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Risk factors for musculoskeletal pain among office workers

Anna Kowalczyk[1], Kinga Kulczycka[2], Ewa Stychno[2], Beata Chilimoniuk[3]

[1]Faculty of Medicine and Health Sciences, Jan Kochanowski University of Kielce

[2]Chair and Department of Management in Nursing, Faculty Health Sciences Medical University of Lublin

[3]Department of Medical Rescue, Faculty of Health Sciences, Medical University of Lublin

Address for correspondence:

Anna Kowalczyk ORCID ID: 0000-0003-4732-3934

e-mail: annakowalczyklublin@gmail.com

Kinga Kulczycka: ORCID ID: 0000-0002-5517-2171

Ewa Stychno ORCID ID:0000-0003-3343-9880

Beata Chilimoniuk ORCID ID: 0000-0002-2630-9941

SUMMARY

Musculoskeletal disorders occur with different frequency and intensity within particular occupational groups. On the basis of the research and observations carried out, the features of people and their living environment, which predispose to the development of disease changes within the locomotor system, were identified. They are divided into two categories: occupational risk factors and non-occupational risk factors. The aim of this paper is to present the main risk factors for musculoskeletal pain among office workers. Early identification and knowledge of vulnerable people allows to plan and implement corrective and preventive actions

at the stage when they have a chance to effectively limit, stop or even reverse the disease changes developing in these people.

Key words: pain, ergonomics, office work

Introduction

Today, musculoskeletal disorders are a major challenge for occupational health professionals. This is because it is the most frequently stated health problem among Poles, which is conditioned by their professional work. High prevalence of musculoskeletal disorders reduces the ability to perform professional activities, as well as their quality and effectiveness. As a result, workers, employers and society as a whole bear a number of costs which could have been avoided if preventive measures had been implemented in good time.

This paper presents the factors predisposing to the development of locomotor problems among office workers, divided into those related to their work, as well as those arising as a result of improper lifestyles or individual employee characteristics.

Professional risk factors

According to art. 207 §2 of the Labour Code, the employer is obliged to take care of the health and life of an employee by ensuring safe and hygienic working conditions appropriate to the current achievements of science and technology [1]. However, if he does not fulfil his duty properly, particularly in the context of ergonomic recommendations, he may endanger the health of the worker.

Representative modular studies : "Accidents at work and work-related health problems", carried out in Poland in 2013, indicate that the most frequently reported occupational health problems are musculoskeletal disorders. They constitute as much as 67.7 % of all ailments experienced during the last 12 months [2]. As compared to the previous edition of the study, the share of this group of ailments in the total number of work-related health problems increased (in previous studies 62.0 %) [3].

An interesting phenomenon is the dependence researched by scientists from Norway, which proves that the employees' belief that their discomfort in the lumbar and sacral spine is caused by their work leads to a change in their health behavior and to an increase in the degree of disability limiting their professional and social life. [4].

The hazards of the working environment, which have a destructive effect on the human musculoskeletal system, are presented below.

A workplace which does not meet the requirements of ergonomic principles

A poorly designed workstation causes increasing tension of the employee's s skeletal muscles and, as a result, leads to excessive overload of the musculoskeletal system [5]. Additional risks arise when the ergonomic knowledge and awareness of employees is low. This makes it difficult to use ergonomic solutions, even if they are implemented in workplaces [6].
At administrative and office workstations, a special role is played by the Regulation of the Minister of Labour and Social Policy on health and safety in workplaces equipped with screen monitors. It specifies the conditions for adapting the computer workstation to the needs of employees [7]. The studies conducted so far confirm that long-term use of a computer increases the risk of developing ailments within the musculoskeletal system [8]. It is therefore of the utmost importance to comply with the provisions of this Regulation. Unfortunately, in Polish conditions, this is still a big problem, because as Ergotest has shown, only 2% of workplaces in Poland meet the requirements of ergonomics, and as a result almost 90% of people working on them complain of spinal pains [9]. It is worth noting that most of the symptoms are temporary and reversible. Improving the working conditions, eliminating excessive strain on the musculoskeletal system, allows for spontaneous regeneration of damaged tissues. In the case of long-term effects of the overload factor, the symptoms recur and with time the diseases become chronic and difficult to cure. Office workers may develop the following diseases: carpal tunnel syndrome, lateral humerus epicondylitis (the so-called tennis elbow), cervical and lumbar-sacral spine overload syndromes, dyskopathies [10].

