVA:

VLF (spectral power of the RR intervals in the very-low frequency area) (0.0033-0.04 Hz) (ms^2); LF (spectral power of RR intervals in the low-frequency area) (0.04-0.15 Hz) (ms^2); HF (spectral power of the RR intervals in the high-frequency area) (0.15-0.4 Hz) (ms^2); LF/HF (ratio of the spectral power of the RR intervals in the low-frequency zone to the high-frequency area) (%).

Data analysis.

A t-test of two independent samples was used for data analysis.

RESULTS:

Indices of the functional state of the CVS and the autonomic cardiovascular control, studied by HRVA:

Time-domain based measures of HRVA:

Table 1. Mean values (X±SD) and level of significance (p) of the time-domain based measures of HRVA in employees and controls

Indices	Employees 1 (N=58) Mean (SD)	Controls 2 (N=30) Mean (SD)	Level of significance P 1-2
X (msec)	783.39±113.51	865.53±83.18	0.039
SDNN (msec)	36.55±15.62	45.29±11.84	0.412
SDNN5 (msec)	30.61±13.35	34.61±10.27	0.892
pNN50 (%)	6.87±0.72	24.27±0.98	<0.001
rMSSD (msec)	30.11±9.72	37.13±12.45	0.468
SDDSD (msec)	20.74±10.50	35.40±7.43	<0.001

Table 1 presents the mean values and the level of significance of the time-domain based measures of the HRVA assessing autonomic vascular control. There was a significant decrease in the mean values of X, pNN50 and SDDSD in employees compared to controls.

Frequency-domain based measures of HRVA:

Table 2. Mean values (X±SD) and level of significance (p) of the frequency-domain based measures of HRVA in employees and controls.

Indices	Employees 1 (N=58) Mean (SD)	Controls 2 (N=30) Mean (SD)	Level of significance P 1-2
VLF (msec²)	192.08±99.63	224.16±93.62	0.958
LF (msec²)	181.48±123.68	245.50±72.87	0.268
HF (msec²)	138.01±94.73	278.78±91.14	0.000
LF/HF (%)	1.47±0.79	0.96±0.09	0.014

Table 2 shows the mean values and the level of significance of the frequency-domain based measures of HRVA analyzing autonomic cardiovascular control. It was found that mean HF was significantly reduced in the employee group compared to controls, and that mean LF/HF was significantly increased in the employee group compared to controls.

DISCUSSION:

The results of our study demonstrate a pattern of dysfunctional cardiovascular control, investigated by time- and frequency-domain based measures of HRVA under exposure to chronic work stress. We found a decrease in the vagally-mediated measures of HRVA: X, pNN50, SDDSD and HF, and an increase in the sympathetically-mediated measure of HRVA: LF/HF in employees compared to controls. Similar results of sympathetic reactivity and parasympathetic inhibition following stress exposure were found by Kageyama et al., 1998 (7).

CONCLUSION:

Chronic stress at work in employees induces a dysfunctional pattern of autonomic cardiovascular control, studied through the measures of HRVA, which is an indicator of the occurrence of early forms of CVD

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DIFFERENCES IN SITTING WORK POSTURE MUSCULOSKELETAL INJURIES BETWEEN TAILORS AND SPECIALISTS

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ABSTRACT:

Work-related musculoskeletal disorders are a significant health problem in many occupations in different sectors of the European Union.

Purpose: To study the differences in work-related musculoskeletal disorders in a sitting work posture between tailors and specialists in information and communication technologies.

Methods: The study included 88 tailors and 72 IT-specialists. Data related to musculoskeletal symptoms were recorded using a modified Nordic Musculoskeletal Questionnaire.

Results: In this study, 92% of tailors and 77.8% of IT professionals reported having musculoskeletal problems in the previous 12 months. Persons with musculoskeletal problems in three or more areas of the body have the highest relative share in both professional groups, but the leading group is tailors (86.4%), followed by IT specialists (62.5%). In tailors, the prevalence of work-related musculoskeletal disorders is greater and affects more areas of the body compared to IT specialists.

Conclusion: The prevalence of musculoskeletal disorders among tailors is high.

Keywords: Work-related Musculoskeletal Disorder, Sewing Machine Operators, Tailors, IT specialists

INTRODUCTION:

The World Health Organization (WHO) defines musculoskeletal disorders (MSDs) caused or aggravated by work and the circumstances of its performance as work-related musculoskeletal disorders (WMSDs) [1]. WMSDs are a significant health problem in many occupations in different sectors of the European Union. According to a report by the European Agency for Safety and Health at Work (EU-OSHA), although the proportion of workers in the EU-28 reporting complaints of WMSDs decreased slightly between 2010 and 2015, they are still a significant health problem in many professions in different sectors of the European Union. It is noted there that in Bulgaria the percentage of workers who reported suffering from one or more musculoskeletal diseases in the last 12 months in 2015 was 54%. Rightfully, WRMSDs are a major cause of concern, not only because they affect the general health status of many workers, but also because of the negative economic impact on enterprises and the financial and social costs for European countries [2].

