

The Prevalence of Musculoskeletal Pains among Healthcare Workers

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Research Article

Keywords: musculoskeletal disorders, COVID-19, Nordic Musculoskeletal Questionnaire, SARS-CoV-2

Posted Date: September 1st, 2022

DOI: <https://doi.org/10.21203/rs.3.rs-1994221/v1>

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Abstract

Background and Objectives: Musculoskeletal pains refer to damages people with inappropriate body positions may suffer in their jobs and are one of the most common occupational diseases.

With hospital personnel and those working in this environment like physicians, nurses, interns and nursing apprentices falling into active occupational groups, this study sought to determine the prevalence of musculoskeletal pains in these occupations.

Method: This descriptive-analytical cross sectional study was conducted in Dr. Ganjavian Hospital in Dezful in 2020 on 239 physicians, nurses, interns and nursing apprentices using a random sampling method. To assess musculoskeletal disorders in people, the Nordic Musculoskeletal Questionnaire (NMQ) was used. The data normalization was examined using chi-squared test and contingency tables. The whole analyses were done by SPSS 16.

Results: Musculoskeletal pains in people with higher job and study-related activities were more prevalent than other people in the study. There was also a significant relationship among gender, median age, the frequency of exercise and BMI with the prevalence of musculoskeletal pains. A significant relationship was found between different occupational groups (physicians, nurses, interns and nursing apprentices) and the presence of pain in wrists, hands and elbows, too.

Conclusions: Our results showed that the presence of musculoskeletal disorders was relatively high in the lumbar regions (51.7%) and necks (49.6%) and in general musculoskeletal disorders are significantly higher among physicians and nurses, a reason of which can be related to a higher median age in these groups than in apprentices. Thus, it seems necessary to both improve working conditions for hospital staff and raise their awareness of the risks leading to musculoskeletal disorders.

1. Background

Musculoskeletal disorders (MSDs) are classified as conditions negatively affecting nerves, tendons, muscles and intervertebral disc [1]. Safety and hygienic issues in work environments are of high importance [2, 3], with musculoskeletal disorders being one of the most important subjects with high prevalence in different jobs [4]. Negatively affecting physical and mental health, and quality of life as well as causing socioeconomic costs, occupational injuries are regarded as an important challenge [5–7].

As an occupational injury, musculoskeletal disorders are ranked second after respiratory diseases [8]. Musculoskeletal pains are among main factors affecting an individual's general health [9]. Most employees have experienced these pains at least once, with musculoskeletal disorders reportedly accounting for 50% of absenteeism [10].

In places like hospitals, a high level of bodily diseases such as musculoskeletal pains among employees has been reported [11]. This type of occupational injury expose not only physicians and nurses but also

interns and apprentices to dangers. This is because interns and apprentices are among the most active social classes as they need to offer services and learn medical sciences, simultaneously [9].

Musculoskeletal disorders refer to injuries that happen to those with inappropriate body positions while working and are one of the most common occupational diseases [12]. These disorders cause discomforts and pains in muscles like back muscles, shoulders, neck and hands [13]. Musculoskeletal disorders are a hidden epidemic in today's world [12]. The US Bureau of Labor Statistics has reported that MSDs constitute 29% of time away from work [14] and in 2014, 32% of occupational injuries in the US were related to these disorders [15]. MSDs account for 7% of total diseases in the society, 14% of patients and 19% of hospitalizations [14]. Research also suggests that 83% of time away from work among healthcare workers in British Columbia is due to musculoskeletal disorders [16] and one third of all cases of sick leave among healthcare workers is related to MSDs [17].

Zolfaghari et al. (2020) reported a high percentage of experiencing MSDs among nurses (47.5%) in one of Iranian hospitals; of these disorders the most common was in the area of neck (60.4%) and in the lumbar region (31.7%) [18]. Also a study by Aghalari et al. (2019) on 700 employees working in healthcare centers showed that the most prevalent disorders in the past year were in the lumbar region (58.9%), neck (54.1%), and in the last 7 days in the lumbar region (46.9%) and neck (44.9%), respectively. 15.5% of the employees also needed medical and physiotherapy services last year due to the presence of disorders [19].