Sitting for a long time

Working in a seated position puts the musculoskeletal system, mainly the spine, under strain. The pressure on the spine depends on the position of the employee. According to the current state of knowledge, the most advantageous position is to lie flat and the worst position is to sit with a deeper incline [11]. The distribution of forces acting on the third intervertebral disc of the spine in the lumbar section is presented in Fig. 1.
Office workers spend most of their daily working time sitting down, which is conducive to the development of diseases within the musculoskeletal system. It is estimated that they spend up to two thirds of their working time sitting and this time is prolonged due to the widespread use of computer workstations. When working with a computer, they are less and less frequently

forced to change their body position, e. g. to stand up and bring documents, because all the necessary data are stored on the computer [12].

Fig. 1. The forces exerted on the third intervertebral disc of the spine in the lumbar section depending on the position of the employee.
Source: http://leczkregoslup.blogspot.com/

Psychosocial risks

Psychosocial stress affects not only mental but also physical well-being. Poor atmosphere at work, chronic stress, lack of social support, lack of job satisfaction may result in somatic disorders, including pain of unknown origin [13]. Psychosocial occupational hazards have been demonstrated to be associated with the feeling of cross pain (LBP) [14], neck, shoulders and lower limbs [15] and cervical spine and upper limbs pain [16].

Depending on the situation, psychosocial risks may contribute to the development of musculoskeletal disorders, exacerbate the discomfort caused by them or hinder the continuation of employment and the return to work of people suffering from specific disorders of the locomotor system. In the latter case, this is usually due to lack of support or inflexible working hours [17].

Non-professional risk factors

Age

As you grow older, you are more likely to experience pain in your joints and the surrounding tissues, muscles and bones. This is due to the natural ageing processes of the organism, poorer regeneration of damaged structures and accumulation of overloads and injuries throughout life [18]. In this context, the ageing of the working population in Poland is

very worrying. In the total number of employed people, the percentage of older people is gradually increasing. This percentage is projected to reach even 27% in 2050 [19]. It is also unfavourable that people who enter late adulthood (50-64 years) or old age (65-74 years) and due to the social and demographic situation of the country will have to continue working, will most likely face much greater health problems within the musculoskeletal system than those who are at the same age today. This is due to the fact that today people are exposed to numerous overloads of the locomotor system from their earliest years. In childhood, outdoor games are transformed into many hours of watching television or using a computer, which does not promise a positive outcome for the future [20]. Preventive measures must be taken now to stop the adverse effect of the cause-and-effect relationship.

Sex

Musculoskeletal disorders are more common in women than in men [18]. According to data from the Central Statistical Office, the percentage of women among all employees reporting problems with their necks, shoulders, arms or hands as the most serious work-related health condition was 57.0%. The same indicator for mobility ailments in the hips, legs or feet was 56.1%. Only in relation to back ailments was it slightly lower and amounted to 46. 8% [2]. The exact causes of the difference in the frequency of sensations from the locomotor system between the two sexes remain under examination. One of the hypotheses is that women report pain more often because they perform the majority of household duties, and therefore are more likely to overload the musculoskeletal system in non-working life [21].

Overweight or obesity

Too much body weight mainly puts a strain on the joints of the lower limbs and the spine, forcing them to lift extra pounds. As a result of obesity, the vertebral column settings in the lumbar sacral section of the spine change [18]. This leads to the development and management of disability and, as a result, to an increasing reduction in physical activity. As a result, overweight turns into obesity and the sick person falls into a vicious circle, becoming less and less capable of any physical effort [19].

Overweight and obesity are assessed using the Body Mass Index (BMI). For this purpose, the WHO has developed classification criteria, which are presented in Table 1 [22].

In today's world, overweight and obesity have become epidemics. Over the past 20 years, the obesity rate has tripled in European countries. According to the World Health Organisation,

half of Europe's adults are currently overweight. It is estimated that 23% of obese men and 17% of women will be obese in Poland in 2020 [23].