Occupational exposure has been found to be highly prevalent and there is evidence that the burden of MSDs attributable to this exposure is substantial [3,4].

The purpose of the study is to investigate the differences in WMSDs in a seated working posture between tailors and information and communication technology (IT) professionals.

MATERIALS AND METHODS:

The survey was conducted in the period November-December 2022. 88 tailors and 72 IT specialists participated. Data were collected using a modified Nordic Musculoskeletal Questionnaire. The original NMQ is sensitive and useful as a screening and monitoring tool [5]. The severity of symptoms is also assessed with this tool. The questionnaire is available from the original article by Kuorinka et al. [6].

The modified by Y. P. Prodanova and T. G. Kundurzhiev Nordic Musculoskeletal Questionnaire serves to assess problems with the musculoskeletal system, assesses the severity of symptoms and contains 2 sections.

Section 1: one general question to identify areas of the body with musculoskeletal problems. Completion is aided by a body map to pinpoint twenty-seven areas of potential problems. Respondents answer whether they have had musculoskeletal problems in the last 12 months. This question is mandatory. Participants must answer yes or no to the screening question, and those who answered yes are asked to indicate one or more locations of pain.

Section 2: with four questions, completed in case of musculoskeletal problems in the last 12 months. It includes a question specifying the presence of difficulties that prevented normal activities (at work, at home) due to problems in the last 12 months, 4 weeks and the last 7 days, as well as additional questions.

For analysis purposes, we regrouped the twenty-eight body areas (visualized in the questionnaire) into 7 areas – neck, back, buttocks, left arm, right arm, left leg, and right leg. When presenting the results, in addition to the relative share of MSDs cases in the district, the zone(s) with the highest relative share in it is indicated.

The statistical analysis was done using the Statistical Package for Social Sciences (SPSS) version 20.

The study was approved by the Research Ethics Committee at MU-Sofia.

RESULTS:

The IT professionals who participated in the study (N=72) were mostly women (56.9%) with an average age of 30.8 (± 7.3) years, bachelors, single urban residents with a total work experience between 4 and 10 years and a specific work experience of 3 to 10 years.

The tailors who participated in the study (N=88) were also mostly women (92%), but with a greater average age of 52.8 (± 8.5) years, secondary education, married urban residents with over 20 years of general and special work experience.

The comparison of results in the studied groups according to the presence of problems in the last 12 months shows that in both groups the relative share of persons with MSDs is high, but the group of tailors is more strongly affected. In this study, 92% of tailors and 77.8% of ITs reported having musculoskeletal problems in the previous 12 months.

In the case of IT specialists, the highest relative share (68.1%) was registered in the last 12 months of back pain complaints (areas with the highest relative share are the upper and lower back). The second most common problem is pain in the neck (with the leading area being the

base) and right arm (shoulder) – 48.6%. In third place with 43.1% are the pains in the left arm (the shoulder area is the leading one).

The distribution of registered complaints is different among tailors – with the highest relative share (79.5%) in the last 12 months are complaints about the pain in the right hand (with the leading area being the armpit). The second most common problem is pain in the left leg (76.1%), (foot and toe area), and the third most common problem is in the area of the left arm (arm) and right leg (ankle) (73.9% each) .

Compared by number of affected areas - it is striking that the highest relative share in both professional groups are persons with musculoskeletal problems in three or more areas of the body. The leading group is tailors (86.4%), followed by IT specialists (62.5%).

The distribution of complaints interfering with normal work in the last 7 days shows that tailors lead IT professionals in complaints in the left (17%) and right leg (10.2%), as well as in the left (8%) and right hand (5.7 %). In the case of IT specialists, complaints in the back (18.1%), neck (9.7%) and buttocks (2.8%) have a higher relative share than tailors.

The distribution of work difficulties due to MSDs in the last 4 weeks of complaints shows that the relative proportion of tailors is higher in only two of seven areas – left leg (12.5%) and back (10.2%). Among IT specialists, complaints in the area of the right arm (11.1%), left arm and right leg (8.3% each), neck (6.9%) and buttock (5.6%) have a higher relative share.

