



# MUSCULOSKELETAL DISORDERS AT NURSING WORK

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**ABSTRACT**

Ergonomics in healthcare is still in its infancy. The responsibilities of healthcare personnel include taking care of the health of the whole population. That is why it is very important to care about healthcare personnel. This article is a presentation of a survey conducted in Slovakia. The survey focused on nurses who work directly at their patients' beds. The objective of the survey was to verify the physical load of nursing profession and to determine the most frequently musculoskeletal disorders of nurses. The survey was conducted in the form of the Nordic Questionnaire. The results of the survey confirmed the most serious difficulties for nurses with the musculoskeletal apparatus. The results also showed pain-related dependence in one body part of a nursing professional depending on his or her profile. However, the analyses included in this article can be applied to any company management, not only nurses.

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## 1. Introduction

The objective of ergonomics is to make day-to-day work more human for people [7]. It reduces the workload and is thus beneficial for people [1, 6]. Healthcare industry is a specific union from an ergonomic point of view. Ergonomics in healthcare is in its infancy. The role of healthcare personnel is to take care of the health of other people. Healthcare workers are in constant contact with patients, which often involves a real physical interaction. Several types of health workers work in healthcare system. The most frequent occupation is a nurse [5].

More than 30,000 nurses work in Slovakia. Only 2 percent of nurses are males [8]. Up to one third of nurses are over 50 years old [6]. People at this age begin to lose functional and working abilities, including physical strength [2].

Mental and physical workload affects the nurses. It is difficult to indicate which component of the load is more dangerous for them. The mental one is very difficult to measure [9]. And it is more difficult to eliminate it. Every day nurses are exposed to difficult live situations of patients and their family members. For this reason the research is focused on mental strain, too.

Every day nurses deal with patients. An average weight of a patient is 70 kg. This is several times more than the weight limit for the handling load of both hands for women and men should handle according to the legal regulations of the Slovak Republic [3, 4]. Nurses make

non-physiological work postures during their work shift. Their work makes them bend their bodies forward and keep their hands away from the body. The weight of patients and non-physiological work postures may pose a health risk to nurses. The question is - how big is this risk? It may be verified by the analysis of the current situation focused on problems with musculoskeletal system of nurses. The occurrence of musculoskeletal system and its problems may confirm or disprove possible health risks when working as a nurse.

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## 2. Objectives and methods

A survey was carried out to examine musculoskeletal disorders nurses suffer from. The analysis of the current situation in Slovakia was carried out through a modified Nordic Questionnaire (NQ). The questionnaire is anonymous, and is designed to provide information on the occurrence of work-related difficulties.

Questionnaire was retrieved and processed by The University of Iowa, Institute of Preventive and Clinical Medicine, Bratislava. For the analysis of the current status, this questionnaire was modified for nurses. The questionnaire is made up of three basic parts: general information, subjective assessment of the difficulties with musculoskeletal system, and subjective assessment of the nurse reaction to specific situations.

The second part of the questionnaire is important for checking the difficulties with the musculoskeletal system. In this part of the questionnaire, the nurses

indicated the parts of the body in which they felt pain during the last 12 months. They also said whether they contacted a doctor or a physiotherapist to have the pain alleviated. Based on the completed questionnaires, the current status is established. The current status is further analyzed, and individual ergonomic analyses are carried out. NQ is shown in Fig. 1.

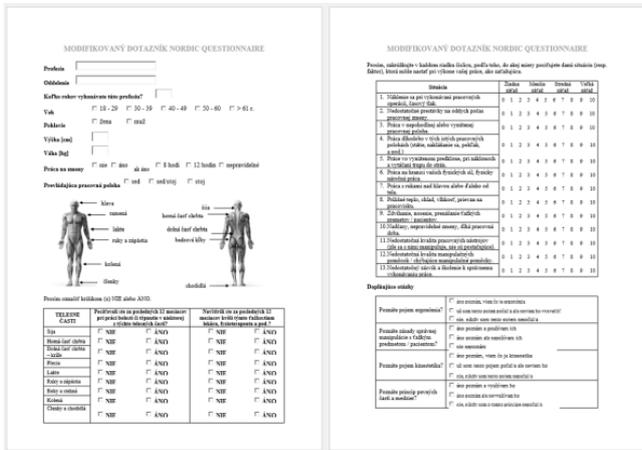


Fig. 1. Nordic Questionnaire.

### 3. Results

The focus of the survey was on nurses working in bed care units, where a greater physical load is expected. Altogether, more than 750 respondents were involved in the survey. After the filtering of the answers that were not complete or that did not refer to the nurses but to technicians and sanitary workers or concerned the nurses working in the ambulance, the total number of respondents was 468. These respondents were from 15 different departments of hospitals and from homes for social services.

