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Prevalence and Perceptions of Work-Related Musculoskeletal Disorders among Hospital Nurses in Tertiary Care Hospital in Karachi Pakistan; A Cross-Sectional Study

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ABSTRACT

Work-related musculoskeletal disorders are a matter of worrisome for both staff and employers. The phrase "musculoskeletal disorders" refers to a group of ailments that injure the muscles, tendons, ligaments, nerves, and joints and are frequently accompanied by pain, discomfort, and incapacity. **Objectives:** To evaluate the prevalence of work-related musculoskeletal disorders in nurses and to assess the perception of risk factors which are associated with work-related musculoskeletal disorders in nurses. **Methods:** A cross-sectional research study was conducted at Civil Hospital and Dow University Hospital Karachi. The data were collected from a sample of 336 nurses using non-probability convenience sampling. **Results:** The result of this study showed that the lower back region was the most popular with 29.2% of the respondents experiencing pain, followed by neck and shoulder (21.2% each), upper back (16.6%), wrist (6.6%), knees (2.5%), thumb (1.1%), ankles (1.1%) and hips (0.5%). The musculoskeletal disorders affect both male and female similarly. **Conclusions:** It was concluded that hospital nurses are highly susceptible to work-related musculoskeletal disorders. The lower back is the most commonly affected body part. Factors such as prolonged standing, awkward postures, and the same task over and over again as contributing factors to work-related musculoskeletal disorders.

INTRODUCTION

The work-related musculoskeletal disorders (WMSDs) are disorders affecting bones, joints, tendons, cartilage, muscles, fascia, spinal discs, and other anatomical structures. Approximately 27 % of all work-related disorders are due to WMSDs [1]. Nurses are the persons who face a significant occupational hazard: work-related musculoskeletal disorders (WMSDs). From lifting patients to enduring awkward postures, their demanding tasks put nurses at high risk of back pain, neck aches, and other musculoskeletal issues [2]. According to a meta-analysis's findings, nurses had an annual prevalence of WMSDs of 77.2%, which was lower than the findings of already published previous research. A substantial risk of WMSDs exists for nurses because of their work features. There are

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so many patient-related emergencies, that nurses have long working hours. Nursing employment is made even more challenging by their frequent long workdays and very high overtime hours. It becomes very complex for nurses to get adequate sleep, which raises the risk of WMSDs. From a psychological view, the majority of nurses work long nights and handle several emergencies, which also puts a great strain on nurse's minds [3]. Ergonomics is the study of people and their working conditions, it is crucial for overcoming musculoskeletal disorders. The ergonomics focused on designing a workspace that is suitable for human anatomy and physiology. According to the research studies the damage from lifting big objects can be reduced by using tools such as ergonomic lifting. The use of ergonomic equipment decreases the physical strain that job processes place on nurses' bodies [4]. Worldwide, work-related musculoskeletal disorders (WMSDs) pose a serious threat to public health [5]. The increased prevalence of musculoskeletal symptoms was positively associated with a high BMI (Body Mass Index) [6]. Nurses who worked in the emergency department were more prone to develop musculoskeletal disorders [7]. The study conducted in the state of Lagos indicates, 95 respondents (70.4%) experienced work-related musculoskeletal diseases at the time and 81 (60%) had them within the past year. Pain in the lower back (35, 43.2%) was the most frequent musculoskeletal problem associated with work. The majority of respondents 125 (92.6%) said that their jobs were both mentally and physically challenging, and nearly fifty percent of them 64 (47.4%) said they had strong work skills [8]. One more study reported that 84.7% of the 569 individuals stated that they had experienced a lot of lower back pain within the last year. The most common body areas to experience discomfort were the neck, the shoulders, and the upper part of the back, followed by the lower part of the back. It was shown that the nurses who utilized mechanical assistance for lifting had low levels of back pain. The more qualified nurses were shown to be noticeably more prone to employ mechanical patient-lifting apparatus in clinical practice [9]. The incidence of musculoskeletal disorders with upper part backache (56%) and pain in the lower back (92%), as well as the negative impacts of work-related stress, is expected to be higher among nurses, as per another study published in Saudi Arabia [10]. Furthermore, the study conducted in Malaysia revealed that the prevalence of neck pain was highest among nurses [11]. The results of the cross-sectional study indicated that musculoskeletal disorders were linked with the early retirement of nurses from their jobs, approximately 12% of nurses retire annually. Musculoskeletal pain is the leading cause of morbidity and disability among nurses [12]. Moreover, the research study in China showed that the frequency of work-related musculoskeletal disorders was higher in female nursing staff. The nurses who were working in the surgical department had a higher prevalence of musculoskeletal disorders. (58%) of nurses were suffering from neck pain and (35%) of nurses were complaining of back pain [13]. Furthermore, the research study showed that factors such as age, work experience, gender, obesity, and injuries were associated with musculoskeletal disorders among nurses. Age was found to be a major element correlated to musculoskeletal disorders among nurses [14]. Lower cases of job-related musculoskeletal disorders were found in the nurses who did not work long shifts [15]. The physical strain experienced by nurses was due to insufficient support systems within hospitals, increased muscle tension and fatigue were significantly associated with the high levels of stress [16].