Tailors have a higher relative share of complaints preventing normal work in the last 12 months. They have difficulty carrying out their daily tasks (at home and at work) most often due to problems in 6 out of 7 areas. With the highest relative share, pain was recorded in the back (34.1%), followed by the left leg (28.4%), right arm (23.9%), left arm (22.7%), right leg (21.6%) and head/neck (11.4%). The relative proportion of neck complaints was higher among IT professionals (13.9%) than among tailors.

CONCLUSION:

The study revealed that in tailors - different types of pain are characteristic of different areas of the body: the right hand (armpit area) is the area causing chronic pain (recorded in the previous 12 months); the left leg (thigh area) is the area causing acute pain (recorded in the previous 7 days and causing difficulty in performing daily tasks); the left leg (lower leg and ankle areas) is the area causing pain prone to chronification (recorded in the previous 4 weeks); the back (area in the upper part) is the area causing loss of activity and difficulty in carrying out daily tasks due to pain and very likely - reason for sick leave (12 m.).

For IT specialists, the back (in its lower part - the lower back) is an area with a concentration of complaints from the largest number of people and pain of the most different types - chronic, acute and causing loss of activity. Areas of pain prone to chronicity (recorded in the previous 4 weeks and causing difficulty in performing daily tasks) are the right arm (palm and fingers) and left leg (knee).

The results of this study show that tailors have a higher prevalence of MSDs and affect more areas of the body than IT professionals.

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VALIDATION OF TEACHER BURNOUT QUESTIONNAIRE

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ABSTRACT:

People working in the area of education are at risk of professional burnout. According to the indicators of the conducted pilot study of teachers from schools in Bulgaria, Emotional exhaustion is in the range of moderate to low levels of intensity. The results showed that Dehumanization varies in the low-intensity values, which proves the responsibility and dedication of those employed in the teaching activity. A negative trend is observed in Workability. This claim confirms the need to reorganize educational activity at the regional and state levels to improve teachers' professional well-being and mental health.

Purpose: Validation of a teacher burnout questionnaire measuring and analyzing teachers' burnout syndrome by subscales.

Methods: A pilot survey was conducted among teachers in the secondary education system in the territory of the Republic of Bulgaria. The results were analyzed using descriptive and analytical statistics based on the Maslach Burnout Inventory (MBI) test.

Results: The sample consisted of 146 teachers who participated in the research and sent completed questionnaires during the study period. The research using the MBI questionnaire has been validated for Bulgarian teachers. The reliability and validity of the assessments is 78.2% based on 22 questions. The arithmetic mean value of Emotional Exhaustion (EE) among teachers is 24.95 ± 11.356 , within moderate frequency and low to moderate intensity. A high frequency of EE was manifested in 51 (36.4%) teachers, and 75 (53.6%) had a low intensity according to the EE subscale. A statistically significant correlation between EE and professional work experience is proven. Women have a significantly higher mean EE rank than men. There is a statistically significant influence of the region where the teachers work and the types of schools ($p < 0.05$). Teachers' mean Dehumanization (DH) level is 2.00, indicating low frequency and intensity. 107 teachers (74.8%) have a low frequency of DH, and 117 (81.8%) teachers have a low intensity of DH. Men have a significantly higher average DH rank than women. A statistically significant difference of DH between the types of schools where they teach is demonstrated ($p < 0.05$). The arithmetic mean value of Workability (WA) among teachers is 36.42 ± 6.683 , within the range of moderate frequency and low to moderate intensity. 46 (33.1%) teachers have a high frequency of Workability, and 68 (48.9%) have a low intensity of WA.

Keywords: Validation of a burnout test; Teachers; Emotional exhaustion; Dehumanization; Workability

INTRODUCTION:

Professional stress in teachers, causing burnout, acts in a complex manner. This stress represents an individual's emotional, cognitive, behavioral, and physiological response. A literature review on burnout shows that burnout is most prominent in humane professions such as social workers, doctors, and teachers [3]. Burnout is characterized as a continuous variable that, on a chain basis, moves from low to moderate to high-intensity value based on personal experiences, expression of emotions, and individuals' perceptions. Different levels of emotional experience are delineated by the tripartite components of emotional exhaustion, dehumanization, and workability, which are assessed by the Maslach Burnout Test [2]. Emotional Exhaustion, Dehumanization, and Workability are directly related to the quality of work life and are the main characteristics that contribute to physical distancing from the work process. The main elements of burnout are a massive obstacle to relationships in the

work environment, both among colleagues and with students [5]. An international study between Italy and France found that teacher burnout stems from challenges related to teaching duties and the cultural environment in which a particular professional role is performed [4]. A study on psychosocial working conditions was conducted in Sweden, showing that low self-efficacy, workability, and high job demands greatly influence teacher burnout [1].

PURPOSE: Validation of a teacher burnout questionnaire measuring and analyzing teachers' burnout syndrome by subscales.

