

The Relationship Between Fatigue and Job Content with Musculoskeletal Disorders Among Nurses

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Abstract

Background: Regarding the high levels of physical and mental activities and the high risk of fatigue, prevalence of work-related musculoskeletal disorders (WRMSDs) is increasingly high among nurses that can be negatively affect their work quality and patients' safety.

Objectives: The present study aimed to survey the relationship between fatigue and job content with WRMSDs among nurses from 2014 to 2015. In this study two hundred and eighty one nurses from two hospitals have been performed in Qom province.

Methods: Demographic information was age, gender, and work-related number of accidents. Fatigue and job content questionnaire (JCQ) developed by researchers was used to collect data. Data were analyzed by SPSS V.20 and Poisson regression was applied.

Results: Totally, 238 nurses (84.7%) had experienced pain in at least one part of their bodies, Fatigue mean scores and standard deviations were 50.83 ± 14.05 , respectively. Job content scores were 43.96 as mean ± 7.23 . Poisson regression model depicted that educational status, regular practice, fatigue, and job content had significant relationship with WRMSDs ($P < 0.05$).

Conclusions: Although job content and fatigue were in acceptable conditions, regarding sever probable consequences such as increasing care errors, some solutions such work procedures, systems and tasks redesign to make a holistic view of performing care duties, using standard equipment and probable layout of them can consequently help to improve the safety and health of staff members and care quality.

Keywords: Job Content, Fatigue, Musculoskeletal Disorders, Nurses

1. Background

Nursing is one of the occupations in which physical and mental activities are significantly required and regarding the perspective of physical activities it is in the second place after industrial jobs. So, nurses among other employees in the healthcare system are at the risk of musculoskeletal disorders (1). It is known as a high-risk occupation. The hospital environment can be stressful and physical problems can be occurred among nurses (2). In Iran, nurses constitute about 80% of personnel of the healthcare system and they do 80% of the jobs (3). Musculoskeletal disorders have been reported as one of the most important work-related injuries among nurses, and in this respect, compared with other occupations, nursing is next to the mining industry (3). Low back pain is the most common musculoskeletal disorder among nurses (4, 5), followed by the shoulder and neck problems (4). These disorders are the major cause of occupational defects and injuries in the developed and developing countries and are the main cause of work time loss, the increased direct and indirect costs, and human damage (2, 6, 7). Various factors increase the job content which can be physical factors such as lift-

ing, carrying heavy loads, work with repetitive movements and psychological factors like job demands, the nature of work, and freedom of decision-making and social conflict, organizational and individual factors are involved in these disorders (2, 8). Freedom to make decision is one of the psychosocial occupational factors which allows the employees to plan their works according to the policies of the organization and production needs, participation and consultation of employees in decisions that affect their works, let them to select the best working process and sequence of work to staff and increase their participation in the production process. It has been shown that an increase in staff's control on their works, job demand is defined as the amount of effort required to do the job (8). Studies notes that the risk of occupational illnesses for nurses who face lower freedom to make decisions and with the less social interaction; the high job demand and low levels of job control in the workplace also can increase the stress and subsequently the incidence of musculoskeletal disorders among people (2, 8). The researchers found that workplaces with high musculoskeletal disorders have low support from co-workers, low decision latitude and freedom of action, lack

of tasks transparency, high stress and working pressure, and low job satisfaction (8). The high amount of physical activity can be considered as one of the nursing occupation needs and physical activity increases the risk of musculoskeletal disorders of the neck, shoulder and back among nurses 9 to 12 times (9). Using visual observations and questionnaires thorough a three-year study among healthcare system workers has shown that bending and lifting heavy objects can increase back pain, constantly (10). A survey on more than 43,000 nurses in five countries have indicated that 17% - 39% of nurses had planned to leave the profession in the following year due to physical and psychological stress caused by the job (9). Since nursing plays a key role in the health sector and it is directly associated with human health, the nurses they should be organized, sympathetic and motivated in their workplace, but usually after facing problems and job stress at work, they are tired and even willing to withdraw their work (10). Fatigue is a condition that causes a reduction in the body's resistance and as a result, people lose their propensity towards work and daily activities (11). Regarding the fatigue and its consequences such as job burnout, an increase in medication errors and the reduced quality of nursing care, it is necessary to identify the causes of fatigue in nurses. Nurses' fatigue as a common problem has been associated with nursing errors (12). Fatigue can be interfere with physical-mental and emotional performance and can cause energy loss and weakness (13). In addition, fatigue can lead to cardiovascular diseases, mental disorders, mental retardation, insomnia, weakness, memory loss, muscle pain, forgetfulness and lack of balance (11). In general, fatigue should not be considered as a single event, but it is a very complex phenomenon and has different components (13). Fatigue affects the central nervous system and muscles (13). Few studies have examined the combination of job content and fatigue among nurses.

