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ORIGINAL ARTICLE

Musculoskeletal Disorders and Its Relation with Job Stress in Midwives

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ABSTRACT

The incidence of occupational stress in midwives may lead to increase in the prevalence of musculoskeletal disorders (MSDs) and decreased work efficiency and quality of care. This study was conducted to determine the rate of MSDs in different body parts and its relation with stress in midwives. This was a cross-sectional (descriptive and analytical) study. The population under study was midwives working in governmental and private hospitals in Nayshabur, Khorasan Razavi Province, Iran, in 2015. All eligible midwives (78 women) entered the study. The standard Nordic Questionnaire and the Altmaier occupational stress questionnaire were used. Data was analyzed by descriptive statistics, correlation, t-test and chi-square. In this population, 67.6% had at least one musculoskeletal disorder. The highest prevalence in the last year was in the shoulder region with 44% and the lowest prevalence was in the elbow (8%). Furthermore, 54% of the midwives had average and 46% had severe occupational stress. There was a significant association between MSDs in some body parts and midwives occupational stress ($P<0.05$). Both MSDs and occupational stress are prevalent among midwives and they are associated with each other.

KEYWORDS: *Musculoskeletal disorders, Occupational stress, Midwives*

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INTRODUCTION

Nowadays human resources are an important factor in the success of

organizations. One of the characteristics of dynamic organizations is that they value their worker's health as much as they value production and efficiency [1]. In the recent decades, all over the world including countries like Iran, because of the increase in the number of female workers who have different personality characteristics and are more sensitive to stress, more attention has been attracted to occupational stress in women. Women have an important role in the family and additional stress from the working environment can be a serious threat and lead to personal and familial problems [2]. On the other hand, many ergonomic studies have been done on Musculoskeletal Disorders (MSDs) and their related factors. The role of some harmful physical factors in the working environment in causing these disorders has been proved [3-6]. MSDs are one of the common causes of injury and disability in developing countries and impose a huge health and economic burden [6-9]. Work-related Musculoskeletal Disorders (WMSDs) are the most important factor in losing working hours, increase in costs and loss of human resources and are one of the biggest occupational health dilemmas in industrial countries [9]. These disorders make up close to 48% of all occupational disorders [10]. In the US, these injuries have led to working time loss in more than 600000 workers per year and have cost between 45-54 billion dollars [8,11]. These disorders are among the most important health problems that ergonomists have to deal with all over the world [12-13].

The incidence of psychological work-related factors such as low job satisfaction [14], low peer and supervisor support [14-15], a high number of visitors and low decision-making ability is always associated with MSDs especially cumulative trauma disorders or CTD [14]. Little research has been done about this issue and just recently, researchers have paid more attention to psychological factors in the occupational environment and its effect on MSDs [16].

In this study, occupational stress which is an inseparable part of midwifery and a probable important factor in the prevalence of MSDs has been evaluated.

Occupational stress is a physical and psychological harmful reaction created by the interaction between the individual and environment, and its source is in coordination between the occupational needs and the individual's abilities and expectations [17-18]. Psychological disorders especially depression, anxiety, and stress in 2006 were one of the most important reasons for long sick leaves (more than 12 months) among Swedish women (33%) and the second most common reason for sick leaves among men (25%) [19]. According to the report from the National Institute for Occupational Safety and Health (NIOSH), 30% of employees suffer from lumbar pains, 28% complain of occupational stress, 20% complain of fatigue, 17% suffer from MSDs and 13% have headaches; due to occupational tensions [20].

The quality of health services is affected by many factors such as the physical and psychological health of the health personnel working in health centers and hospitals. Midwives and nurses make up a big part of the health and medical personnel in the world and more than 80% of medical care is done by them [21-22].

Factors such as continuous confrontation with patients, responsibility in regard to patients' health, conducting clinical tasks, confronting terminal patients, lack of sufficient equipment, faulty devices, facing urgent and unforeseen situations, noisy working environment, shift work and the working place (hospital, clinic, etc.) are among the occupational stress factors among hospital personnel; and especially the labor section [22-25].

Consequently, these stress factors can lead to psychological and MSDs; and can, therefore, ruin the quality of health services and threaten patients.

Studying the role of psychological factors in the development of MSDs can help understand and reduce working related diseases and disabilities [16]. Medical personnel have an essential role in improving patient health. The quality of health services is influenced by several factors including the physical and mental health of the medical personnel. There have been many studies about occupational stress, and some studies about MSDs in midwives, but only a few studies have been done about the relation between occupational stress and MSDs in midwives.

This study was performed in order to determine the prevalence of MSDs among the midwives of Neyshabur hospitals and estimate the relation between occupational stress and MSDs in this occupational group.

MATERIALS AND METHODS

This descriptive and analytical cross-sectional study was done in 2015. In this study, all midwives working in the governmental and private

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hospitals of Neyshabur, Khorasan Razavi Province, Iran (78 women) were enrolled in the study. The exclusion criteria were work experience less than one year, history of limb surgery or injury, scoliosis, fractures, pregnancy, osteoporosis, and psychological diseases. People with one of the aforementioned criteria were excluded from the study. Accordingly, people who met inclusion criteria were invited to participate, and after they consented, they were asked to complete the questionnaires carefully. The questionnaires were distributed and collected by the researchers. Eventually, 50 questionnaires were completed by midwives in two governmental (Hakim Hospital and 22 Bahman Hospital) and one private hospital (Qhamar Beni-Hashem Hospital) in Nayshabur.