MATERIALS AND METHODS:

A pilot survey was conducted among teachers in the secondary education system in the territory of the Republic of Bulgaria. The results were analyzed using descriptive and analytical statistics based on the Maslach Burnout Inventory (MBI) test.

Study population: Teachers in the Bulgarian Education system.

The sample consists of 146 teachers who completed online questionnaires from the six regions of Bulgaria. The questionnaire was sent to 24 schools nationwide electronically (link to online form) and in PDF format. The schools were randomly selected from all schools in Bulgaria.

Study period: From December 20th, 2023 to January 10th, 2024.

Instrumentation: The questionnaire consists of the Maslach Burnout Inventory (MBI) test, which has 22 questions. Prof. Stanislava Stoyanova, MD provided the test [6], and the questions have been revised and are suitable for the teaching profession.

The assessment for each question is on a 7-point scale: 0 – never; 1 – once a year or less, 2 – once a month, 3 – a few times a month, 4 – once a week, 5 – several times a week, 6 – every day.

Three subscales were examined: Emotional exhaustion (EE), Dehumanization (DH), and Workability (WA). Dependencies of subscales with Age, Total work experience, and Special work experience as a teacher are examined. Differences are analyzed by Gender (male, female); Regions where teachers practice their profession (Southwest, South Central, South East, North West, North Central, and North East); populated places (Capital, Big City, Small city, Village); Type of school (Primary (I - IV grade), Secondary (I - VII grade), High school (VIII-XII grade), Vocational high school (VIII-XII grade), Secondary (I - XII grade)) and Type of school according to the subsidization (State, Private).

Statistical methods: Cronbach's Alpha; Descriptive statistics: Absolute and relative frequency, Arithmetic Mean \pm Standard Deviation, Median (Mean Degree), and 95%CI; Kolmogorov-Smirnov test; Coefficient U (Mann-Whitney test) and Coefficient χ^2 (Kruskal-Wallis test); Parametric and Nonparametric correlations.

The SPSS v.20 statistical package was used for the statistical analyses. The level of significance $\alpha = 0.05$ (5%), and the study's power is 80%.

RESULTS:

One hundred forty-six teachers participated in the study and sent completed questionnaires during the study period. Women predominate -121 (82.9%), and men are 25 (17.1%). The last decade has seen a feminization of the teaching profession.

The reliability and validity test for the Maslach Burnout Inventory (MBI) test for teachers calculated Cronbach's Alpha = 0.782 for 22 items. Based on 22 questions, the reliability and validity of the assessments are 78.2%. The questionnaire's validation has high reliability.

The distribution by populated places is: from the capital 25 teachers (17.2%) participated in the survey; from large cities - 71 (49%); from small towns - 39 (26.9%); and villages - 10 (6.9%). One hundred thirty-seven teachers (93.8%) work in public schools and 9 (6.2%) in private schools. The most studied

teachers were from Vocational High Schools (VIII-XII grades) - 43 (29.7%), followed by Primary Schools (I - VII grades) - 39 (26.9%) and High Schools (VIII-XII grades) - 37 (25.5 %).

The Kolmogorov-Smirnov test reported a Normal distribution for the subscales: Emotional Exhaustion ($Z=0.705$, $p = 0.702 > 0.05$) and Workability ($Z=0.971$, $p = 0.302 > 0.05$) and different from a Normal distribution for Dehumanization ($Z=2.56$, $p = 0.000004 < 0.05$). Age ($Z=1.079$, $p = 0.195 > 0.05$) and total work experience ($Z=0.828$, $p = 0.5 > 0.05$) also have a Normal distribution. Professional work experience ($Z=1.449$, $p = 0.03 < 0.05$) does not have a Normal distribution; Parametric characteristics will be used to describe the subscales of Emotional exhaustion and Workability, as well as for age and total work experience, and nonparametric characteristics for Dehumanization and professional work experience. Nonparametric methods will be used to analyze differences due to the number of teachers in the respective groups. For dependencies, both parametric and nonparametric correlations will be used depending on the distribution.

The mean age of the study sample of teachers was 49.54 ± 9.064 years, with a mean total work experience of 25.14 ± 9.379 years and a mean level of professional experience of 20.5 years. The confidence intervals for the general population mean age were 95% CI: [48.04 ; 51.05] and for the mean total work experience were 95% CI: [23.57; 26.7].