This study aims to evaluate the prevalence of Work-related musculoskeletal disorders in nurses and to assess the perception of risk factors which are associated with Work-related musculoskeletal disorders in nurses.

METHODS

A cross-sectional was conducted in tertiary care hospitals at Dr. Ruth Pfau Civil Hospital and Dow University Hospital Karachi by using a convenience sampling technique. Open Epi 3.0 was used to calculate the sample size using the proportion of 31.6% of the musculoskeletal disorder [5], with a 5% margin of error, and a confidence level of 95%. The study was conducted between November 2023 to March 2024. Inclusion criteria were nurses who gave consent to take part in the study, nurses' aged above 18 years and who had a minimum of one year of full-time bedside experience. Exclusion criteria were nurses with pregnancy and nurses who have undergone recent surgeries or already have musculoskeletal diseases. Study approval was taken from the research committee of DOW University with reference number (DUHS/DIONAM/2023/18-312). The permission for data collection was sought from the Medical Superintendent of DUHS, and Dr. Ruth Pfau Civil Hospital, Karachi with reference number (DUHS/DION &M/MSN2024/241). The validated questionnaire of "prevalence and pattern of Work-related musculoskeletal disorders (WMSDs) among. Nurses" was used to collect the data and the Visual Analog Scale to measure the intensity of pain [8, 17]. The data were entered and analyzed through R Language software version 4.2.3. R software is a data analysis software which provides a wide variety of statistical tests and graphical techniques and is very extensible [18]. For the descriptive variables, frequency was calculated. Logistic regression model was used to estimate the relationship between the dependent and independent variables.

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RESULTS

The survey included observations of 336 registered nurses from various departments aged between 21 to 59 years, having work experience ranging from 1.5 years to 22 years, out of which 151 (44.9%) were female and 185 were male (55.1%), 166 (49.4%) were married and 170 (50.6%) were single. Furthermore, among those who experienced pain in the past 12 months, 213 (78.6%) participants reported having treated themselves, 37 (13.7%) sought help from a health professional, 12 (6.3%) did nothing, while 4 (1.5%) participants did not answer this question. Interestingly, when asked about the intensity of pain, 138 (41.1%) participants responded with no pain, 118 (35.1%) responded with mild pain (1-3), 60 (17.9%) responded with moderate pain (4-6) and 20 (6.0%) responded with severe pain (7-10). Lower back region was the most popular with 29.2% of the respondents experiencing pain, followed by neck and shoulder (21.2% each), upper back (16.6%), wrist (6.6%), knees (2.5%), thumb (1.1%), ankles (1.1%) and hips (0.5%). (Table 1).

Table 1: Point Prevalence, 12-Month Prevalence, and Parts of the Body Affected by WMSDs

Variables	Frequency (%)
Point Prevalence	
Yes	271 (80.6%)
No	65 (19.4%)
Total	336 (100%)
12 Months Prevalence	
Yes	198 (58.9%)
No	138 (41.1%)
Total	336 (100%)
Parts of the Body Affected	
Ankles	2 (1.1%)
Hips/Thighs	1 (0.5%)
Knees	5 (2.5%)
Lower Back	58 (29.2%)
Neck	42 (21.2)
Shoulder	42 (21.2%)
Thumb	2 (1.1%)
Upper Back	33 (16.6)
Wrist/Hand	13 (6.6%)

The result showed that 256 (76.2%) participants agreed that physical activity should be avoided as it may cause impairment. The 161 (48%) participants agreed that these problems get better usually within three months, while 217 (64.6%) participants believed that rest is needed to get better (Table 2).

