

Prevalence of Musculoskeletal Disorders among Paramedics Working in a Large Hospital in Ahwaz, Southwestern Iran in 2010

KR Shafieezadeh

Abstract

Background: Musculoskeletal disorders (MSDs) are common among employees throughout the world, particularly in high risk groups such as nurses.

Objective: To determine the prevalence of MSDs among nurses in a large hospital in Ahwaz, southwestern Iran, and to examine its correlation with gender, age, shift working, years at service and smoking.

Methods: Using a self-reported questionnaire-based cross-sectional study, Nordic questionnaire for MSDs was disseminated to all inpatient hospital paramedics (n=195) in a large hospital in Ahwaz.

Results: Questionnaires of 161 participants were completed and returned back for analysis (response rate of 83%). The reported prevalence of MSDs was very high in the studied paramedics so that more than 90% of them reported at least one MSD in last week. The most prevalent site affected was that of neck (64%) followed by head (62.1%), knees (54.7%) and wrists/hands (49.7%); the least frequent disorder was that of elbows (14.3%). MSD was more common in females and increased with age and years of service. Non-shift workers reported more neck and elbows MSDs than shift workers.

Conclusion: Considering the very high prevalence of MSDs among paramedics, it is suggested that they engage in an exercise program at their work place to lower the risk of MSDs and promote working efficiency.

Keywords: Musculoskeletal diseases; Epidemiologic studies; Prevalence; Low back pain; Nurses; Occupational diseases

Introduction

Musculoskeletal disorders (MSDs) refers to more than 200 conditions that affect the joints, ligaments, muscles, tendons, peripheral nerves and blood vessels causing ache, pain and functional impairment.¹ Since the beginning of 18th century, it has been shown that MSDs may have occupation-

al causes.² However, only after 1970 we have witnessed publication of epidemiologic studies on work-related MSDs in the scientific literature.

MSDs are the leading causes of occupational injuries, disability, absenteeism and incapacity among workers in both developed and developing countries. Chronic musculoskeletal pain affects more than 100 million people in Europe—

Division of Environmental Health and Risk Management
School of Geography, Earth and Environmental Science
University of Birmingham, UK



Correspondence to
K. Reza Shafieezadeh,
MD, NIOC Grand Hospital, Ahwaz, Iran
Tel: +98-611-444-0365
E-mail: shafizezadehmg@yahoo.com

TAKE-HOME MESSAGE

- MSDs are the leading causes of occupational injuries, disability, absenteeism and incapacity among workers in both developed and developing countries.
- The causes of MSDs in nurses are widespread and mostly occupational in origin.
- Depending on the policy, work regulation, psychosocial environment and use of new technologies, the prevalence of MSDs as overall and ranking of each site of body affected by MSDs are different.
- MSDs were more common in women than men and increased with age and years of service.
- Early detection of, and intervention in MSDs, would ultimately reduce the burden on governments' health and disability budgets. Simple and practical participatory action-oriented training such as regular aerobic exercises can prevent or reduce the prevalence of MSDs.

over 40 million of whom are workers.³ In spite of increasing trend in the incidence of stress-related illness among European workers, MSDs remain the single most important cause of absence from work.^{3,4} In the US, work-related MSDs are a major component of the cost of work-related illness. A conservative estimate of the cost previously published by the National Institute for Occupational Safety and Health (NIOSH) was US\$ 13 billion annually; others have estimated the cost at US\$ 20 billion annually. Regardless of the estimate used, the problem is significant in terms of health and economic burdens.²