The arithmetic mean value of Emotional Exhaustion among teachers is 24.95 ± 11.356 , as 95%CI: [23.05; 26.85], within the moderate frequency and low to moderate intensity range. EE manifests itself when our emotional reserves are depleted. The result is a general feeling of tiredness, irritability, sleeplessness, chronic fatigue, insomnia, and physical and mental strains. The combination of physical and mental exhaustion is essential. Physical fatigue is not the only factor contributing to professional burnout. A high frequency of EE occurs in 51 (36.4%) teachers, a moderate frequency in 49 (35%), and a low frequency in 40 (28.6%). 75 (53.6%) teachers have low intensity according to the EE subscale, 50 (35.7%) teachers have moderate intensity, and 15 (10.7%) have high intensity. Daily teaching with children requires a high concentration level, and a large part of emotional resources is depleted with advancing age and work experience. A statistically significant correlation between EE and professional work experience is demonstrated (Spearman's rho = 0.212, $p = 0.013 < 0.05$). As the working experience as a teacher increases, the value of the assessment on the EE subscale increases. There is insufficient evidence for a correlation between age and EE (Pearson Correlation Coefficient $r = 0.062$, $p = 0.475 > 0.05$). A significantly higher mean EE rank was demonstrated in women than in men (Mann-Whitney U = 1042, $p = 0.031 < 0.05$). Female teachers tend to be more emotional and more dedicated to the profession. A statistically significant influence exists in the region where teachers work (Kruskal-Wallis $\chi^2 = 11.253$, $p = 0.047 < 0.05$). The distribution of EE by region is ordered by size in the following order: South West, South East, North Central, North West, North East and South Central. No difference was observed on the EE subscale depending on the place of residence ($\chi^2 = 5.429$, $p = 0.143 > 0.05$). A statistically significant difference in EE between the types of schools where they teach is demonstrated ($\chi^2 = 15.555$, $p = 0.004 < 0.05$). There is no evidence of a difference in EE among school types according to the subsidization (U = 478, $p = 0.653 > 0.05$).

The mean level of Dehumanization among teachers is 2.00, indicating low frequency and intensity. Dehumanization is expressed in the tendency towards cognitive and social withdrawal. It is statistically proven that teachers with Burnout tend to see students as objects, not individuals. A high frequency of DH occurs only in 12 (8.4%) teachers, a moderate frequency in 24 (16.8%), and a low frequency in 107 (74.8%). 117 (81.8%) teachers have low intensity according to the DH subscale, 21 (14.7%) of the teachers have moderate intensity, and 5 (3.5%) have high intensity. Working with young people evokes feelings of attachment and empathy. Children's problems often become problems for teachers, and they try in every way to help and care for their schoolchildren. Teachers live with the joys and problems of their schoolchildren. There is no sufficient evidence of correlation between age, general work experience, professional work experience, and the studied DH ($p > 0.05$). A significantly higher average DH rank was demonstrated in men than women (Mann-Whitney U = 1036, $p = 0.017 < 0.05$). Female teachers often experience motherly feelings towards their schoolchildren, while male teachers are

more severe and thorough about their profession. There is no significant influence on the region where teachers work (Kruskal-Wallis $\chi^2 = 7.202$, $p = 0.206 > 0.05$). No difference was observed on the DH subscale depending on the place of residence ($\chi^2 = 2.602$, $p = 0.457 > 0.05$). A statistically significant difference in DH between the types of schools where they teach is proven ($\chi^2 = 12.685$, $p = 0.013 < 0.05$). There is no evidence of a difference in DH among school types according to the funding method ($U = 565$, $p = 0.747 > 0.05$).

Workability is the main component of professional burnout, resulting in reduced work and work motivation. The arithmetic mean value of the WA among teachers is 36.42 ± 6.683 , as 95%CI: [35.3; 37.55], within the moderate frequency and low to moderate intensity range. There is a high frequency of WA in 46 (33.1%) teachers, a moderate frequency in 44 (31.7%), and a low frequency in 49 (35.3%). 68 (48.9%) teachers have low intensity according to the WA subscale, 47 (33.8%) of the teachers have moderate intensity, and 24 (17.3%) have high intensity. Work capacity is the diligence of a person for a particular time to perform motivated activities with a certain intensity and quality, and depending on personal experience and working conditions, not to have unfavorable changes for his body. There is no sufficient evidence of correlation between age, general work experience, special work experience, and the studied WA ($p > 0.05$). No difference in WA was demonstrated between male and female teachers (Mann-Whitney $U = 1291$, $p = 0.619 > 0.05$). There is no significant influence of the region where teachers work on WA (Kruskal-Wallis $\chi^2 = 4.136$, $p = 0.53 > 0.05$). No difference was observed on the WA subscale depending on the place of residence ($\chi^2 = 7.15$, $p = 0.067 > 0.05$). There is insufficient evidence for a difference in WA between the types of schools they teach in ($\chi^2 = 8.082$, $p = 0.089 > 0.05$), as well as for the types of schools according to funding method ($U = 545$, $p = 0.732 > 0.05$).

