Musculoskeletal Disorders in Nurses in Hospitals

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Abstract

BACKGROUND: Healthcare is a sector with a high risk of musculoskeletal disorders. The work of nurses in a hospital is associated with stress, prolonged work, uncomfortable working postures, bending and twisting of the body, etc.

AIM: The aim of this study was to identify the risk factors for the frequency and localization of musculoskeletal complaints and diagnosed diseases of the musculoskeletal system in nurses in hospitals.

METHODS: The study is cross-sectional and comprised 1,412 female nurses from 19 hospitals in Sofia having an average age of 50.3 ± 9.9 years. An ergonomic analysis of workplaces in hospitals was made. A survey was conducted in relation to the workplace, the workload, the working posture, and movements; Standardized Nordic questionnaires for the analysis of musculoskeletal symptoms were used, body mass index (BMI). Information on musculoskeletal diseases diagnosed by a doctor was collected with work ability index. The statistical analyses were made using SPSS.

RESULTS: The frequency of musculoskeletal complaints is high, complaints in the lower back being in the lead with 74.2%, followed by the back, neck, and shoulders. A musculoskeletal disorder, diagnosed by a doctor, occurs in 35.6% of the individuals. Widespread is the prolonged work in a standing position, awkward working postures, bending, twisting, and stretching. The data from the regression analysis show that the work with bending, twisting, and stretching, prolonged work in a standing position and BMI is predictors of musculoskeletal complaints.

CONCLUSION: The results indicate lack of good workplace organization and equipment. The activity involves prolonged work in a standing position, awkward working postures, and work with bending and twisting of the body. High is the incidence of musculoskeletal disorders and the undergone treatment related to them.

Introduction

The work of nurses in a hospital is associated with short deadlines for tasks, stress and anxiety, work in shifts, prolonged work, uncomfortable working postures, bending and twisting of the body, etc. [1], [2], [3]. There is a high risk of occurrence of musculoskeletal disorders in nurses, with data varying widely [4], [5]. More than half of the absences due to ill health are related to musculoskeletal disorders [1]. The incidence of the musculoskeletal disorders is affected by factors such as individual characteristics of the worker, environmental, and workplace factors (working postures and movements, etc.), work organization, psychosocial factors, and stress [5], [6], [7]. In nurses, the incidence of the musculoskeletal disorders increases with age and the increase in body mass index (BMI), where there are work-related factors (prolonged work in a standing position, awkward working postures and movements, etc.) [8], [9]. The increasing average age of the working nurses is also associated with an increase in the incidence of the musculoskeletal disorders [10], [11]. High workload and working postures involving bending, stretching, and twisting of the body increase the frequency of the musculoskeletal complaints. This relationship is also observed in younger nurses [11], [12].

Aim

The aim of this study was to identify the risk factors for the frequency and localization of musculoskeletal complaints and diagnosed diseases of the musculoskeletal system in nurses in hospitals.

Methods

The study is cross-sectional and comprised 1,412 female nurses from 19 hospitals in Sofia. The nurses have an average age of 50.3 ± 9.9 years, with average length of service of 27.8 ± 10.6 years. An anonymous survey was conducted, covering questions on the working postures, and movements and the characteristics of the work. Adapted "Standardized Nordic questionnaires" for the analysis of the musculoskeletal symptoms" [14] were applied, allowing accurate identification of the areas of the musculoskeletal system associated with the complaints,
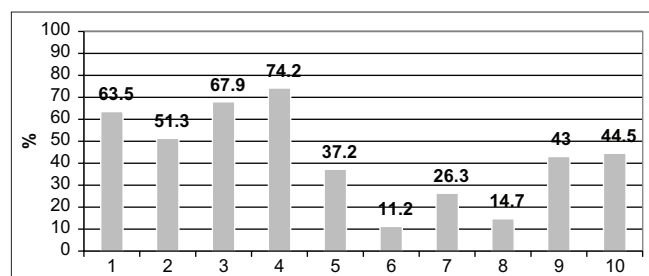
Figure 1: Musculoskeletal complaints in nurses, working in hospitals, by anatomical areas: 1 – neck, 2 – shoulders, 3 – back, 4 – lower back, 5 – arms, 6 – elbows, 7 – wrists/fingers, 8 – thighs, 9 – knees, and 10 – feet