MSDs cause a significant cost to employees, employers and society as a whole. MSDs are responsible for nearly half of absence from work in the European Union³ as well as 60% of permanent work incapacity in these countries. In economic terms, it is estimated that up to 2% of gross domestic product (GDP) is spent on the direct costs of MSDs each year in European Union.⁴ Every year, 9.5 million work days are lost in the UK alone due to MSDs.³ The cost of these conditions to society in UK was calculated to be US\$ 9.2 billion per year in 1995-96.⁵ When adjusted to 2007 prices, this figure exceeds US\$ 12 billion.⁶ It seems that this value is still an underestimation because indirect costs most commonly measured in association with ill health in employees are the summation of absence from work and what is called "presenteeism" which occurs when a worker continues/returns to work with an illness or injury, but with a reduced level of productivity.⁷ As a consequence, employers may incur further costs due to a decline in productivity and a subsequent higher average unit cost of production. Some estimates have put this reduction in employee productivity due to employee health-related presenteeism as high as 33%.⁸ Presenteeism is however extremely difficult to measure and thus the attributed costs are often neglected.

According to Davatchi's study, the prevalence of musculoskeletal pain among adult Iranians residing in urban areas and rural areas are 52.4%, and 54.3%, respectively.⁹ Other studies reported a higher rate in high risk employees. In Iranian rubber factory workers, 73.6% of workers had some kind of MSDs during last year.¹⁰ In another study, among zinc factory workers, the rate was reported as 77.6%.¹¹

There are some investigations revealing that MSDs are more common among nurses than other groups.¹² In a study, low back pain had an overall prevalence

of 65.8% in hospital staff and the highest rate (77.1%) was reported in nurses.¹²⁻¹⁴ This research, however only studied low back pain and other forms of MSDs were not studied. A study conducted on Nigerian nurses showed that the 12-month prevalence of MSDs was 90.7%.¹⁵

Studies of back-related worker compensation claims in the US reveal that nurses have the highest claim rate of any occupation or industry, that 12% of nurses leave their profession annually as a result of back injuries, and that more than 52% of them complain of chronic back pain.^{16,17}

In a study conducted on Iranian nurses, Mehrdad reported a prevalence of 73.2% for back pain 68.7% for knee pain, 48.6% for shoulder pain, and 48.3% for neck pain.¹⁸ In another study by Choobineh, it was demonstrated that 84.4% of hospital nurses in Iran had experienced some symptoms of MSDs during a year period.¹⁹

The causes of MSDs in nurses are widespread and mostly occupational in origin. In a study by Lorusso it was demonstrated that female gender, physical and psychosocial factors are among important risk factors for low back pain among Italian nurses.²⁰ The prevalence of MSDs is increased by work volume, work hours per week and job experiences.¹⁵

This study was conducted to determine the prevalence of MSDs in nurses and nurse aides working in the National Iranian Oil Company (NIOC) Grand Hospital, Ahwaz, southwestern Iran and to examine its correlation with gender, age, shift working, years at service and smoking.

Materials and Methods

All the nurses and nurse aides (who from now on we call them “paramedics”) who worked in inpatient wards of NIOC Grand Hospital, Ahwaz, southwestern Iran, were included in this cross-sectional study. Those who worked in outpatient

and other clinical nurses were excluded from the study. Using a self-administered questionnaire, we collected the necessary data. The first part of the questionnaire was about demographic characteristics of participants including gender, age, shift working, years at service and smoking. Shift-workers were defined as those who intermittently worked in the morning (6:00–14:00), afternoon (14:00–22:00), and night (22:00–6:00). Those paramedics who usually worked in the morning but sometimes did work as over time in the afternoon or night, and those who had history of shift working, were not considered as shift workers. “Smoker” referred to one who had been smoking at least one cigarette per day.

The second part of the questionnaire consisted of MSDs' Nordic questionnaire which specifies the organ involvement of those who have or have had MSDs during last week and/or last year. There were 20 questions about ache, pain or any musculoskeletal discomforts from head, neck, shoulders, elbows, wrists/hands, upper back, low back, hips/thighs, and knees and ankles/feet. We assigned ‘1’ to each positive response to each question and a ‘0’ to each negative response. In this way, the mean of responses to the whole questionnaire reflected the mean number of sites with MSD reported by studied paramedics.