A research by Abd El Hay et al. (2019) in one of clinical centers in Cairo on the working conditions of 130 physiotherapists also showed that the most prevalent disorders were in the lumbar region (75%), neck (65%) and shoulder pain (58%) [20].

And the results of a similar study by Ng A et al. (2016) on a sample population of students in the University of Melbourne reported that all student groups had experienced 85% of MSDs in at least one body part, with the most prevalent disorders being in the lumbar and neck regions [21]. The heavy costs associated with MSDs to the country's healthcare system are: the disability of the damaged person and the loss of his/her wage, the costs imposed on the employer for recruiting and training a new workforce instead of the damaged person, the costs related to insurance coverage, and social and life quality-related harms [22–24].

In addition to challenges facing physicians, nurses, interns, and nursing apprentices in hospitals, a disease like the lethal acute pneumonia was observed in Wuhan, China that was identified as a bat-borne viral infectious disease and soon swept whole China and the world as an epidemic. At first, it was introduced as an acute respiratory syndrome, but after DNA sequencing and the separation of viral markers, World Health Organization named it "Covid-19" [25, 26]. With consequences like remote work and home quarantine, this disease led to some changes in communications and jobs across the world [27]: for example, it resulted in an increase of workload burden for medical health workers and subsequently an increase in occupational stresses and on the other hand by creating social distancing for preventing the spread of the virus, it brought some changes in education system.

2. Objectives

The prevention of MSDs in an occupational population requires an assessment of factors related to jobs and personal traits, and finding the relationship between these factors and the disorders, with WHO, US Occupational Safety and Health Administration and UK Health and Safety Executive placing special emphasis on the control and prevention of these disorders and regarding them as one of their priorities [28]. As healthcare occupations by nature always put the personnel at risk of physical and mental fatigue [29], it is of high importance to examine MSDS among healthcare workers and its relationship with the coronavirus crisis. In this regard, a study was designed and conducted with the aim of investigating the prevalence rate of MSDS and its relationship with the demographics among healthcare workers in hospitals supervised by Dezful University of Medical Sciences in 2020 because identifying and controlling risk factors as well as preventing the mentioned disorders in work environments seems necessary, so that economic losses can be prevented and healthcare workers' health can be provided.

3. Methods

This is a cross-sectional (descriptive-analytical) study that has been conducted on 239 physicians, interns and nursing apprentices working in Dezful University of Medical Sciences in 2020, who were selected using a random sampling method. The criterion for including the participants into the study were: being a physician, nurse, intern or nursing apprentice, inclination toward taking part in the study, and filling in the questionnaire; and the criterion for no including were: having a physical disability, an injury from an accident, spinal cord surgery, and congenital disorders. The data from the participants were secretly collected and coded.

The data collection tools included demographic questionnaire and Nordic Musculoskeletal Questionnaire (NMQ) for examining the prevalence of musculoskeletal pains, which were distributed electronically.

The data collection was done as follows:

Stage 1: Demographic questionnaire consisting of age, marital status, work experience, education, time spent reading, exercise, height, weight, history of a musculoskeletal surgery, and the history of a general anesthesia and spinal anesthesia.

Stage 2: Nordic Questionnaire was used to record the symptoms of MSDs in the nine body regions: neck, shoulders, upper back, lumbar region, elbow, wrist, thigh, knees and ankles. Thus, this questionnaire was used for determining the prevalence of MSDs in one or several regions of the employees' body [30].

Our questionnaire for determining the prevalence of MSDs was taken from the Nordic Questionnaire designed by Cornina et al. in 1987 in the Professional Health Organization of Scandinavia. This questionnaire is formed of several parts: determining complications and discomforts in different regions of the body, and deciding whether to leave or not to leave the workplace due to these pains. Using this questionnaire, the prevalence of MSDs symptoms were investigated in the nine body regions: neck,

shoulders, upper back, lumbar region, elbow, wrist, thigh, knees and ankles [31]. The validity of the Persian version of this questionnaire has been assessed in Choobineh et al.'s study [32].

The statistical analysis was done using SPSS 16 and considering $\alpha = 0.05$.

Given that the report for the results of the Nordic Questionnaire was qualitative and with the consideration of the values of zero and one, chi-squared test and contingency tables were used. However, because of reporting the findings, percentage, frequency, mean and standard deviation were also utilized.