CONCLUSION:

The research using the Maslach Burnout Inventory questionnaire has been validated for Bulgarian teachers, and through the evaluations of the three subscales, Emotional exhaustion, Dehumanization, and Workability, has been proven moderate to low levels of overheating. However, it is necessary to take political measures to preserve teachers' physical and mental health. They are the people who work with young people daily, and their principal goal is not only to provide them with good quality education but also to prepare the future generation for adaptation to the rapidly growing economy.

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STUDY OF FREQUENCY OF NON-ERGONOMIC MOVEMENTS AMONG TAILORS IN BULGARIA

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ABSTRACT:

Musculoskeletal disorders (MSDs) are a very common problem among work-related disabilities and injuries among tailors.

Purpose: To study the frequency of non-ergonomic movements among tailors.

Methods: The study included 22 tailors. Data on the type and frequency of movements were collected with a "Dynabak" wearable body-type electronic device with built-in sensors, and were interpreted in accordance with the BDS EN 1005-4:2005+A1 standard.

Results: In about 50% of the average time measured, the tailors' hands were in an unacceptable position. With the highest proportion are persons occupying unacceptable positions of the elbows, and acceptable positions are when rotating the torso and moving the body laterally.

Conclusion: Tailors often have poor working postures and the risk of musculoskeletal disorders is high for them.

Keywords: work-related musculoskeletal disorder (WMSD), Sewing Machine Operators, Tailors

INTRODUCTION:

Tailors perform monotonous, repetitive, high-speed, precision-demanding tasks involving prolonged sitting, as well as frequent repetitive movements of the upper extremities (eg, to feed fabric to the needle) and continuous foot pedal control. All this is a prerequisite for the appearance of work-related musculoskeletal disorders (WRMSDs) in them/in this group of workers. Previous studies have shown that sewing machine operators experience problems in the neck, shoulders, arms, back, and sometimes in the lower extremities, such as the knees. These problems may interfere with their work and daily activities [1, 2].

THE PURPOSE of the study is to investigate the frequency of non-ergonomic movements among tailors.

MATERIALS AND METHODS:

The study included 22 tailors. Data on the type and frequency of movements were collected with a "Dynabac" T-shirt type device with built-in sensors and interpreted in accordance with the standard BDS EN 1005-4:2005+A1 ("Safety of machines. Human physical characteristics").

The evaluated movements are: frontal - left and right; sagittal - left and right; extended elbow - left and right; body - forward/backward; lateral to the body; torso rotation.

Table 1 presents the criteria for evaluating the position.

Table 1. Position evaluation criteria

Position	Ranges, Angles	Evaluation
1	[0,20)	Acceptable
2	[20,60)	Conditionally acceptable
3	[60,180)	Unacceptable
4	[-90,0)	Unacceptable

The statistical analysis was done using the Statistical Package for Social Sciences (SPSS) version 20. The study was approved by the Research Ethics Committee at MU-Sofia.

RESULTS:

Distribution depending on the duration of the occupied positions

The average measurement time of the frontal movement of the left hand was 169 minutes. In 48.7% of the measurement time, this hand occupied an unacceptable position, in 22.9% it occupied an acceptable position, and in 18.54% of the time it was in a conditionally acceptable position (Figure 1A). In 9.86% of the time, the frontal movement of the left arm was outside the positions presented in Table 1.

The reported frontal movement of the right hand had an average duration of 151 minutes. Over half of this time, the position of the hand is unacceptable (57.34%). About 1/5 of the time, the hand was in an acceptable position (21.76%) and relatively equally, in a conditionally acceptable position (19.08%) (Figure 1B). Unidentified positions are at 1.82% of the time.

Sagittal movement of the left arm was tracked for an average of 172 minutes. In this movement, the conditionally acceptable position prevails (42.19%). The unacceptable position was 33.97% of the time and the acceptable position 19.3% (Figure 1C). In 4.5% of the time, the sagittal movement of the left hand was outside the four positions studied.

The average time to measure the sagittal movement of the right hand was 161 minutes. The distribution of this time depending on the position is: 52.01% - conditionally acceptable; 23.93% acceptable and 19.51% unacceptable (Figure 1D). Unidentified positions occupy 4.55% of the average measurement time.

