

Impact of job stress on the prevalence of musculoskeletal disorders among computer users of hospitals in Gorgan, Iran, in 2014

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Abstract

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Background: Occupational stress has physical and psychological consequences, and is a major cause of job dissatisfaction among employees, which can reduce the quality of services provided. This study was conducted to examine the relationship between job stress and the prevalence of musculoskeletal disorders (MSDs) among computer users in hospitals (private & governmental) of Gorgan, Iran, in 2014.

Materials and Methods: This was a cross-sectional descriptive study. The study participants consisted of 94 hospital computer users. Data were collected using the Nordic Musculoskeletal Questionnaire (NMQ) and Osipow's Occupational Stress Inventory. Data analysis was performed using SPSS software.

Results: The mean score of the subjects studied was 159 ± 77.24 . The results revealed that 6.38% of the staff had mild stress, 68.9% mild to moderate stress, 24.47% had moderate to high stress, and none of the employees had high occupational stress. There was no significant relationship between job stress and MSDs of the neck, shoulders, back, elbows, and hands and wrists, but the relationship between stress and MSDs of the waist was significant ($P=0.03$).

Conclusions: The prevalence of MSDs in the studied hospital computer users was high and stress in the workplace can have an important role in the pathogenesis of this disorder.

Keywords: Stress, Occupational, Computer, Musculoskeletal Disease

Introduction

Human resources are the most important asset of any organization and determine the method by which the other resources of an organization are used to achieve its goals and objectives. As the World Health Organization (WHO) has emphasized, the determination of the goals of health systems with respect to quality improvement, efficiency, effectiveness, and equitable access to health care is related to the performance of human resources (1). Despite the critical importance of health, it is neglected internationally in terms of required

human resources (2). Stress is an inevitable part of our modern life and if it emerges in the workplace, due to changes in the work environment, activities, and objectives, it will represent job stress (3). If job stress exceeds the threshold values, it will lead to reduced efficiency through reducing individuals' attention, sleep disruption, increased risk of disease, irreparable mistakes, and even

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harassment and violence at work, work absences, burnout, and reduced work performance. It will also endanger one's health through physical, psychological, and behavioral symptoms (4). Annually, substantial losses occur due to the physical and mental health problems of employees, reduced efficiency, turnover, and changing jobs which are caused by job stress. Stress and its possible complications cause a hundred lost workdays annually and an average of one million individuals refuse to return to their work due to disorders and illnesses caused by work stress every day.

It has been reported that about 30% of the labor forces suffer from job stress in developed countries.

The International Labor Organization (ILO) has estimated that the cost of job stress is about 1%-3.5% of gross domestic product (GDP), which is increasing (2).

On the other hand, it should be noted that one of the most important factors of productivity and quality of work, particularly among medical staff, is job satisfaction and lack of stress (5). Job satisfaction is a positive emotional state resulting from job quality (6). Job satisfaction is defined as the compatibility between individuals' perception of their needs and that which they receive from their job, it is one of the most important research variables in organizational behavior as well as a pivotal change in organizational research and theories (7). Studies show that lack of job satisfaction, through having negative effects on physical and mental health and stress among staff, increases internal conflicts, work-related accidents, absenteeism, and staff movement, and has negative consequences such as reduced efficiency and effectiveness of the organization (8). In addition, stress has a relationship with job satisfaction and performance and is one of the factors affecting the health, safety, and wellbeing of individuals. Complications of workplace stresses and costs associated with the disease musculoskeletal disorders have forced managers to pay attention to this issue (9).

Different countries have evaluated the rate of job satisfaction and stress from different perspectives. The highest level of job satisfaction has been reported in America with 41%, followed by Scotland (38%), the UK (36%), Canada (33%), and Germany (17%). Kargar et al. conducted a study on 5486 health staff in Ontario, Canada (10). They found that belief in fulfilling the organization's mission, good communication, authority to decide, the amount of salary, recognition of staff's efforts by the organization, and effective group work were of the most important factors in job satisfaction and coping with stress (10). The results of the study by Yami et al. on health workers in Ethiopia showed that 46.2% of them were dissatisfied with their jobs and the main reasons for their dissatisfaction were lack of motivation, low pay, and inadequate educational status (11). Monjamed et al. found that job satisfaction of nursing staff across the country was moderate; the highest satisfaction was related to the variables of workplace environment and communication with colleagues, and the least satisfaction was related to job security, benefits, and salary (12). Zahedi et al. showed that the majority of health care workers of Chaharmahal and Bakhtiari, Iran, were satisfied with their supervisor, their colleagues, and the nature of their job, and dissatisfied with promotions and salaries (13). On the relationship between psychological factors and the incidence of musculoskeletal injuries, it can be said that dissatisfaction with and stress from work are among the factors that are closely related to musculoskeletal disorders (MSDs) (14). This study aimed to investigate the effects of job stress on MSDs among computer users of governmental and private hospitals of Gorgan city, Iran.

