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## THE IMPACT OF PHYSICAL AND ERGONOMIC ASSESSMENT OF THE WORKPLACE ON THE PREVALENCE OF MUSCULOSKELETAL DISORDERS RELATED TO WORK AMONG PHYSIOTHERAPISTS IN MONTENEGRO

**Krsto Kovacevic**

Institute for Physical Medicine, Rehabilitation and Rheumatology “Dr Simo Milosevic” Igalo,  
Montenegro, krsto.fizio@gmail.com

**Abstract:** The purpose of the article is to present the impact of physical and ergonomic assessment of the workplace on the prevalence of musculoskeletal disorders related to work among physiotherapists in Montenegro.

**Methodology:** One hundred twenty-seven physiotherapists performed the general questionnaire and modified questionnaire of Physical-Ergonomic Workplace Evaluation. Statistical analysis was performed using the IBM SPSS Statistics version 20. The significance level was set up to  $p < 0.05$ .

**Results:** The most common problems of the working environment are related to ergonomic conditions at work, with 87.4% of respondents. The most common connection between the work environment and space is 50.4% and repetitive work in 47.2% of respondents, while lifting loads in 37.8% of respondents. Ergonomic problem associated with inadequate posture in our study was in 81.1% respondents. 52.8% of respondents were absent from work due to illness caused by conditions in the physical environment.

**Conclusions:** The results of our research confirmed that ergonomic working conditions affect the prevalence of musculoskeletal disorders related to work in physiotherapists in Montenegro.

**Recommendations:** In the evaluation and ergonomic analysis of the risk of work-related musculoskeletal disorders, it is recommended to involve a physiotherapist through four steps: physical work situation, task ranking, objective assessment and risk management.

**Keywords:** ergonomic conditions, musculoskeletal disorders, physiotherapists, working environment, work related

### 1. INTRODUCTION

Three basic groups of risk factors can be taken into account in the development of musculoskeletal disorders related to work: physical, psychosocial and individual factors. Physical factors include prolonged or inappropriate postures, repetition of the same movements, strenuous exertion, hand and arm vibrations, whole body vibrations, mechanical compression, and coldness. Psychosocial factors are pace of work, autonomy, monotony, work / rest cycle, task requirements, social support from colleagues and management, and job insecurity. Individual factors are age, gender, professional activities, sports activities, home activities, recreational activities, alcohol / tobacco consumption and previous history of musculoskeletal disorders. The risk factor that affects all risk factors is duration. Patient handling, transfer of dependent patients, lifting, repositioning and performing manual therapy, with frequent flexion and rotation of the torso, as well as awkward positions when performing tasks, increase the risk of musculoskeletal disorders related to work with physiotherapists. In a study conducted by Mohamed and co-workers, working with the hands of a physiotherapist is a predominant problem among physiotherapists who apply manual work techniques, as well as a manually applied therapy apparatus for a long time. Risk factors associated with musculoskeletal disorders include muscle strength and elasticity. The most common work-related disorders were pain in the arm, decreased muscle strength and manual function with a worsening of symptoms caused by long-term use of hand-held devices, manual techniques such as mobilization, awkward postures, lifting, repetitive movements and handling. The effect of manual techniques, and load problems were associated with symptoms in the wrists, hands, and thumbs. A physiotherapist who often does patient transfers or bends his body forward with spinal rotations is more likely to have back problems than another physiotherapist who does not work in the area. Hossain and colleagues in their study state that physiotherapists who work in wards with early rehabilitation are at risk for musculoskeletal disorders due to cramped space between beds or low beds that are not adaptable to physical therapy. In their research, Milhem et al state that in addition to the knowledge and skills about the correct biomechanics of the body during work, physiotherapists are still at risk of developing musculoskeletal disorders related to work. Disorders and injuries affecting muscles, tendons, joints, ligaments and bones are caused by mechanical overload of these biological structures. Examples of activities that coincide with high mechanical loads are the capture and transfer of objects, jobs that require pushing and pulling forces of objects, as well as jobs in which the same forces are transmitted to machines. The determining effect of mechanical overload mostly depends on the magnitude of the force. Older workers are more susceptible to developing injuries due to natural degenerative processes. The duration of exposure is the next important factor for the development of the disease. It is determined by the total time of

exposure to certain forces and the number of repetitions in a certain time. Depending on the duration and period of the load, they can be long-term and short-term. Long-term periods mostly lead to chronic problems, while short-term ones lead to acute disorders.