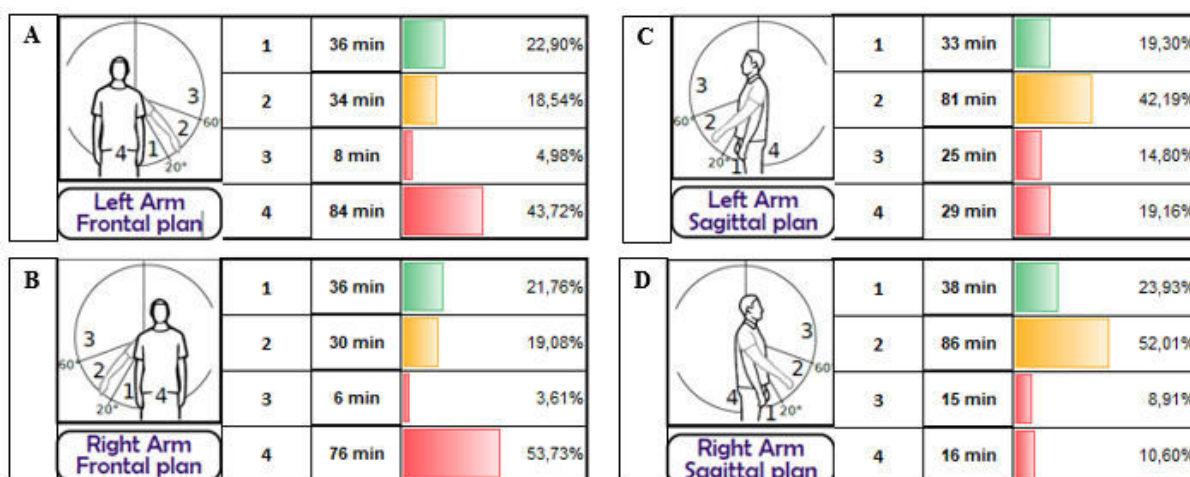


Figure 1. Time distribution in the different positions (angular range) for frontal and sagittal planes.

Distribution of cases depending on the occupied positions.

The most common unacceptable positions are elbows (left elbow – 86.4% of tailors; right elbow – 76.9%), body movement (forward/backward) – 60.0% and frontal right arm movement – 54.5%. Predominantly acceptable positions were recorded for torso rotation – 90.0% and lateral body movement – 50.0% (Table 1).

Table 1. Distribution of tailors depending on the performed movements and position (acceptable/conditionally acceptable/unacceptable).

Движение	Позиция	N	%
Sagital Right	acceptable	6	28,6
	conditionally acceptable	15	71,4
	unacceptable	0	0,0
Frontal Right	acceptable	4	18,2
	conditionally acceptable	6	27,3
	unacceptable	12	54,5
Sagital Left	acceptable	0	0,0
	conditionally acceptable	16	76,2
	unacceptable	5	23,8
Frontal Left	acceptable	5	23,8
	conditionally acceptable	6	28,6
	unacceptable	10	47,6
Elbow ext, Left	acceptable	1	4,5
	conditionally acceptable	2	9,1
	unacceptable	19	86,4
Elbow ext, Right	acceptable	1	7,7
	conditionally acceptable	2	15,4
	unacceptable	10	76,9
Body For/Back-ward	acceptable	8	40,0
	conditionally acceptable	0	0,0
	unacceptable	12	60,0
Body Lateral	acceptable	8	50,0
	conditionally acceptable	4	25,0
	unacceptable	4	25,0
Torso Rotation	acceptable	18	90,0
	conditionally acceptable	0	0,0
	unacceptable	2	10,0

CONCLUSION:

The highest proportion of unacceptable positions were recorded in the movement of the elbow (left and right). In sagittal movement of the hands, conditionally acceptable positions are most often registered. In frontal arm movement and forward/backward body movement, the most common positions are unacceptable. Most often, acceptable positions are observed when the body is moved laterally and the torso rotates.

The results of this study show that tailors have a poor working posture - the duration and frequency of unacceptable positions are high, which is a prerequisite for the development of a high risk of

musculoskeletal disorders.

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OCCUPATIONAL – PHYSIOLOGICAL SCREENING OF RISK FACTORS CONTRIBUTES TO INCREASING THE LEVEL OF HEALTH RISK

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ABSTRACT

Exposure to social, professional and psychological risk factors can reduce the possibilities for psychological and physiological adaptation of a person by forming strong stressogenic factors and agents, and induce a risk of diseases of the Cardiovascular and Cerebro-Vascular Systems. The aim of the present study is to investigate the level of Health Risk in case of chronic exposure to work-physiological risk factors. The Job Analysis and functional state of the Cardiovascular System were investigated using a computer diagnostic method and Heart Rate Variability Analysis (HRVA) system in 63 nurses and 33 controls. We found a significant increase in occupational risk factors in nurses compared to controls, which contributes to an increase in the level of Health Risk. The established dysfunctional cardiac control contributes to the determination of latent forms of Cardiovascular Diseases.