Material & Methods

This cross-sectional descriptive study was conducted to examine the relationship between job stress and MSDs among the staff of governmental and private hospitals in Gorgan.

The subjects in this study were 94 men and 4 women who were selected by census method (15). The inclusion criteria included having at least a diploma degree and a minimum of 1 year of work experience. The process of data collection was conducted from July 2014 to September 2014. In the next stage, after explaining the research objectives for the participants, assuring them of confidentiality, and obtaining written consent forms, questionnaires were simultaneously distributed among the participants. The questionnaires with incomplete information were excluded from the study, and finally, questionnaires remained for further analysis. Two questionnaires were used in this study.

Occupational Stress Inventory: The Occupational Stress Inventory was designed by Osipow et al. in 1987 and was called the job stress measuring tool. In this study, Osipow's Occupational Stress Inventory was used to determine the level of stress(16).In this questionnaire, the severity of stress is divided into four categories of mild stress (60-119), moderate stress (120-179), moderate to severe stress (180-239), and severe stress (240-300)(17, 18). The questionnaire has repeatedly been used by researchers in Iran and abroad and its validity and reliability ($\alpha = 0.89$) have been approved (19).

Nordic Musculoskeletal Questionnaire: To determine the prevalence of MSDs, the Nordic Musculoskeletal Questionnaire (NMQ) was used. The NMQ was designed to determine the prevalence of MSDs in 1987 by Korinka et al. at the Institute of Public Health of Scandinavian countries (20). This questionnaire examines MSDs in 9 areas of the body including the neck, shoulders, elbows, wrists, hands, back, waist, hips/thighs, and

knees and ankles during the 3 process times of 7 days, 1 month, and 1 year ago (21). The Statistical Package for the Social Sciences (SPSS) (version 19, SPSS Inc., Chicago, IL, USA) was used to analyze the gathered data.

First, Cronbach's alpha was used to assess the reliability of measurement scales. Second, ANOVA, Pearson correlation analysis, and descriptive statistics were used to assess the research variables and the usefulness of the data set. Finally, a stepwise regression analysis was used to assess the direct relationship between variables as well as to show the causal relationship and the nature of the relationship between the variables. All P values of less than 0.05 were considered significant. The normality of data was verified using the Kolmogorov-Smirnov test.

Results

The results showed that the subjects had a mean age of 34.88 ± 8.20 . In addition, 4.2% of the participants were women and 95.8% were men. In terms of education, 13 (13.8%), 13 (13.8%), 57 (60.7%), and 11 (11.7%), respectively, had a diploma, associate's degree in education, bachelor's degree, and master's degree. Among the studied subjects, 89 participants (94.7%) were non-smokers and 5 (5.3%) were smokers. The mean experience of individuals was 9.56 ± 6.69 years and the average daily working hours was 9.38 ± 1.42 hours per day. Based on data derived from the questionnaires, average stress score of participants studied was 159 ± 24.77 . The results showed that 6.38% of the staff had mild stress, 68.09% mild to moderate stress, 24.47% moderate to high stress, and no one (0%) had high job stress (Table 1).

Table1: Frequency and percentage of job stress in the subjects studied

Level of job stress	N	%
Low	6	6.38
Medium	64	68.09
Medium to severe	23	24.47
Severe	0	0
Not answered	1	1.06
Total	94	100

Table2: Frequency and percentage of musculoskeletal disorders in the past 12 months and 7 days

Segment		12 Months		7 Days	
		N	%	N	%
Neck	No	43	45.7	62	66
	Yes	51	54.3	32	34
Shoulder	No	57	60.6	69	73.4
	Yes (on the right shoulder)	13	13.8	9	9.6
	Yes (on the left shoulder)	5	5.3	6	6.4
	Yes (on both)	18	19.1	10	10.6
Elbow	No	87	92.6	88	93.6
	Yes (on the right elbow)	3	3.2	3	3.2
	Yes (on the left elbow)	4	4.3	2	2.1
	Yes (on both)	0	0	1	1.1
Wrist and hand	No	61	64.9	78	83
	Yes (on the right wrist and hand)	17	18.1	8	8.5
	Yes (on the left wrist and hand)	5	5.3	2	2.1
	Yes (on both)	11	11.7	6	6.4
Back	No	51	54.3	69	73.4
	Yes	43	45.7	25	26.6
Waist	No	32	34	49	52.1
	Yes	62	66	45	47.9

In the subjects studied, in the past year and the past week, the highest prevalence of MSDs was related to the waist area with values of 66% and 47.9%, respectively (Table 2). Table 3 shows the relationship between stress and the prevalence of MSDs in the study

participants. In this study, all participants, regardless of gender, were evaluated. No significant correlation was observed between women and men in terms of the stress score and the prevalence of MSDs.