Table 2: Participants' Understanding of Causes and Prevention of Pain

Sr.No.	For Someone with This Problem	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
1	Physical activity should be avoided as it might cause harm.	0 (0%)	8 (2.4%)	33 (9.8%)	256 (76.2%)	39 (11.6%)
2	These problems usually get better within three months	0 (0%)	1 (0.3%)	120 (35.7%)	161 (48%)	54 (16%)
3	Rest is needed to get better	0 (0%)	1 (0.3%)	56 (16.7%)	217 (64.6%)	62 (18.4%)
4	Neglecting problems of this kind can cause permanent health problems	0 (0%)	4 (1.2%)	35 (10.4%)	172 (51.2%)	125 (37.2%)
5	These problems are commonly caused by people's work	0 (0%)	1 (0.3%)	39 (11.6%)	133 (39.6%)	163 (48.5%)

Results demonstrate the participants about their perception of the risk factors associated with work-related musculoskeletal disorders, 201 (59.8%) participants agreed that these problems occur from performing a similar task over and over. The 158 (47%) individuals agreed that nurses might develop such disorders by treating an excessive number of patients per day. The 121 (36%) participants believed that pain was caused by the tasks performed in similar positions for extended periods (standing, bending over, sitting, and kneeling) (Table 3).

Table 3: Perception of Job Risk Factors That May Contribute to the Development of Work-related Musculoskeletal Disorders

Sr.No.	Causes of pain	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
1	Performing the same task over and over.	0 (0%)	0 (0%)	44 (13.1%)	201 (59.8%)	91 (27.1%)
2	Treating an excessive number of patients in one day.	0 (0%)	5 (1.5%)	46 (13.7%)	158 (47%)	127 (37.8%)
3	Not enough breaks/pauses in one day	0 (0%)	1 (0.3%)	39 (11.6%)	164 (48.8%)	132 (39.3%)
4	Work in awkward and cramped positions	0 (0%)	1 (0.3%)	30 (8.9%)	140 (41.7%)	165 (49.1%)
5	Work in the same positions for long periods (standing,bending over, sitting, kneeling)	0 (0%)	2 (0.6%)	91 (27.1%)	121 (36%)	122 (36.3%)

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6	Reaching or working away from your body	0 (0%)	2 (0.6%)	39 (11.6%)	195 (58%)	100 (29.8%)
7	Work schedule (Overtime, irregular shifts, length of the workday)	0 (0%)	0 (0%)	32 (9.6%)	162 (48.2%)	142 (42.2%)
8	Inadequate training on injury prevention	0 (0%)	0 (0%)	43 (12.8%)	125 (37.2%)	168 (50%)

For each one-unit increase in age, the log odds of experiencing pain increase by 0.062, holding other variables constant. This coefficient is statistically significant, (OR=1.06, 95 % CI: 1.008–1.124, p-value=0.026), showing that age is likely to have a significant effect on pain experience. Similarly, for each one-unit increase in work experience, the log odds of experiencing pain increase by 0.152, holding other variables constant. This coefficient is statistically significant (OR=1.16, 95% CI: 1.036–1.309, p-value=0.011), indicating that work experience is likely to have a significant effect on pain experience. For each one-unit increase in gender, the log odds of experiencing pain decrease by 0.106, holding other variables constant. This coefficient is statistically insignificant, (OR=0.90, 95 % CI: 0.5431.491, p-value=0.681). Similarly for each one-unit increase in weight, the log odds of experiencing pain increase by 0.025, holding other variables constant. This coefficient is statistically insignificant, (OR=1.02, 95 % CI: 0.990–1.060, p-value=0.159). Likewise for each one-unit increase in marital status, the log odds of experiencing pain increase by 0.458, holding other variables constant. This coefficient is statistically insignificant, (OR=1.58, 95 % CI: 0.902–2.771, p-value=0.110). Based on the coefficients and their significance levels, age and work experience appear to be significant interpreters of pain experience in the model. Gender, weight and marital status may not have a significant effect on pain experience, based on the current analysis. In real-world settings the relationship between weight and musculoskeletal pain is significant, excess weight can contribute to the development of musculoskeletal, similarly marital status has a potential impact on musculoskeletal disorders. The majority of participants in the sample of the current study were unmarried and had a normal BMI (Body Mass Index), which may be the reason for insignificant results. A Hosmer-Lemeshow test p-value of 0.33 indicates that the logistic regression model is a good fit (Table 4).