INTRODUCTION:

In the process of long-term interaction of the individual with the working, psycho-social, environmental agents and the labor process, it is possible to study, discover, determine and analyze factors related to the risk to the health status of the working person and the performance of the work activity and safety at work. The screening of risk factors related to the performance of the work activity and exposure to psycho-social stress of the person contributes to early detection and determination of stressogenic factors affecting health status, prevention of work-related stress-induced morbidity, management of risk factors, occupational safety and health promotion (1, 2).

The aim of the present study is to investigate the level of Health Risk in case of chronic exposure to work-physiological risk factors.

MATERIAL AND METHOD

Material

Two groups of individuals were included and examined in the study: nurses and controls. The nursing group consisted of 63 individuals, females (mean age/SD, 44.73/7.12 years; mean job tenure/SD, 23.87/9.93 years). The control group of individuals consisted of 33 individuals (mean age/SD, 36.37/9.49 years; mean job tenure/SD, 16.92/10.15 years), of which 19 were male and 14 female.

Methodological design

Job Analysis (3):

The overall analysis of the work activity included determination of main and basic risk factors; conducting and carrying out an interview with the employer and the employees; monitoring the work and the performance of work tasks; study of the conditions provided by the working environment for the performance of the activity, and the existing psycho-social conditions at the workplace and others.

Investigation of the functional state of the Cardiovascular System (CVS) by means of a computer diagnostic method and a system for the Analysis of Heart Rate Variability.

To study the functional state of the CVS and the autonomic cardiovascular control, a computer diagnostic method and a system for the Analysis of Heart Rate Variability (HRVA) have been applied (4-6). The methodological system consists of a PC-IBM, specialized hardware and software that allow the following functional tests to be performed: Cardiotachogram, Histogram, Scattergram, Spectral Analysis of Heart Rate Variability, Mental and Health Risk. HRVA indicators are determined from 10-minute ECG recordings between 9-11 a.m. in a sitting position of the body after a one-hour rest period.

In order to achieve the aim of the study, the following are applied:

Index of HRVA:

Health Risk (HR) (%).

Data analysis.

A t-test of two independent samples was used for data analysis.

RESULTS:

Work-physiological screening of basic and main risk factors as a result of the application of Job Analysis:

Nurses

Psychological Factors:

- psycho-social stress due to exposure to the psycho-social risks such as work control, work demands/workload, social support from immediate supervisor, colleagues and family, self-esteem in relation to work, cognitive abilities, psycho-somatic complaints;
- psychological load associated with the risk of neglecting the human factor and the risk of accidents

Occupational Factors

- nervous and mental stress;
- requirements for high responsibility for the health and life of patients;
- emergency patient care and diagnostically and therapeutically difficult cases;

- security and safety requirements;
- requirements for quick and urgent expeditious intervention;
- shift work;
- high concentration and distribution of attention when performing work;
- visual, sound and auditory load.

Controls:

Psychological Factors:

- psycho-social stress due to exposure to the psycho-social risks such as work control, work demands/workload, social support from immediate supervisor, colleagues and family, self-esteem in relation to work, cognitive abilities, psycho-somatic complaints;

Occupational Factors:

- mental stress;
- high concentration and distribution of attention when performing work;
- visual load.

Indices of the functional state of the CVS studied by HRVA:

Index of HRVA:

Table 1. Mean values (X±SD) and level of significance (p) of HR in nurses and controls

Indices	Nurses 1 (N=63) Mean (SD)	Controls 2 (N=33) Mean (SD)	Level of significance P 1-2
HR (%)	49.03±15.60	24.40±6.43	<0.001

Table 1 presents the mean values of the HRVA - Health Risk index for nurses and controls. A significant increase in the level of Health Risk was observed in the nurses compared to the controls.

DISCUSSION:

In the process of work activity social, occupational and psychological risk factors can reduce the possibilities of psychological and physiological adaptation of the person, forming strong stressogenic factors and agents, and induce the risk of diseases. Occupational-physiological screening of occupational, psychological and factors related to the work and environment of individuals working in health care, such as nurses, contributes to the early detection of stress-induced diseases of the Cardiovascular System. We determine these diseases by examining the Health Risk index (4). We found a significant increase in HR in the nursing group compared to controls. In the group of nurses,

we found dysfunctional cardiovascular control, as the HR value was greater than 25%. The identification of latent forms of Cardiovascular Diseases (CVD) in healthy working nurses due to the determination of dysfunctional cardiovascular control during exposure to chronic occupational risk factors is of primary importance for health prevention.

CONCLUSION:

The professional and work activity of nurses working in healthcare is associated with exposure to stressogenic occupational risk factors that cause dysfunctional cardiovascular control and respectively latent forms of CVD.

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