4. Results

With 239 physicians, nurses, interns and nursing apprentices filling in the questionnaire, 4 of them due to the history of spinal cord surgery and 1 person due to completing the questionnaire in half were removed and in the end 125 men and 109 women were examined. The mean ages were 8.31 ± 35.23 , 28.21 ± 5.52 , 25.07 ± 3.23 , and 23.69 ± 4.83 for physicians, nurses, interns, and nursing apprentices, respectively. In this research, 97.1% of physicians, 87.3% of nurses, 84.4% of interns, and 82.7% of nursing interns had MSDs at least in one of the 8 body regions (Table 1).

Table 1
descriptive statistics – qualitative variables

Case Summaries		Frequency (N)	Precent (%)
Gender	Male	125	53.4
	Female	109	46.6
	Total	234	100.0
Major	Medicine	34	14.5
	Nursing	71	30.3
	Medicine student	77	32.9
	Nursing student	52	22.2
Worke-hours	8 hours	150	64.1
	10 hours or more	84	35.9
Study-hours	less than 5 hours	194	82.9
	5 to 7 hours	35	15.0
	more than 7 hours	5	2.1
Exercise	every day	19	8.1
	some days in week	68	29.1
	some days in month	82	35.0
	Never	65	27.8
Residing	Native	109	46.6
	Non-native	125	53.4
Type of activity	Sitting	27	11.5
	Standing	60	25.6
	sitting & standing	147	62.8
Anesthesia	Spinal	22	9.4
	nothing	212	90.6
Marriage	Married	49	20.9
	Single	185	79.1
Married lady	No children	25	10.7

Case Summaries		Frequency (N)	Precent (%)
	cesarean section	8	3.4
	NVD	6	2.6

[Table 1 near here]

In total, 34 physicians, 71 nurses, 77 interns, and 52 nursing apprentices replied to the questionnaire, out of whom 46.6% were natives of where they worked.

On average, 42% of the participants had BMI < 23. In all occupational groups (physicians, nurses, interns and nursing apprentices), there was a significant relationship between the prevalence of MSDs and increased body mass index (BMI) ($P = 0.0001$), with the power in this relationship being higher in the lumbar and lower organs regions (Cramer's $V = 0.990$) (table-2).

[Table 2 near here]

Table 2
descriptive statistics – quantitative variables

Descriptive Statistics					
		Mean	Median	Mode	Std. Deviation
Age (year)	Medicine	35.2353	32.0000		8.31595
	Nursing	28.2113	26.0000		5.52376
	Medicine student	25.0779	24.0000		3.23129
	Nursing student	23.6923	22.0000		4.83670
	Total	27.2886	25.0	24.0	±6.48670
Weight (Kg)		67.8717	66.0	60.0	± 1.28156
Height (m)		1.6855	1.68	1.60	± .09005
BMI (Kg/m ²)	Medicine	24.4701	23.9690	-	± 2.97898
	Nursing	25.1777	25.3444	-	± 4.02908
	Medicine student	23.0324	23.4061	-	± 3.43185
	Nursing student	22.9901	23.7812	-	± 3.59565
	Total	23.8329	23.7812	17.58	± 3.70184

It is worth noting that in all occupational groups (physicians, nurses, interns and nursing apprentices), there was a significant relationship between gender and the prevalence of pain in different regions (wrist, hand and elbow), with the level of significance and power in this relationship being shown in table-3. And as the number of working hours per day increases, the prevalence of musculoskeletal pains goes up.

[Table 3 near here]

Table 3
relationship between gender and the prevalence of pain in different regions

	Gender		Working hour	
	Correlation coefficient	p-value	Correlation coefficient	p-value
Neck	0.143	0.093	0.182	0.021
Shoulder	0.096	0.338	0.052	0.726
Elbow	0.177	0.025	0.149	0.075
Wrist	0.206	0.008	0.107	0.265
Lumbar region	0.096	0.338	0.171	0.033
Bottom and thigh	0.126	0.154	0.163	0.045
Knee	0.061	0.643	0.168	0.036
Ankle	0.107	0.259	0.125	0.159

There was a difference among the studied groups in terms of exercise, with those exercising every day less likely to suffer from MSDs than others.