In the statistical sample, 466 women and two men in all age categories were evaluated. The number of years in the profession ranged from 3 months to 49 years. 78% of the nurses (365 persons) indicated that their working position alternating sitting and standing was a predominant one. 18% of the nurses (83 persons) said that the prevailing working position is standing. Less than 1% (6 persons) determined the prevailing position to be sitting. The other 3% of the nurses did not comment on this issue.

#### 3.1. Subjective assessment of the difficulties with the musculoskeletal system

In the questionnaire, the nurses marked parts of the body in which they felt pain during the last 12 months. They also indicated whether they contacted a doctor or physiotherapist about this pain. The results of the questionnaire are represented in Fig. 2.

The lower back pain was identified as the biggest problem for nurses. Up to 80% of nurses felt lower back pain at work. Only 28% of the nurses made an appointment with a doctor or physiotherapist concerning this

problem. Nurses also felt a pain in the neck and upper back. Similarly, to the lower back, only 25% respectively 28% of nurses visited a physician or physiotherapist due to their pain. More than 50% of the nurses also felt pain in the shoulders, ankles and feet. In general, it is not possible to say that some of the departments exhibited the greatest or the smallest occurrence of difficulties in the musculoskeletal system. Nurses felt different loading on individual parts of their bodies in different departments.

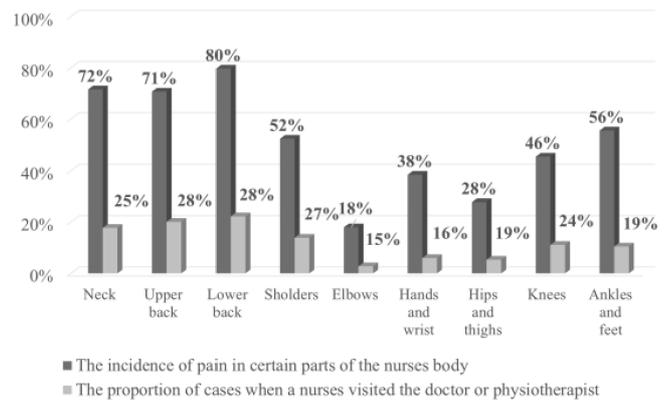


Fig. 2. The incidence of pain in a statistical sample of nurses.

One of the characteristics of the nurse's profile is the number of years during which she performs her profession. The assumption is that the longer the nurse performs his/her profession, the greater the risk of damage to the musculoskeletal system and the appearance of pain. This assumption is made on the basis that the work of the nurse is considered physically demanding. Dependence of the occurrence of pain in individual body parts of nurses on the number of years in profession is shown in Fig. 3.

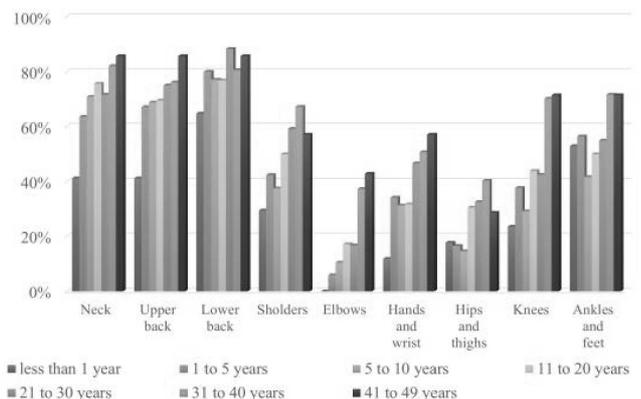


Fig. 3. Occurrence of pain in a statistical sample of nurses depending on number years in profession.

It has been confirmed that the number of years in the profession directly affects the incidence of pain in individual parts of the nurses' body. Figure 3 shows a relatively large increase in pain among nurses working less than 1 year and nurses working for 1 to 5 years. This fact confirms that work of a nurse is physically demanding.

The statistical sample of the nurses is also divided into five age groups. The assumption is that with increasing age, the health condition of nurses gets worse. Aging means a decline in functions. It does not begin in old age but in the early adulthood. The best physical condition of a person is between 20 and 29 years of life. Once this age is reached, the muscle mass and strength gradually decrease. In connection with this, it is possible to predict an increase in disorders of the individual parts of the body. Dependence of the occurrence of pain in individual body parts of nurses from their age is shown in Fig. 4.