Figure 2: Musculoskeletal complaints in nurses, working in hospitals, by age (<45 years of age and ≥45 years of age) and anatomical areas: 1 – neck, 2 – shoulders, 3 – back, 4 – lower back, 5 – arms, 6 – elbows, 7 – wrists/fingers, 8 – thighs, 9 – knees, and 10 – feet

through the graphic map of the human body enclosed to the questionnaire. The questionnaires cover the musculoskeletal complaints over a long period of time (the past 1 year). The data on the musculoskeletal disorders diagnosed by a doctor were collected using an adapted questionnaire for assessment of the work ability index, developed by the Finnish Institute of Occupational Health [15], translated, and adapted in Bulgaria [16]. Collected data were about the BMI [17]. Age aspects of the prevalence and localization of musculoskeletal disorders were studied, and the nurses covered were divided into two groups: <45 years of age and ≥45 years of age (Figure 1). The following statistical tests were used for the data analysis: Chi-square test, Student's t-test, ANOVA and Stepwise regression analysis. The data were entered and processed using the statistical package SPSS.

Results

Musculoskeletal complaints occur in 97.5% of the nurses. Complaint related to only one area of the body occurs in 8.3%, 2–3 complaints – in 29.2%, and 3 or more complaints occur in 60% of the individuals.

The total number of musculoskeletal complaints is higher in the elderly (<44 years of age 4.19 ± 2.21; ≥45 years of age 4.39 ± 2.36), with no significant difference. There is a significant difference between the two age groups as regards the complaints in the neck area, higher in persons <44 years of age (χ^2 = 13.747 p = 0.000). In persons ≥45 years of age, a higher frequency of complaints was registered in the area of the limbs, hands (χ^2 = 10.588 p = 0.001), elbows (χ^2 = 3.957 p = 0.049), wrist/fingers (χ^2 = 5.303 p = 0.024), and knees (χ^2 = 20.450 p = 0.000) (Figure 2).

Musculoskeletal complaints make difficult the daily activities of 49.4% of the nurses. A visit to a doctor during the last year happened to 46.8% of them. Treatment related to musculoskeletal complaints were applied to 62.6%, with 21.5% being hospitalized and the rest undergoing treatment on an outpatient basis.
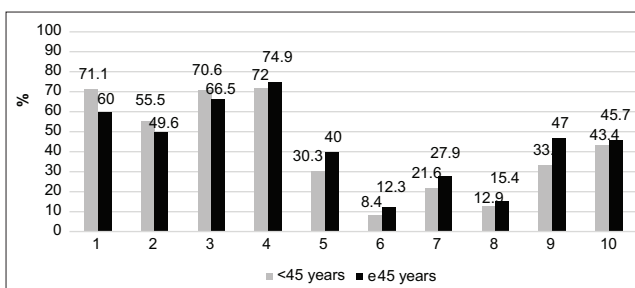
A sick leave of up to 10 days was taken by 17.5% of the nurses and 5.1% used sick leave for a longer period.

A musculoskeletal disorder, diagnosed by a doctor, occurred in 35.6% of nurses. The most common are musculoskeletal disorders in the lower back and lumbar area, followed by those in the neck and the upper back (Table 1).