The original Nordic questionnaire is in English. Since the first language of the target population was not English, the questionnaire was translated into Persian (Farsi) by the researcher. The objectives of the study were presented in a general meeting of head nurses before dissemination of the questionnaire. In the meeting, a sample of the questionnaire was distributed among head-nurses and asked them to answer the questions, as a pilot study. The questionnaire was then modified according to their comments and the final version was handed out among inpatient

Table 1: Demographic characteristics of studied paramedics.

Parameter	n (%)
Gender	
Male	19 (13)
Female	127 (87)
Age (yrs)	
20–30	41 (25.9)
30–40	80 (50.6)
40–50	34 (21.5)
50–60	3 (1.9)
Work Experience (yrs)	
<5	39 (24.7)
5–15	81 (51.3)
15–25	37 (23.4)
>25	1 (0.6)
Shift work	
Yes	120 (76.4)
No	37 (23.6)
Smoking	
Yes	5 (3.1)
No	156 (96.9)

Note: The number of subjects for each parameter may not sum up to 161 for missing values.

hospital paramedics by head-nurses. The reliability of Nordic questionnaire for MSDs measured by Cronbach's alpha test was 83.5%.

Prevalence rates between two groups were compared with χ^2 test. Means between two groups were compared by independent-sample *Student's t* test. Pearson's correlation coefficient was used to evaluate the correlation between two normally distributed variables. A $p < 0.05$ was considered statistically significant.

Results

Of the 195 distributed questionnaires, 161 were completed and returned back for analysis, hence a response rate of 82.6%. Demographic characteristics of the studied paramedics are presented in Table 1.

Most (87%) of studied paramedics were female. Three participants aged 50–60 years, and only one had >25 years of service. More than three-quarters of them were shift workers and almost 3% of paramedics smoked (Table 1).

The prevalence of MSDs was very high (Fig 1). Of the studied paramedics, 90.1% had at least one MSD, 81.4% had at least two disorders and 65.9% had more than two sites with MSDs during the last week; only 9.9% of responders were symptom-free during the last week (Table 2). The rates were 92.5%, 83.8%, 71.4%, and 7.5%, respectively during the last year (Table 2).

Among studied paramedics who reported MSDs during last year, the most prevalent disorder was that of neck (64%) followed by head (62.1%), knees (54.7%) and wrists/hands (49.7%); the least frequent disorder was that of elbows (14.3%).

Prevalence rates of MSD during last week and last year among studied paramedics stratified by the site affected are shown in Table 3. While shift workers less frequently reported MSDs in their neck and elbows during last week compared to non-shift workers ($p < 0.05$), there was no statistically significant difference between the two groups in terms of prevalence rates of the reported MSD during last year (Table 3).

Women reported more MSDs during last year than men (Table 4), although the difference was not statistically significant ($p = 0.053$). The mean \pm SD number of sites affected by MSD reported by studied paramedics was not significantly different between shift workers and non-shift workers, smokers and non-smokers, and between

nurses and nurse aides (Table 4).

The mean number of sites with MSD during last year reported by studied paramedics was significantly correlated with their age ($r=0.290$, $p<0.01$) and years at service ($r=0.760$, $p<0.01$).

Discussion

The reported prevalence of MSDs was very high in the studied paramedics so that more than 90% of them reported at least one MSD in last week. MSD was more common in females and increased with age and years of service. Non-shift workers reported more neck and elbows MSDs than shift workers.

The findings of this study were come from a questionnaire-based self-reported survey, and thus, just reflect the attitude and perception participants regarding ache, pain and discomfort. Therefore, the prevalence of MSDs among particular group of workers in different countries even those exposed to the same level of hazards may be very different due to their different attitudes and perception.

Although we reported an overall prevalence of smoking of 3.1%, it is worthy to mention that the prevalence of smoking in male paramedics was 26.3%, while it was zero for female paramedics. The observed difference in smoking prevalence in male and female paramedics was probably attributed to the negative social impacts of female smoking in Iran.