2. Objectives

Present study aimed to assess fatigue and job contents and their relationships with the prevalence of musculoskeletal disorders. to provide effective solutions to prevent musculoskeletal disorders and their consequences by raising awareness of the risk factors.

3. Methods

This cross-sectional study was done on nurses working in the educational hospitals in Qom province from 2014 to 2015. Sampling was done in several steps. In this study, two hospitals and 281 nurses were randomly selected. Minimum sample size regarding the regression model and

twenty samples per each independent variable was calculated as 220. Demographic, job content, fatigue and Nordic musculoskeletal questionnaires were used to collect data. Demographic questionnaire included age, gender, work experience and educational level. Job content questionnaire that is usable to assess physical and mental pressure is responded as Likert scale (0-totally disagree to 3- totally agree so, its score would be 0-69 with the middle score of 34.5); its validity has been proved by Choobineh (14). Also, its reliability was tested and Cronbach's alpha was reported as 0.75 (15). In the present study, its Cronbach's alpha was measured as 0.77. Fatigue questionnaire contains 20 items with seven options as responses scored from 0 - 6, Yes to No (16). Its scores can be between 0 and 120 and the middle score is 60. In the present study, its Cronbach's alpha was 0.67. In addition, standard Nordic questionnaire was applied to assess WRMSDs (17). This questionnaire investigates WRMSDs in different parts of the bodies that divide the body in anatomical parts (6). All questionnaires were self-reported. Collected data was analyzed by SPSS V.20. Data description was done using frequency tables and description indices as mean and standard deviation (SD). Poisson regression was utilized to identify the related factors with musculoskeletal disorders.

4. Results

This cross-sectional study was conducted on 281 persons (64.8% female and 35.2% male). 81.5% of the people had B.Sc. degree and 2.5% had M.Sc. degree as the highest and lowest values, respectively. 67.6% of the studied nurses were married and 32.4% were single. Forty seven percent of the subjects noted that their left hand is the dominant hand. Only 11.7 percent of the participants had regular exercise; and 5.3% has a second job. The demographic characteristic among the studied population is shown in Table 1. The averages age and work experience of the workers were 34.1 and 10.5 years, respectively (Table 2).

Based on our findings, 238 people (84.7%) had musculoskeletal pain at least in their one limb in the past year prior to the study. As shown in Table 3, the pain in the neck among the 278 people (98.93%) was reported as the most common pain, followed by the knee and lower back pains. The least percentage belonged to the elbow pains with a 35.98% (73 people).

Findings regarding fatigue and job content also showed that the average of these variables was calculated 50.8 for fatigue and 43.9 for job content (Table 2). Results of the univariate analysis showed that the correlation between musculoskeletal disorders with job content variable was significant (0.3, $P < 0.001$), while there was no significant association with fatigue (-0.11, $P = 0.06$).

Table 1. Qualitative Demographic Factors Description (n = 281)

Factor	Frequency (%)
Gender	
Male	99 (35.2)
Female	182 (64.8)
Marriage status	
Married	190 (67.6)
Single	91 (32.4)
Education	
Diploma or lower	25 (8.9)
Associate's degree	20 (7.1)
Bachelor	229 (81.5)
Master or higher	7 (2.5)
Shift working	
No	232 (82.6)
Yes	49 (17.4)
WRMSD	
No	43 (15.3)
Yes	238 (84.7)

Considering the relationship between musculoskeletal disorders, fatigue and job content with demographic variables, only the correlation between job content and work program ($P = 0.002$), job content and age ($P = 0.01$), the number of musculoskeletal disorders and exercise ($P = 0.03$) and musculoskeletal disorders with work experience ($P = 0.03$) were significant.

To evaluate the risk factors associated with musculoskeletal disorders, Poisson regression model was used. In this model, the number of musculoskeletal disorders was considered as dependent variables such as demographic variables, fatigue and job content as independent variables. To interpret coefficients of qualitative variables, the reference category was considered as one of the classes and other classes were compared with it. Based on the results, variables such as exercise, fatigue, job content and variables pertaining to the B.Sc. degree of education were meaningful in Poisson regression model (Table 4).

According to the estimation of the coefficients of each of these four variables, interpretation of the average number of disorders, among people who do not exercise than those who do will be one and a half times more. In addition, for fatigue, it revealed that the increment was equal to ten points reduction equals to 1% in the average number of disorders that have occurred as well as the content variable scores with the ten point increment in the job, and we found 3% increment in the average number of problems. The average number of disorders among workers with a B.Sc. degree would be higher than those who have M.Sc. or higher degree as forty percent.