There was no significant relationship between time spent reading and the prevalence of MSDs (p-value > 0.05). 11.5%, 25.6%, and 62.8% of the participants worked in sitting, standing, and sitting/standing positions, respectively, with the sitting position among physicians (74.1%), the standing position among nurses (46.7%), and the sitting/standing position among interns (40.8%) recorded as the dominant working postures.

The most common locations of pain among women were: neck, lumbar region, bottom and thigh. And the most common locations of pain in men were, respectively: lumbar region, neck, bottom and thigh.

Moreover, no significant relationship was found between the history of spinal anesthesia and the prevalence of pain in the lumbar region (P value = 0.104). This lack of significance was also true about the regions of bottom and thigh (P value = 0.315).

20.9% of the statistical population was formed of the married people, with 43 of the total 49 suffering from backache in the last 12 months and 15 having to leave their workplace because of this pain. The

findings suggest that being married increases the possibility of MSDs outbreak, especially in the lumbar region (P value = 0.0001).

Of 6 natural childbirths, 5 people had backache in the last 12 months, 4 of them as a result having to leave their workplace. With a level of significance $P = 0.006$ and the coefficient 0.232, it is possible to justify the prevalence of musculoskeletal pains in the lumbar region.

5. Discussion

This study showed that the prevalence of MSDs is significantly higher in physicians and nurses than other participants, which can be related to the number of working hours in this occupational group. The results of our study similar to Ng's research revealed that the most common locations of pain were in the lumbar region (51.7%), and neck (49.6%) [21]. Our research results also indicated a significant relationship between working in a standing position and the prevalence of pain among all occupational groups. As can be seen in Table 3, the number of working hours has a direct relationship with the prevalence of pain in the lumbar region and lower body parts (bottom, thigh and knee), which is also related to working in a (standing) position.

As with previous studies, the current study proved that there is a significant relationship between aging and the prevalence of MSDs (P value = 0.0001), which can be regarded as an important factor involved in the prevalence of musculoskeletal pains [17, 22, 23]. Thus, the higher prevalence of MSDs in physicians and nurses can be attributed to the higher average age in these two groups compared to interns and nursing apprentices.

The most important limitation in this study is that the research was limited to state hospitals supervised by Dezful University of Medical Sciences, which calls for multi-center research in a greater number of centers.

Conclusion

This study showed that the prevalence of musculoskeletal pains is in direct relationship with the number of working hours, with the increase in the hours of exercise regarded as a protection against the prevalence of MSDs in some body regions. Meanwhile, there was no significant relationship between time spent reading and the prevalence of MSDs.

Given the effect of financial and consulting supports in decreasing the prevalence of MSDs [33], it seems necessary to not only improve the working conditions of healthcare workers in hospitals, but further, to raise their awareness level of the risk factors responsible for such disorders because this results in their physical and mental health and offering patients better services.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from Institutional Review Board and the Ethics Committee of DUMS (IR.DUMS.REC.1400.031). The aims and the methods of the study were verbally explained to the participants. Participation in the study was voluntary, and participants could withdraw from the study at will. They were assured of the confidentiality of their data. Written informed consent was obtained from all the participants prior to their inclusion within the study.

Consent for publication

Not applicable.

Availability of data and materials

The dataset generated and analysed during the current study are not publicly available due to the ethics approval (but are available from the corresponding author on reasonable request).

Competing interests

The authors declare that they have no competing interests

Funding

This study was financially supported by grant: 400027 from Vice-Chancellor for Education and Research Affairs of Dezful University of Medical Sciences. The funder has no responsibility in the design of the study, data collection, analysis, and in the writing of the manuscript.

Author contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by *M.Kh*, A.A, *B.Z*, *A.N* The first draft of the manuscript was written by *Z.K* with input from all authors and designed the figures. all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Acknowledgments

The authors of the article are most grateful the Vice Chancellor for Education, Research and Technology of Dezful University of Medical Sciences for approving and financially supporting this study. We would like to express our sincere appreciation and gratitude to Clinical Research Development Unit, Ganjavian Hospital for its guidance.

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