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Occurrence and applied interventions in Work-Related Musculoskeletal Disorders among medical workers – review

Abstract

Introduction. Ailments resulting from work-related musculoskeletal disorders (WRMSD) are currently a large social problem that is widely studied both in Poland and in the world in the context of preventive measures. WRMSD are one of the main causes of dysfunction or injuries, resulting in absenteeism and even disability. The professional group of medical workers is currently one of the most exposed to the occurrence of occupational-related musculoskeletal disorders, right after the construction and, agricultural and fishing sectors.

Aim. The aim of the study is to present the problems of musculoskeletal disorders and various interventions to prevent this disease in medical professions.

Material and methods. The authors undertook the analysis of the subject matter due to the increasing number of musculoskeletal disorders and occupational diseases in medical groups.

The authors obtained articles from reputable databases: PubMed and Embase.

Results. The results of the analyzed studies clearly indicate an increasing frequency of musculoskeletal disorders among medical workers, higher in increasingly younger age groups. The dominant symptoms include muscle pain in the neck area, upper and lower back, shoulder and knee joints, as well as numerous overload syndromes.

Conclusion. Kinesiology programs significantly reduce the incidence of WRMSD and also injuries, they reduce pain and the use of drugs. The most common types of intervention include: consultation with therapists in preventive programs and work ergonomics training.

Continuous and multidirectional research on the issues of WRMSD is necessary due to their more frequent occurrence and the lack of effective system solutions in the field of their prevention and treatment.

Keywords: musculoskeletal disorders, medical workers, occupational diseases.

DOI: 10.2478/pjph-2022-0016

INTRODUCTION

Work-Related Musculoskeletal Disorders (WRMSD) are disorders of the muscular structures, joints, as well as the nervous system, which are directly caused by working conditions. The definition of musculoskeletal diseases is used as an “Umbrella Heading” for various pain and overload conditions. Counts to them: several types of tendinopathy, bone syndromes, vascular and nerve compression syndromes, and also overloading of joint structures (e.g. meniscus) [1,2]. Pain is the dominant symptom of the disease multi-place with a specific location, having a surviving character. Most often they concern overloads in the area of: upper limbs, neck, shoulder girdle, neck the uterus and the area of the thoracic or lumbar spine [1]. To the diseases that occur within the shoulder girdle and upper limb, the following syndromes are also included: carpal tunnel, thoracic opening (compression on the brachial plexus, subclavian and axillary arteries and the subclavian vein), rotator cuff overload, and epicondylitis medial and lateral [1,2]. Diagnosis of WRMSD due to sudden dete-

rioration is often mistakenly confused with muscle strains, sprains or tears. Unfortunately, due to the persistent nature of the ailments, patients often refer to a specialist with already advanced disease [1]. As a consequence of the persistent condition muscle fatigue, micro-injuries and repetitive or chronic inflammation, there are treatment and convalescence, which are a serious health, social and economic problem [1].

WRMSD are one of the most common problems related to work and concern virtually all occupations and sectors. Epidemiological studies confirm the presence of at least one musculoskeletal disorder in the last twelve months for 60% of employees in 2015 compared to 58% in 2010 [1]. In Poland, the incidence of these ailments among employees is 58%, both in 2010 and 2015 [1]. Number of years lost as a result of health deterioration, and the impact on previous disability or death reflected in the indicator DALYs for this disorder are as high as 15% [1]. More and more is being done now, including information campaigns regarding WRMSD, as well as preventive actions, such as the program for 2020-2022 by the Healthy Workplaces Campaign (HWC): Prevention of work-related musculoskeletal disorders (MSDs) [1].

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AIM

WRMSDs are one of the leading causes of absenteeism. According to the program of the members of the European Union “Europe 2020”, they are a social problem (earlier resignation from work), demographic (population ageing) as well as economic one (increase in company costs: the cost of sick leave is largely covered by employers). The current epidemic situation has deepened the already existing on a large scale WRMSD issues among health professionals. Musculoskeletal disorders are common with healthcare professionals, which is also confirmed by own research. This is a problem that has not found a systemic solution in the form of preventive or remedial measures yet. This group is currently one of the most vulnerable, right after the construction and, agricultural and fishing related sectors with the profession [1]. There are also not enough related publications on the subject of WRMSD, hence the interest of the authors in this subject.

Factors affecting the human body

The human body can be affected by both exogenous and endogenous factors depending on the individual reactions of the human body. Polish Standard – PN or the Labor Code determine the number of hours and the possibility of exposure to each of them. Medical professionals are particularly vulnerable to exposure to both physical and environmental factors, mental or social (work under time pressure, responsibility for life and health). Stress-inducing and harmful factors are presented in table 1 [3] and table 2 [1,2,4].