Another important finding was that only 3 (1.9%) of studied paramedics aged between 50 and 60 years—i.e., the target population was relatively young. This was not unexpected due to retirement regulations in NIOC which imply the normal retirement age of 55 years for women and 60 for men, and as mentioned earlier, only a small percentage of paramedics was male.

The 12-month prevalence of MSDs among Japanese nurses was 85.5%; the

Table 2: Distribution of studied paramedics according to the number of MSDs they reported during last week and last year.

Number of MSDs	Number of nurses (%)	
	Last week	Last year
0	16 (9.9)	12 (7.5)
1	14 (8.7)	14 (8.7)
2	25 (15.5)	20 (12.4)
3	31 (19.3)	14 (8.7)
4	23 (14.3)	23 (14.3)
5	20 (12.4)	20 (12.4)
6	14 (8.7)	19 (11.8)
7	7 (4.3)	16 (9.9)
8	5 (3.1)	13 (8.1)
9	3 (1.9)	6 (3.7)
10	3 (1.9)	4 (2.5)
Total	161 (100)	161 (100)

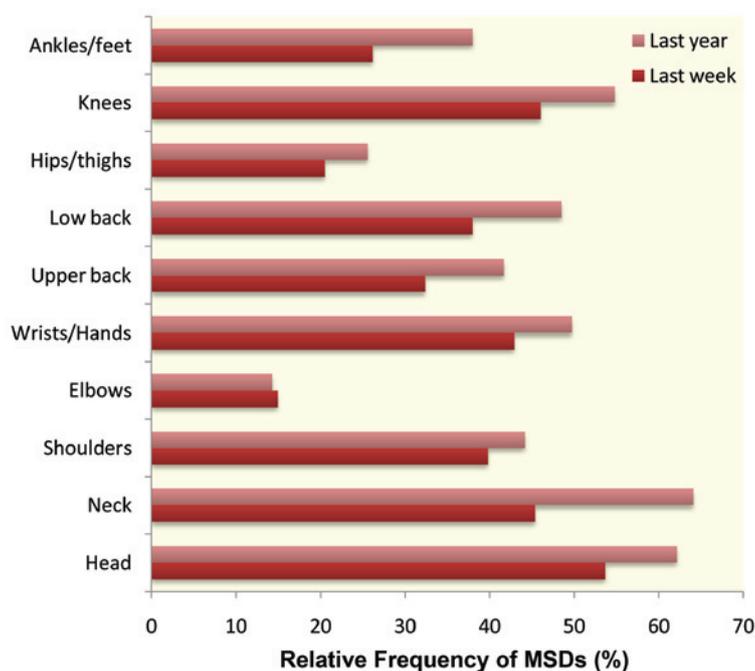


Figure 1: Distribution of MSDs reported in different sites during last week and last year.

Table 3: Prevalence rates of MSD during last week and last year among studied paramedics stratified by the site affected.

Site	During last week, n (%)			During last year, n (%)		
	Shift-workers	Non-shift-workers	p value	Shift-workers	Non-shift-workers	p value
Head	64 (53.8)	22 (60)	0.544	72 (60.5)	28 (76)	0.093
Neck	49 (41.9)	23 (62)	0.031	73 (63.5)	28 (76)	0.172
Shoulders	47 (39.8)	17 (46)	0.510	55 (47.4)	16 (44)	0.755
Elbows	14 (12)	10 (27)	0.028	14 (12.2)	9 (25)	0.062
Wrists/Hands	50 (43.1)	19 (51)	0.380	57 (48.7)	23 (62)	0.154
Upper back	42 (35.9)	9 (24)	0.192	54 (46.2)	12 (33)	0.174
Low back	46 (40.4)	15 (42)	0.889	58 (49.6)	20 (56)	0.530
Hips/thighs	26 (22.8)	8 (22)	0.881	35 (29.4)	6 (17)	0.129
Knees	53 (45.7)	21 (57)	0.241	64 (53.8)	23 (62)	0.370
Ankles/feet	35 (29.9)	7 (19)	0.191	49 (41.2)	12 (33)	0.399

most MSD reported was that of shoulder (71.9%) followed by low back (71.3%), neck (54.7%), and upper back (33.9%).^{21,22} As shown in Table 2, while in this study the 12-month prevalence of MSDs (92.5%) was more than Japanese nurses (85.5%), here the most MSD reported was that of neck (64%), followed by head (62.1%), knees (54.7%) and wrists/hands (49.7%).