5. Discussion

The pain arising from musculoskeletal disorders as well as musculoskeletal disorders based on the Nordic questionnaire (Table 3) showed that about 84.7% of the people had experienced pain at least in one limb of their bodies. Neck with the incidence rate of about 90% was the first, followed by the knees and low back, with approximately 75% and 72%, respectively. Our results are consistent with Choobineh et al. (5) study. They showed that 84.4% of the participated nurses in the study had pain in one or more parts of their bodies. In the present research, the most problems were reported in the neck and the back which is consistent with previous studies (4, 5, 18, 19). Our investigation revealed that reliability of the applied questionnaires compared with the reference and a suitable level as 0.7 was at an acceptable level (20). The calculated average in both fatigue (50.83) and job content (43.96) were below in the average and may be relevant to the tools (both of 60) in the sense that they had been accepted situations. Saremi et al. (21) concluded that general fatigue among nurses were high. In the assessment of relationship between the various factors with musculoskeletal disorders, it is identified that they were inconsistent with previous studies (22, 23), but consistent with other investigations (7) relationship between musculoskeletal disorders with age, gender and work experience were not statistically significant ($P < 0.05$). However, in the previous studies, the differences between educational levels regarding musculoskeletal disorders had not been reported (24). In this study, people with B.Sc. degree had experienced more problems than those who had M.Sc. or higher educational levels. In addition, people who have performed regular exercises had less musculoskeletal disorders which is similar to Akbari et al. (25). Data analysis from Poisson regression analysis which is similar to other studies (26) revealed that the relationship between job content and musculoskeletal disorders were significant ($P < 0.01$). Furthermore, fatigue as described (11) was associated with the musculoskeletal disorders.

In general, in this research, complaints about pain in the neck and back were high; hence evaluation and the immediate appropriate solution for this problem are required.

5.1. Conclusion

Although, people regarding job content and fatigue had acceptable status (compared with middle scores of the questions), but there can be severe and heavily induced consequences for healthcare systems such as increasing medical errors, reducing the patient safety as

Table 2. Quantitative Demographic Factors Description (n = 281)

Factor	Mean (SD)	Max	Min
Age	34.11 (7.87)	55	20
Work experience	10.53 (7.82)	33	0
WRMSD numbers	4.25 (3.47)	15	0
Fatigue	50.83 (14.05)	86	0
Job content	43.96 (7.23)	63	18

Table 3. WRMSDs Description Among Participants (n = 281)

Part of Body	Ankle	Tight	Upper Back	Low Back	Knee	Wrist	Shoulder	Elbow	Neck
Frequency	133	135	189	203	211	185	199	73	278
%	47.33	48.04	67.26	72.24	75.09	65.84	70.82	25.98	98.93

Table 4. Poisson Regression Results to Find Factors Affect WRMSDs

Parameter	Class	WRMSDs		
		Sig.	Std. Error	Exp (β) ^a
Intercept	-	0.5	0.4	0.8
Education	Diploma or lower	0.5	0.2	1.1
	Associate's degree	0.1	0.1	1.1
	Bachelor	0.03	0.1	1.4
	Master or higher	Reference		
Gender	Female	0.4	0.06	0.9
	Male	Reference		
Marriage status	Single	0.4	0.07	1.06
	Married	Reference		
Exercise	No	0.001 >	0.08	1.5
	Yes	Reference		
Shift working	No	0.1	0.09	0.9
	Yes	Reference		
Second job	Yes	0.4	0.1	1.1
	No	Reference		
Main hand	Right	0.2	0.08	1.1
	Left	Reference		
Age	-	0.6	0.01	1.01
Work experience	-	0.2	0.01	1.02
Fatigue	-	0.007	0.002	0.99
Job content	-	0.001 >	0.004	1.04

^a Exp (β) (the odds multiplier) was used as the odds ratio for unit increase or decrease in the explanatory variable.

well as productivity, efficiency and job satisfaction. Accordingly, the correct adjustment of the work schedule as risk management strategies in health care is recommended. Using a suitable work-rest regime can reduce fatigue. However, lack of standard equipment, poor layout, small workspaces, inadequate work structure and ambiguous roles as well as problems of access, and record-keeping of the information were considered as the sources of workload and musculoskeletal disorders. It seems that the using a comprehensive and unique ergonomic approach for

the redesigned work, work systems and procedures are essential to provide a holistic perspective on healthcare tasks. This holistic approach can help the adjustment of physical and psychological contents in the healthcare sectors.

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Footnotes

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