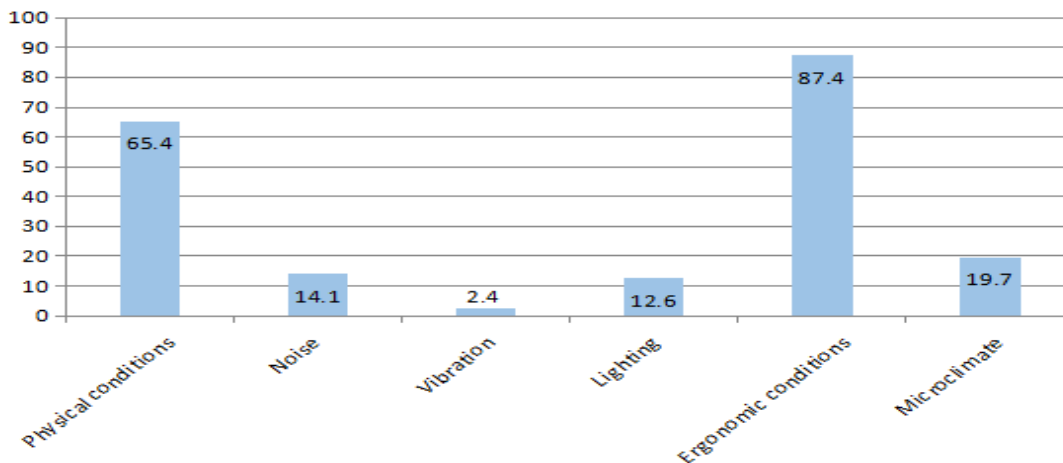
## 2. MATERIALS AND METHODS OF WORK

One hundred twenty-seven physiotherapists performed the general questionnaire and modified questionnaire of Physical-Ergonomic Workplace Evaluation. Statistical analysis was performed using the IBM SPSS Statistics version 20. The significance level was set up to  $p < 0.05$ .

## 3. RESULTS

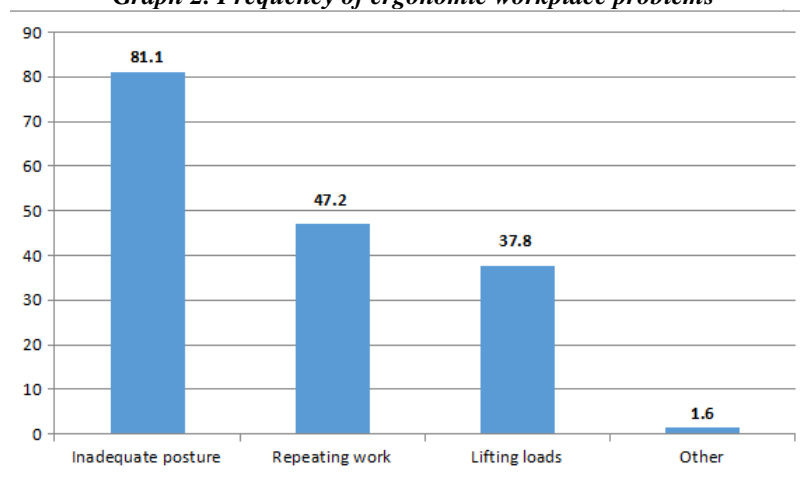
By analyzing the gender structure of the total number of respondents, we came to the result that there were 25.2% male respondents, while there were 74.8% female respondents. Using the chi-square test, a statistically significant difference was found in the gender structure of the respondents, and that the sample was dominated by women,  $\chi^2 = 31,252$ ;  $p = 0.001$ .

*Graph 1. Frequency of problems of physical and ergonomic circumstances of the workplace*