Table 1: WHO criteria for assessment of adult body weight.

BMI value	Body weight assessment
<18,50	Underweight
18,50-24,99	Normal body weight
25,00-29,99	Overweight
30,00-34,99	Obesity in first degree
35,00-39,99	Obesity in second degree
40,00 and more	Obesity in third degree

Lack of physical activity

Physical activity is a prerequisite for the proper development and functioning of the musculoskeletal system. It is with its participation in muscles that the number of open active vessels increases, thanks to which they become better nourished, have more energy substances, and more easily remove accumulated products of metabolism. Thanks to physical exercises, muscle mass increases, resistance to fatigue and injuries increases. Well-developed back and spine muscles stabilize the body, relieve painful symptoms of the spine. Physical activity also increases the mineral density of bone tissue, makes bones more massive and widens joint surfaces. Osteoporosis develops less frequently in active subjects [24].

The deficit of physical activity leads to the development of motor system dysfunctions, worsens physical and mental well-being, and this increases the subjective feeling of pain [25]. Eurobarometer surveys conducted at the turn of November and December 2013 showed that 52% of Poles do not practice sports at all. For comparison, for the total population of the European Union (EU28) this percentage is lower and amounts to 42%. It is necessary to undertake actions aimed at increasing the level of physical culture in our country as a key factor reducing the risk of developing musculoskeletal disorders [26].

Smoking

Smoking affects the musculoskeletal system in two ways. Firstly, it causes the so-called "smoker's cough", during which sudden short-term pressure is exerted on the spine in the lumbar region. Secondly, tobacco smoke hinders the penetration of nutrients into the

intervertebral discs [18]. The risk of development and reemission of symptoms of rheumatoid arthritis increases in the smoker [27].

Non-professional overloading of the musculoskeletal system

Musculoskeletal overload can also occur outside the working environment. Many everyday activities do not promote health. Housework, hobbies or gardening or work on a plot of land, when not properly done, increase the risk of developing musculoskeletal disorders. A similar risk is posed by practicing physical activity incorrectly matched to the body's abilities. On the one hand, physical activity effectively prevents musculoskeletal disorders and, on the other hand, it can cause injuries and overloading of the musculoskeletal system. Therefore, the main aim of all forms of physical activity should always be to promote health. A disadvantageous phenomenon is the creation of competitive sports by the mass media, where the pursuit of success is associated with enormous exhaustion of the body, and the real purpose of motor recreation is lost [28].

Non-professional psychosocial burden

Problems in family life, lack of meaning in life, lack of motivation to act, lack of social support - all these factors may exacerbate the ailments of the locomotor system. Individual factors also play a role in an individual's attitude towards work and employment. Such factors include the pattern of A's behaviour and, with it, excessive involvement in the work, excessive perfectionism, controversy, and negative impact [13].

Genetic burden of disease

The state of human health in about 20% is conditioned by genetic factors [29]. The risk of musculoskeletal disorders may depend on the frequency and severity of the relationship with family members with specific MSDs, such as rheumatoid arthritis. Reiter syndrome, stiffening spondylitis, psoriatic arthritis and others. [19]. Muscle, joint and bone pains may also accompany diseases from outside the locomotive apparatus, such as obesity or diabetes [30].

Discussion

Musculoskeletal disorders are the main health problem of working Poles. The discomfort caused by them reduces the quality of professional and personal life as well as the efficiency and effectiveness of the work performed. It is also often the cause of absence from work or makes it permanently impossible to do so. One of the factors predisposing to the

development of ailments within the musculoskeletal system is the performance of activities in a sitting position. Thanks to advances in science and technology, more and more occupations are characterised by a sedentary style of work. The power of human muscles is replaced by machines, robots and entire technological systems, and the task of a human being is limited only to controlling them or watching the results of their work on a computer monitor. All this means that more and more people spend their working lives sitting down, and often these habits are also transferred to family life, choosing passive forms of rest. This leads to an overload of the musculoskeletal system as a result of static forces acting on it. Office workers are a flagship example of a group that spends most of its shift in a seated position. The risk factors of musculoskeletal pain presented on their example show how many factors of the working environment and private life predispose to the development of these ailments. It is important to be able to identify them and to effectively influence those that are modified in some way.

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