TABLE 1. Stress factors and the way they affect the human body [3].

Type of stressor	Factors
Physical	hunger, thirst, physical trauma, overstimulation, noise, temperature fluctuations
Social	isolation, bullying, conflict
Mental	too much workload, loss of control, haste, fear of not meeting the tasks set

TABLE 2. Characteristics of harmful factors in the medical environment [1,2,4].

Occurrence factor	Characteristic
Uniform and forced non-ergonomic position	bent or twisted trunk, tilted head, arms above the shoulder line, excessive movements in the wrist joints, squatting or kneeling position
Hand work with the use of great force and repetitive movements	lifting and moving patients, moving heavy loads
Work under pressure and high job demands	work under pressure and high job demands
Working with medical screens (Visual Display Units – VDU)	computer screens, medical equipment

All of these factors can result in problems over time in daily and professional functioning. Lack of adequate rest, regeneration, or supportive therapies increases the risk of chronic work-related muscle fatigue syndrome. It leads to problems of nature bio-psycho-social, i.e., among others, a decrease in motivation, the development of psychosomatic diseases or physical injuries [5-7]. Common symptoms include: pain, general fatigue, insomnia, depression or professional burnout [1,8]. Upper back pain affects up to 60% of the population, and office workers have this rate as high as 78%. One in five surveyed people suffers from chronic back pain [9,10].

Classification of work-related musculoskeletal disorders

There are several classifications of ailments in the literature pain, the currently standardized method of assessing the occurrence of WRMSD syndromes is the standardized Nordic Musculoskeletal Questionnaire (Standardized Nordic Questionnaire-NMQ) [1,8]. This tool has been used in a number of studies both clinical and cohort ones to assess the occurrence of this syndrome. For the study of pain, algometers are used to measure muscles, the range of motion is measured (Range of Motion), and hand-held dynamometers are tested, and numerous questionnaires are also used for the subjective assessment of the subject, such as Disabilities of the Arm, Shoulder and Hand (DASH) Outcome Measure [1,11] or a quality assessment questionnaire life of SF-36 [11].

RESULTS

Review methods

The literature review was performed using the keywords “Work-Related Musculoskeletal Disorders” or “WRMSD” and “therapy” based on Embase and Pubmed. A total of 48 results were obtained, duplicate searches were excluded as well as erroneous ones, not related to the subject and 35 items were obtained, of which 14 concerned the prevalence of WRMSD in medical professions. Articles not related to medical professions were eliminated manually. Five of the articles contained aspect of using an intervention or therapy to treat or prevent muscular syndromes. The articles cover the years from 2009 to the current year, updated on 05/30/2021. Six of the articles are from the last 5 years, and they confirm the increasing risk of musculoskeletal disorders syndromes among medical professions.

Occurrence of ailments among healthcare workers

The complaints associated with WRMSD apply to all medical professions, research scientific studies confirm the frequent occurrence of these ailments in doctors: dentists, surgeons, orthopedists, as well as nurses, diagnosticians, physiotherapists, hygienists, as well as office workers in the medical sector [1]. For medical workers, numerous protocols are being prepared to improve the working environment, adaptation of medical equipment, ergonomic training and therapies with physiotherapists. The frequency of injuries and negative influence of the working environment are still large. Medical workers often work overtime, under time pressure and in an unergonomic environment [1,8,12].

Research by Dabholkar T. et al. [13] presents the existence of a 14-hour system work for over 75% of the surveyed surgical room operators. In a study by Sharan D et al. [14], musculoskeletal pain was observed in 88% of physiotherapists distinguishing between pain in the lower back in 62% and in the upper back 59%, with an average age of only 27.6 years. Among 601 dentists surveyed in India in the study by Gupta T et al. [15], muscle problems occur in as many as 82%. In the study by Saleem M. et al. [16], pain symptoms were present in nurses: 58% had average level of muscle pain, and over 30% severe pain in the study group of 250 nurses between the age of 22 and 30. A survey by Fátima D. et al. [17] among 254 oral hygienists in Portugal showed symptoms of pain in the neck and pelvis in more than 50%. Tests survey by Parul R. A et al. [18] among dentists indicate the greatest problems – 68% percent with lower back pain, then problems with knee joints and feet. There was also a tendency that greater ailments concern

dentists working with small tools in out-of-position for more than 40 minutes and that there are often problems of dentists with less work experience. Among the respondents in the study by Evans K. et al. [19], in a group of nearly 3,000 (n=2.963) ultrasound diagnostic workers, 90% reported pain during work.