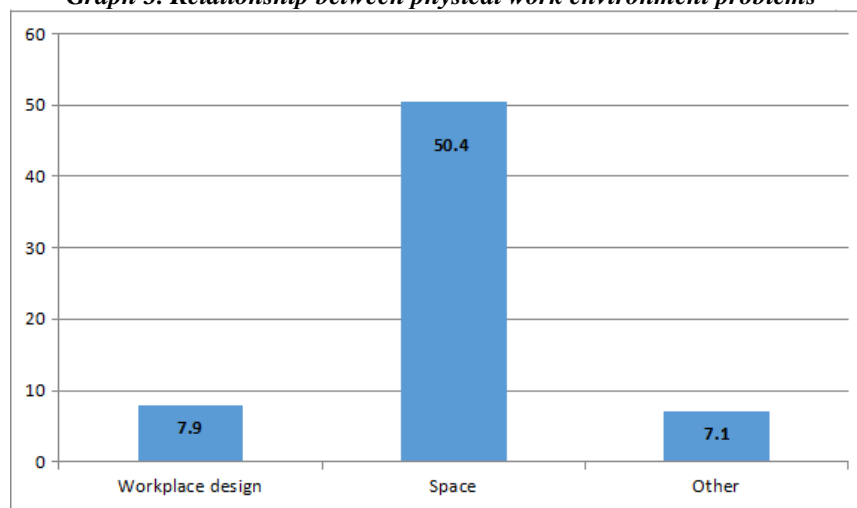
The most common problems of the working environment are related to ergonomic conditions at work, with 87.4% of respondents, followed by physical conditions (65.4%). In 14.1% of respondents it was noise, in 2.4% of respondents vibration, and in 12.6% of respondents lighting. Microclimate as a workplace problem was present in 19.7% of respondents.

*Graph 2. Frequency of ergonomic workplace problems*



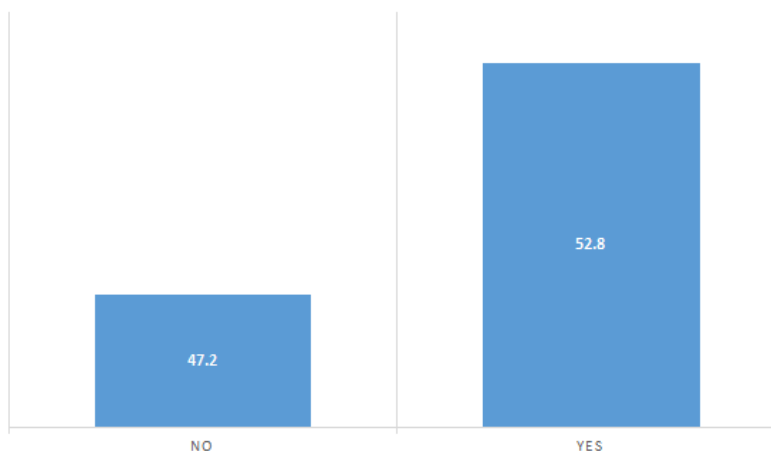
Ergonomic problem associated with inadequate posture in our study was in 81.1% respondents. Repetitive work in 47.2% of respondents, while lifting loads in 37.8% of respondents and other (shape and design of the device) in 1.6% of respondents.

**Graph 3. Relationship between physical work environment problems**



The most common connection between the work environment and space is in 50.4% respondents, following 7.4% of respondents said workplace design and 7.1% of respondents said other reasons.

**Graph 4. Absence from work due to illness caused by conditions in the physical environment**



52.8% of respondents were absent from work due to illness caused by conditions in the physical environment.

#### **4. DISCUSSION**

A study by Yasobant et al., in which 140 respondents participated, found a correlation between work factors and the incidence of work-related musculoskeletal disorders among health professionals. The results of this study correlate with the results in our study. In the study of Preran et al., in which 271 physiotherapists participated, one of the most common risk factors was bending and twisting in awkward positions in 65.8% of respondents. The results of this study do not correlate with the results in our study.

#### **5. CONCLUSIONS**

The results of our research confirmed that ergonomic working conditions affect the prevalence of musculoskeletal disorders related to work in physiotherapists in Montenegro. Physiotherapists who treat patients and apply physiotherapy to treat various musculoskeletal problems / disorders are themselves prone to the development of

various musculoskeletal disorders related to work. Based on the results of our research, we can recommend the education of physiotherapists for safer work in recognizing the limits of their practice and knowledge when and from whom to seek advice and additional professional instructions. Actively involve physiotherapists in primary prevention related to the prevention of musculoskeletal disorders related to work and control of risk factors, and in secondary prevention related to the prevention of the consequences of musculoskeletal disorders related to work through their early detection and treatment.

## 6. RECOMMENDATIONS

In the evaluation and ergonomic analysis of the risk of work-related musculoskeletal disorders, it is recommended to involve a physiotherapist through four steps: physical work situation, task ranking, objective assessment and risk management.

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