Table 4: Results of Logistic Regression Model for Pain Experience

Variables	Estimates	Odds Ratio	95% Confidence Interval	p-value
Age	0.062	1.064	1.008 – 1.124	0.026
Gender	-0.106	0.900	0.543 -1.491	0.681
Weight	0.025	1.025	0.990 – 1.060	0.159
Marital Status	0.458	1.581	0.902 – 2.771	0.110
Experience	0.152	1.165	1.036 – 1.309	0.011

DISCUSSION

The main purpose of the study was to evaluate the prevalence and to assess the perception of the risk factors which are related to work-related musculoskeletal disorders in nursing staff. Our study revealed that most of the nurses experienced low back pain (29.2%) followed by neck and shoulder pain (21.2%). Similar results were found in a research study conducted in China, the majority of nursing staff suffered from low back pain (80.5%), followed by neck pain (79.0%) and shoulder pain (70.4%) [19]. Another meta-analysis study also revealed that as far as anatomical regions go the lower back (59.5%), neck (53.0%), and shoulder (46.8%) had the highest rates of WMSDs among nurses [20]. The Korean Working Condition Survey showed that work experience was found to be significantly associated with WMSDs [21]. Moreover, the descriptive study which was conducted in Bangladesh also showed that marital status was positively correlated with low back pain [22]. Gender did not have a significant effect on pain experience, based on the current analysis. In contrast, the research study conducted in Jordan revealed that musculoskeletal disorders remained higher in female nurses and the prevalence of WMSDs was moderately high in nurses who were above 30 years of age [23, 24]. In this study the most common causes linked to the development of WMSDs were inadequate injury prevention training (50%), working in an awkward or cramped position (49.1%), work schedule (42.2%) and spending extended amounts of time in the same position (36.3%). Similar results were found in the research study conducted in Ethiopia, which also showed that WMSDs are significantly associated with occupational factors such as work schedule, spending extended amounts of time in a similar position and working in an uncomfortable position [25]. The majority of participants in the current study believed that musculoskeletal disorders occur from work schedules (overtime, irregular shifts, and length of work day). Similarly, the results of the meta-analysis also identified the link between working rotation and irregular shifts and WMSDs, the correlation studies also showed that the prevalence of WMSDs was higher in nurses who were working in rotating and irregular shifts [26]. Inadequate training in injury prevention of nurses was considered a major factor in musculoskeletal disorders among nurses. The study conducted in Saudia Arabia concluded that the risk of WMSDs in nurses was reduced by proper training and applying ergonomic principles as a management strategy [27]. Furthermore, factors such as working in awkward & cramped positions and reaching or working away from the body also play a significant role in the development of musculoskeletal disorders. Many systematic literature reviews considered poor work environments, physical obstacles and difficult-to-access equipment as possible sources of WMSDs [28].

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CONCLUSIONS

It was concluded that the lower back is the most commonly affected body part, followed by the neck, shoulders, and upper back. It was found that age and work experience had a significant association with pain. Nurses often identify prolonged standing, awkward postures, and doing the same task over and over again as causative factors to WMSDs. Hospital nurses are highly susceptible to work-related musculoskeletal disorders. Based on this research study, the prevalence of musculoskeletal disorders over time explores changes in perceptions among hospital nurses, providing a more comprehensive understanding of the issue. This study recommended evaluating existing interventions or ergonomic programs for preventing musculoskeletal disorders among hospital nurses within the research study, assessing their effectiveness and impact on nurses' perceptions and well-being.

Authors Contribution

Conceptualization: FMA, RMH
Methodology: FMA, DAS, AP
Formal analysis: FMA, RMH, DAK
Writing review and editing: FMA, HB, NEMAS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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