Interventions used in the study by Giagio S. et al. [11], the use of ergonomic instruction in the operating room and exercises supervised by a physiotherapist allowed to reduce the ailments pain by 16% compared to the control group and a reduction in painkillers consumption by 15% in a study of 140 operators over a six-month period. A perennial study by Marshall L. et al. [8] (2007-2011) on 163 participants confirmed that multidirectional changes and kinesiology programs can reduce risk of the occurrence of another injury by 51%. This study also points to many methods used, systemic changes: purchase of lifts for lifting patients, injury prevention as well as “kinesiology trainings”. The authors, on the other hand, emphasize numerous limitations and deficiencies in the documentation tests. An innovative solution in the study by Dabholkar T. et al. [12] was the application surveys among otolaryngologists prompting them to find a solution themselves concerning the occurrence of pain symptoms in them, rules were written down on its basis work in these positions and the conclusions drawn about the improvement among this group after the trial their involvement in solving systemic problems, but no numerical value was provided. In a study by Larsen A.K. et al. cognitive-behavioral training was used, in which employees participated in sessions where they could talk about working conditions with superiors and create self-preventive countermeasures for pain situations. This was to increase health awareness. A total of 509 participants from six centers were qualified for the study, who have participated in this type of therapy at least once. The results of the evaluation after 6-12 months allowed for a 7% reduction in pain and no statistical impact on the nuisance of illness or absenteeism at the workplace [20]. A Survey of Gupta D. et al. [15] among dentists in Indian countries in a group of 601 respondents showed 1.5 times lower chance of illness, 5 times lower chance of temporary cessation of work for more than 1 month and more than twice as likely to use alternative therapies compared to conventional ones, indicating effectiveness in preventing injuries at work. Alternative therapies included: supplementation, herbal medicine, chiropractic and other therapies included in the “CAM” group (complementary and alternative) [15].

Summary of results regarding the interventions used and their effectiveness is presented in table 3.

TABLE 3. Interventions and their results.

Research authors	Intervention applied	A number of participants	Intervention duration	Result
Giagio S. et al. [11]	Instruction in ergonomic work and exercises supervised by a physiotherapist	140 (65 study group, 75 control group)	6 months	reducing pain by 16% compared to the control group, a 15% reduction in the consumption of analgesics compared to the control group
Marshall L. et al. [8]	Kinesiology program dedicated to staff	163 (59 study group, 104 control group)	4 years	51% less risk of another injury compared to the control group
Dabholkar T. et al. [12]	Survey to cause damage to respondents	73	no data available	no data available
Larsen A.K. et al. [20]	Cognitive-behavioral training with an emphasis on dialogue, increasing health awareness	509 participants	6-12 months	pain reduction by 7%, no impact on sickness nuisance and absenteeism at work
Gupta D. et al. [15]	A survey discriminating between the use and non-use of alternative therapies	601 participants	no data available	1.5 times less chance of disease, 5 times less chance of temporary cessation of work for more than 1 month

Kinesiology programs significantly reduce the incidence of WRMSD and injuries compared to groups not covered by these programs, they also reduce pain and the frequency of taking painkillers. There is also a lot of emphasis put on ergonomics of work and instructions, as well as access to consultations with therapists in preventive programs against muscular diseases [8,11,21].

The presented results show how important is the problem with musculoskeletal disorders among the medical professions. An untreated and persistent condition of these disorders can also be the cause of work-related accidents [1].

DISCUSSION

The analyzed studies, especially those by Sharan D. et al., Gupta T. et al. and Saleem M. et al., clearly indicate the frequent occurrence of pain syndromes muscles and joints among health professionals. It is worrying that the greatest ailments occur in groups with less seniority [14,16]. Research confirms the effectiveness of changes in the form of the purchase of equipment supporting the work of medical workers. The work of the health service is increasingly supported by various types of lifts working with patients [8]. There is a strong emphasis on growth in medical workers occupational injury awareness and prevention. Many supervised programs and ergonomic work instructions are created [11]. Analyzing the available literature, the conclusions are similar. Neves M et al. [21] point to the need for interdisciplinary programs as the only effective ones. In Asian countries, unconventional therapy is also used more and more often [15]. There is not however, enough research to be able to clearly choose the most effective method. Results of further research may be used to develop interest in new methods of prevention and therapy in the context of prevention and treatment of WRMSD.

CONCLUSIONS

- Pain is common among healthcare workers with WRMSD and they are a serious and growing problem.
- Work-related musculoskeletal overload syndrome occurs in different ways in medical professions, especially among: nurses, operators in rooms surgeons, physiotherapists, dentists and office workers.
- Effective prevention methods include therapist-supervised training and supervised tutorials, surveys, as unsupervised training brings questionable effectiveness.
- There are not enough publications on WRMSD in the context of therapy and reliable elaboration of its results.

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