Table 1: Diagnosed by a doctor musculoskeletal disorders in nurses working in hospitals (n; %)

Neck and upper back areas	Lower back and lumbar area	Pain when moving from back to leg	Limbs (arms and legs)	Rheumatoid arthritis	Other musculoskeletal disorders
250 (18%)	292 (21.3%)	137 (10%)	167 (12.2%)	38 (2.8%)	75 (5.5%)

In persons over 45 years of age, the incidence of diagnoses made by a doctor for the neck and the upper back is higher (20.2% compared to 13.7% in younger nurses; χ^2 = 7.193 p = 0.007). The elderly have a higher incidence of diagnoses made for lower back and lumbar pain (25.0% vs. 12.0% in younger nurses; χ^2 = 26.010 p = 0.000), pain shifting from the back to the leg (11.5% vs. 6.2% in younger nurses; χ^2 = 8.155 p = 0.004), and the limbs (14% vs. 7.6% in younger nurses; χ^2 = 9.938 p = 0.001). BMI significantly affects the frequency of musculoskeletal complaints (F = 8.777 p = 0.000), include in the lumbar area (F = 4.130 p = 0.006) and knees (F = 9.881 p = 0.000) (Table 2).

Table 2: Relationship between BMI and musculoskeletal complaints in nurses in hospitals

BMI (n; %)	Musculoskeletal complaints ($\overline{x}$ ± SD)	F	p
< 18.5		8.777	0.000
43 (3.7)	3.88 ± 2.29		
18.5 ≦ BMI< 24.9			
553 (47.2)	4.11 ± 2.22		
25 ≦ BMI<30			
381 (32.5)	4.51 ± 2.32		
BMI≧30			
194 (16.6)	5.03 ± 2.49		

Nurses in hospitals often work under time pressure and uneven distribution of the workload, which is accompanied by a higher frequency of musculoskeletal complaints (Table 3).

The work of the nurses is dynamic, as the main working posture is standing upright for

Table 3: Characteristics of the work and total number of musculoskeletal complaints in nurses in hospitals

Characteristics of the work (n, %)			Musculoskeletal complaints ($\overline{x} \pm SD$)	F	p
Time pressure	No	90 (7.1)	3.42 ± 2.24	16.351	0.000
	Sometimes	802 (62.5)	4.25 ± 2.28		
	Always	390 (30.4)	4.82 ± 2.31		
Even distribution of the workload at work	No	298 (22.6%)	4.96 ± 2.23	19.879	0.000
	Sometimes	564 (42.7%)	4.43 ± 2.28		
	Always	458 (34.7%)	3.90 ± 2.31		

56.5% of the individuals. In 26.5%, standing work covers part of the working time and is performed intermittently, with a change in the working posture. Working under good and very good working conditions is reported by 55.8% of the respondents.

Table 4: Impact of the working conditions on the frequency of performing a task in an awkward working posture, in nurses in hospitals

Working postures	Frequency of performance	Poor and satisfactory working conditions (n, %)	Good and very good working conditions (n, %)	F	p
Work in An awkward Working Posture	No	76 (12.5)	199 (25.8)	40.718	0.000
	Sometimes	215 (35.2)	368 (47.7)		
	Often	192 (31.5)	150 (19.5)		
	Always	127 (20.8)	54 (7)		

Good working conditions affect the performance, a decrease in the frequency of taking awkward working postures and work with bending, twisting, and stretching being registered (Tables 4 and 5).

Table 5: Impact of the working conditions on the frequency of performing a task with bending, twisting, and stretching, in nurses in hospitals

Working movements	Frequency of performance	Poor and satisfactory working conditions (n, %)	Good and very good working conditions (n, %)	F	p
Work with Bending, Twisting and Stretching	No	31 (5.1)	85 (11)	25.226	0.000
	Sometimes	157 (25.8)	280 (36.2)		
	Often	212 (34.9)	283 (36.6)		
	Always	208 (34.2)	125 (16.2)		

The regression analysis show that work with bending, twisting, and stretching is the main predictor of musculoskeletal complaints in nurses in hospitals. Predictors are also the continuous work in a standing position and BMI at statistical significance of the model (Table 6). The model includes age, length of service, BMI, characteristics of the work, working conditions, working postures, and movements.