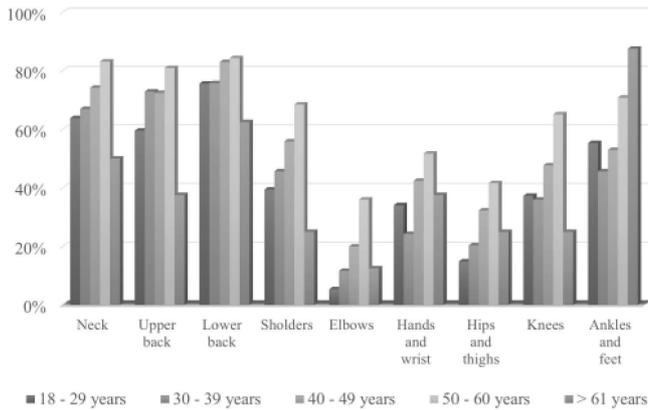


Fig. 4. Occurrence of pain in a statistical sample of nurses depending on age.

Generally, it is confirmed, that with the increasing age of nurses the problems with the musculoskeletal system also intensify. There is a slight decrease in the age group > 61 years. This may be due to the fact that this age category is a small statistical sample of nurses.

The purpose of the study was to find out whether the shift work affected the incidence of pain in the individual parts of the body. The results are shown in Fig. 5.

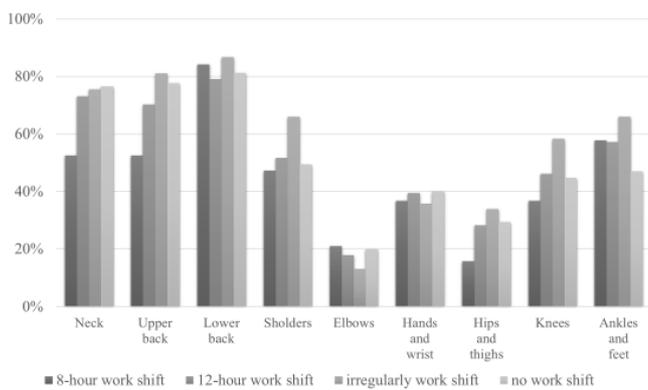


Fig. 5. Occurrence of pain in a statistical sample of nurses depending on shift work.

It can be said that there is no dependence between shift work and the occurrence of problems with the musculoskeletal system. However, the highest percentages may be observed in most parts of the body of the nurses working irregularly.

Nurses should also indicate their prevailing working posture. They could mark sitting, standing or alternating sitting and standing. The assumption reveals the most favourable posture is the alternating sitting and standing posture for the musculoskeletal system. In this case, the lower part of the body is not statically burdened in the long term, which is considered to be favorable for the musculoskeletal system. It is expected that the least frequent problems with the musculoskeletal system will be in the alternating of sitting and standing posture. The results are shown in Fig. 6.

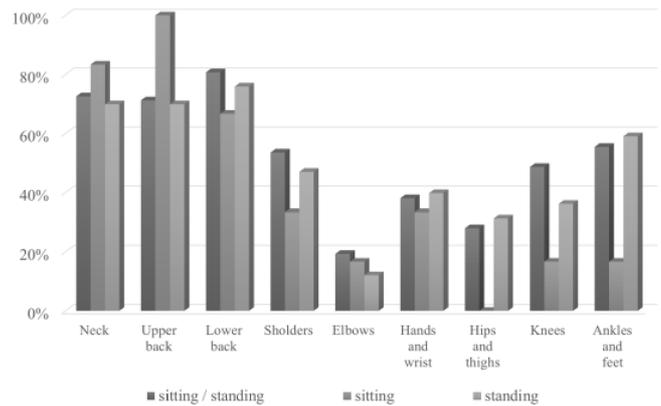


Fig. 6. Occurrence of pain in a statistical sample of nurses depending on working posture.

The assumption was not confirmed. It cannot even be said that there is a direct relationship between the particular prevailing working posture and the incidence of pain in the individual parts of the nurse's body. The statistical sample for the dominant work posture – sitting – is less than 1% of the nurses, which may distort the results in this category.

#### 4. Conclusion

The survey confirmed problems of nurses with a musculoskeletal system. Most frequently, nurses have problems with their neck, lower back and upper back. There are several studies that match these results. There are physical demands in the nursing profession. Problems with musculoskeletal system are most likely caused by handling patient and heavy objects and by work in non-physiological postures. And, of course, by combination of these two factors.

In order to prevent musculoskeletal system problems, it is important for nurses to know the basic principles of ergonomics. These include the principles of correct handling of the load and also indicate work positions that are nonphysiological. Thanks to the principles of ergonomics, nurses can prevent problems with the musculoskeletal system and thus also occupational diseases. An important recommendation is the purchase of healthcare handling aids in order to facilitate the work of nurses.

The analysis of current status musculoskeletal system of nurses was the first step of the research. The

next step will be the verification of the causes of the problems. It will be done through observation of work of nurses in selected departments. The Causes of the problems with musculoskeletal systems of nurses will be named risks. Risks will become criteria that need to be evaluated in the nurse's work. It will be also necessary to determine the severity of the risks in relation to nurse health. Based on this procedure, a new way of assessing the physical load in work of nurse will be developed.

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