In another study by Choobineh, the 12-month prevalence of MSDs among Iranian nurses in Shiraz medical school was 84.4% which is less than what we found in our study;¹⁹ low back symptoms were the most prevalent MSDs in their report, while in our study the most prevalent symptoms belonged to the neck.

According to Sheikhzadeh, the most prevalent MSDs among nurses was low back pain (84%) followed by ankles/feet (74%) and shoulders (74%).²³ Fabunmi reported the prevalence of MSDs among nurses in University College Hospital of Ibadan, Nigeria; the results showed that the 12-month prevalence of MSDs was 90.7% while low back pain was the most

commonly reported MSDs (78.0%) and elbows MSD was the least reported site (23.4%).¹⁵ These findings are in keeping with our finding though the order of sites affected was not similar. In the study by Karahan, nurses reported the highest prevalence of low back pain (77.1%) among the studied Turkish hospital workers¹² while in our study the rate reported by the studied paramedics was 48.4%.

The common finding in all previous studies is that MSDs are very common among nurses with a prevalence rate of more than 80% but the body sites affected have different orders, although in most of them, the most frequent site affected is low back; in our findings the most frequent disorder was that of head and neck and low back pain was the 5th frequently reported MSDs.

Why is the prevalence rate of MSDs among hospital nurses so different in various countries and even in different centers of the same country? The probable answer would be that the work-place hazards including psychological and physical factors

Table 4: The mean±SD number of sites affected by MSD reported by studied paramedics stratified by different parameters.

Parameter	n	Mean±SD number of sites with MSD during	
		Last week	Last year
Gender			
Male	19	2.68±2.237	3.26±2.600
Female	127	3.72±2.367	4.54±2.672
p value		0.074	0.053
Shift work			
Yes	120	3.67±2.367	8.27±4.568
No	37	3.68±2.274	7.95±4.618
p value		0.982	0.711
Smoking			
Yes	5	4.40±3.286	5.40±3.130
No	156	3.57±2.331	4.39±2.641
p value		0.605	0.515
Position			
Nurse	133	3.58±2.274	4.58±2.553
Nurse aide	17	4.59±2.917	4.47±3.338
p value		0.186	0.897

are different. For example, in some hospitals implementing the policy of “minimal manual lift” and use of devices to change the position of patients reduce the risk of MSDs.²⁴ In this way, the risk of injuries related to lifting (*e.g.*, low back pain) is reduced. In another example, seating for a long time and using computer and other video display terminals for monitoring the patients' vital signs increase the risk of head, neck and shoulders discomfort. It seems that depending on the policy, work regulation, psychosocial environment and use of new technologies, the prevalence of MSDs as overall and ranking of each site of body affected by MSDs are different.

The Pan-European research suggests

that early detection of, and intervention in MSDs, eventually reduces the burden on governments' health and disability budgets.⁴ Intervention and management of work place and outside of work place risk factors can reduce the prevalence of MSDs and their consequences. There are some evidence which indicate that some simple and practical participatory action-oriented training can prevent or reduce the prevalence of MSDs.²⁵ The participatory action-oriented training programs emphasize the active participation of nurses in low-cost and practical solutions for improving their work environment by reducing the risk factors of MSDs. In a study by Yuan in Taiwan, it was demonstrated that

regular aerobic exercises such as using a treadmill have a significant positive effect on health-related physical fitness indicators among hospital nurses such as better grasp strength, flexibility, durability of abdominal and back muscles and cardiopulmonary function. It is therefore suggested that paramedics engage in an exercise program at their work place to lower the risk of MSDs and promote working efficiency.

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