Table 6: Impact of the working movements and postures, and BMI, on the musculoskeletal complaints in nurses in hospitals

Variables		β	t	p
Dependent	Predictors			
Musculoskeletal complaints	Work with bending, twisting, and stretching	0.133	3.845	0.000
	Continuous work in a standing position	0.086	2.475	0.014
	BMI	0.082	2.441	0.015

r^2=3.6%, F = 10.810, P = 0.000.

Discussion

Our data are in agreement with the studies of other authors who establish a high frequency of musculoskeletal complaints in nurses in hospitals [4], [5]. The frequency of complaints in the lower back, back, and neck is high [1], [3]. Studies have found variation in the frequency of musculoskeletal complaints by country, with differences in the applied methods and the evaluation criteria. [4], [5]. Data about the work, the workplace, and the equipment are scarce, making it difficult to compare results. The frequency of musculoskeletal complaints is affected by the age of the workers, being higher in the elderly [6], [7]. Our data show difference between two age groups, but for number of all complaints and in the lumbar area did not reach statistical significance. The frequency of complaints in the limbs is higher, with a significant difference. In younger people, the frequency of complaints in the neck, shoulders, and back is higher and the difference is significant for the neck area. The results are in agreement with the studies of other authors, discussing the impact of psychosocial factors, stress and skills gaps in younger people, and lack of professional experience [18], [19]. The other authors also discussed the high frequency of musculoskeletal complaints in the back and lower back in young nurses, the studies placing the emphasis on the activity – working postures and movements, and high workload [13], [20]. Our data show a significant relationship between BMI and the musculoskeletal complaints in hospital nurses, the results being in agreement with the studies of other authors [9], [21].

In our study, almost half of the nurses covered by the survey have difficulty with the everyday activities due to musculoskeletal complaints. The proportion of the older nurses, diagnosed by a doctor as regards disorders in the neck and the upper back, the lower back and the waist, as well as pain moving from the back to the legs and the limbs, is higher, with significant difference. The data are in agreement with the studies of other authors [8]. The musculoskeletal complaints in nurses are affected by work organization (weekly working hours, daily working hours, and overtime work), time pressure, uneven distribution of the workload, etc. [22], [23]. A lot of nurses work often or always under the time pressure and uneven distribution of the workload, which is accompanied by a higher frequency of musculoskeletal complaints. Under these conditions, it is difficult to take short breaks and pauses, the options for a change in the working posture are diminished [13]. The working postures and movements are discussed as the most common risk factors for musculoskeletal disorders in nurses [3], [5], [24]. Our data related to nurses in emergency and intensive care units show a high frequency of performing work with bending, twisting, and stretching [25]. In our study, prolonged work in a standing position is to be encountered in the majority of individuals (56.5%), which is in agreement with other authors [3]. Good working conditions diminish the frequency and affect the frequency of musculoskeletal complaints, the difference for the lower

back being significant. A decrease is also observed in the performance of high-risk work movements (work with bending, twisting, and stretching). One possible reason is the improved ergonomic characteristics of the workplace (size of furniture and equipment, workplace organization) [24]. The data from the regression analysis show that work with bending, twisting, and stretching, work in a standing position and BMI is predictors of the musculoskeletal complaints, which is in agreement with the other authors [3], [6], [7].

Conclusion

A high frequency of musculoskeletal complaints has been established in nurses working in hospitals. The most common complaints concern the lower back, the back, and the neck. The disorders of the musculoskeletal system diagnosed by a doctor are in accordance with the complaints. The working postures and movements, as well as the characteristics of the work, affect the frequency of musculoskeletal complaints in nurses. The results suggest a further study of the ergonomic characteristics of the workplaces, related to improvement of the working conditions. Reducing the incidence of working postures and movements, creating a risk for the musculoskeletal system, should be one of the objectives when taking measures to protect workers' health. Better organization and optimization of the activities will also contribute to the process of creating and maintaining occupational health and safety.

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