Table3: Comparison of the frequency of musculoskeletal disorders in hospital computer users in terms of job stress scores

Segment		Job stress score	P
		Mean \pm SD	
Neck	Yes	157.80 \pm 25.72	0.80
	No	159.67 \pm 24.62	
Shoulders	Yes	156.95 \pm 25.53	0.68
	No	159.93 \pm 24.91	
Waist	Yes	163.22 \pm 25.76	0.03
	No	150.23 \pm 21.54	
Back	Yes	161.05 \pm 30.77	0.61
	No	157.23 \pm 20.87	
Elbow	Yes	167.20 \pm 19.56	0.43
	No	157.75 \pm 25.94	
Wrist and hand	Yes	159.44 \pm 28.13	0.79
	No	159.45 \pm 23.36	

Discussion

Among the factors affecting the prevalence of MSDs is the degree of job stress. Job stress in this study was an average of 159 ± 24.77 which according to the classification of the severity of job stress in this study was in the middle range. The results also showed that 68.09% of the subjects had moderate and 24.47% had moderate to severe stress. Stress results achieved moderate levels of stress. Although the overall stress level was high, the undesirable stress level value obtained in this study was lower compared to other studies on staff in Iran. For example, in a study by Danesh et al. in 2006 on the stress level in the control tower, the medium and high stress was 74% (22).

Another study that was carried out in 1994 by Putz et al. on 533 computer users showed that work-related upper body MSDs are prevalent among individuals (23). It was also shown that occupational and psychological factors of the workplace have a significant relationship with the occurrence of this disorder (23). Lee Sang et al. in their study on MSDs in different parts of the body state that stress is one of the factors that can be effective in the occurrence of MSDs (24). In this study, with the use of the Occupational Stress Inventory and t-test analysis in the sample, no significant relationship was found between job stress and MSDs of the neck, shoulders, back, elbows, and hands and wrists. However, a relationship was observed between stress and MSDs of the waist ($P=0.03$). The waist, back, and neck had the highest rate of disorders.

This study showed that the frequency of MSDs among office workers in the past 12 months was 50.7% in the back, 57.6% in the waist, 46.5% in the neck, and 22.1% in the right shoulder area.

. In the study by Klusmann et al. in Germany on 1065 computer terminal employees, 12-month prevalence of symptoms in the neck, shoulder, hand and wrist, elbow and lower arm were, respectively, 55%, 38%, 21%, and 15% (25). Their results are relatively similar to that

of this study. In a study that the effects of stress factors on back pain among nurses, the joy of work, headaches, and mood were found to have a significant relationship with the prevalence of low back pain. According to studies conducted by other researchers, job stress is a risk factor in the development of MSDs (23, 26, 27). Leino et al. also studied the relationship between MSDs and stress and found a significant relationship between these factors (28). In their study, they suggest that there is a significant relationship between the pleasure of working, headache, fatigue, and low mood in the environment and low back pain (28). Luqmani et al. studied the relationship between job satisfaction and the prevalence of MSDs among office workers (29). In their study, they suggest that decreased job satisfaction is a predisposing factor in the prevalence of MSDs (29). Freemord in his study has shown that there is a significant relationship between the prevalence of depression and stress, and back pain (30). Violante et al. found a significant relationship between low back pain and psychosocial factors and Johansson et al. between MSDs and psychosocial factors (31, 32). Moreover, a significant association was found between low back pain and psychological factors such as social support at work and home and leisure time (33). Haukkal et al. investigated psychosocial factors and stated that psychosocial factors are predictors of MSDs and psychological stresses are associated with MSDs (34).

Conclusion

In this study, most of the subjects complained of MSDs, but only recognized back problems as the result of job stress and considered other areas to be the result of other factors. According to the results of this study, it is suggested that managers of health care organizations attempt to reduce stress and prevent its mental and physical effects through different strategies. This can be a step in the direction of increasing the productivity of and

the quality of services provided by health care organizations. Holding classes for stress management and methods to deal with it, providing entertainment and exercise facilities, at least periodically, increasing the number of employees in the sector, and removing forced extra work hours, modifying job descriptions of health center personnel, reducing work pressure, developing guidelines to explain and promote jobs, and providing appropriate mental and physical environments are among the proposed solutions to this issue.

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Conflict of Interest: None declared

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