In order to evaluate MSDs, the standard Nordic Musculoskeletal Questionnaires (NMQ) was used. This questionnaire included different parts such as demographic information including age, height, marital status, job history, education, and dominant hand; and questions about MSDs in the neck, upper back, thighs, knees, and ankle. This questionnaire also asks about the duration of these disorders and the rate and degree of limitation in different body limbs and the prevalence of MSDs in these people.

In order to measure occupational stress, Altman occupational stress questionnaire was used. This 28 item questionnaire was developed by Altman in 1985 and is scored according to a Likert 4 degrees scale (from 1 to 4). The score of 28 and less than 28 indicates little stress, 29 to 57 indicate low stress, 58 to 86 indicate moderate stress, and 87 to 112 indicate severe stress. This questionnaire has validity and reliability to measure occupational stress among hospital personnel in Persian [18].

In this study, the content validity of the questionnaire was approved by five academics working at Zabol University of Medical Sciences. The test-retest reliability of the questionnaire was 0.86.

Body mass index (BMI) was calculated by dividing weight by the square of height. People were classified into four groups: thin (BMI<18.5), normal (18.5≤BMI<25), overweight (25≤BMI<30) and fat (BMI≥30). Data analysis was done by SPSS (Chicago, IL, USA) ver. 20. Data normality was checked by the K-S test. Then descriptive statistics (mean, standard deviation) and analytical statistics (Pearson's correlation coefficient, independent T-test, chi-square and Fisher's exact test) were performed. The relations between quantitative demographic variables (such as age and work history) with occupational stress were evaluated by Pearson's Correlation Coefficient. The relations between qualitative demographic variables (such as gender and education) with occupational stress were evaluated by independent t-tests. The relation between occupational stress (in 3 categories) and the existence of MSDs in each body part and BMI (in 4 categories) were evaluated by chi-square. P-values under 0.05 were considered significant.

This study was approved by the Ethics Committee of Neyshabur University of Medical Sciences. The objectives of the study were clarified for the participants and informed consent was obtained from them. Permission was obtained beforehand from the hospital supervisor. All personal information was kept confidential and the final results were reported without mentioning the name of people or hospitals.

RESULTS

All midwives working in the governmental hospitals of Neyshabur, Iran (78 women) were asked to participate in the study. After applying the inclusion and exclusion criteria and seeking consent, only 50 midwives remained and entered the study. The age range was from 22 to 58 yr. Table 1 shows some of the demographic characteristics of these women.

Table 1. The demographic information of the midwives under study and its relation to job stress

Variable		Mean (SD)	Max-Min	Job Stress *P*-value
Age (yr)		33.12 (8.26)	22-58	*0.030
Work Experience (year)		10.41 (4.87)	1-30	*0.010
Height (cm)		162.43 (6.82)	145-182	0.900
Weight (kg)		65.86 (10.3)	48-92	*0.009
		Frequency	**Percent**	
Marital status	Single	16	32	**0.69
	Marred	34	68	
Education	MSc degree	6	12	
	BSc degree	44	88	**0.67

*Pearson's correlation coefficient, **, T-independent test

Totally 67.6% of midwives suffered from at least one MSDs in their limbs and 19 people (38%) had visited a physician because of their MSDs, 11 people (22%) had to use sick leave because of their MSDs, 9 people (18%) has used physiotherapy because of their MSDs, 16 people

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(32%) exercised regularly. Twenty-seven people (54%) believed that MSDs would make them change their jobs in the future, and 10 people (18%) did not like their jobs.

In this study, 27% of the women stated that MSDs have caused limitation in their work and this pain and discomfort continued in 21.6% of people for 1-7 d, in 4.1% for 8 to 30 d, and in 9.5% for more than 30 d. Among them, 18.9% had been absent from their jobs because of MSDs. In these midwives, 16.2% reported daily musculoskeletal pain, 18.9% reported it one day a week and 24.3% reported it once a month.

These disorders also caused 35.1% of people to refrain from work for 1 d, 13.5% for 2-7 d, 4.1% for 8 to 30 d, and 12.2% for more than 30 d. Moreover, 41.9% of these women had decreased their leisure and social activities because of these disorders. The most prevalent body parts for MSDs during the last year were the shoulders in 22 women (44%), the neck in 16 people (32%), lower back in 15 people (30%), the wrist in 15 people (26%), back and ankle, each one in 11 people (22%) and the elbow and knee each one in 8 people (16%), respectively.

There was a significant relation between the prevalence of musculoskeletal disorders in the neck, shoulders and lower back with work experience, besides, between age and MSDs in the neck and shoulders (Table 2). There was no significant relation between height or education of the people under study and their MSDs.

Table 2. The relation between some demographic variables and MSDs in the midwives under study

Body Part	The existence of MS disorders	**Age**		**Work Experience**	
		Mean ± SD	*P*-Value	Mean ± SD	*P*-value
Neck	Yes	34.12±9.10	*0.02	11.27±8.70	*0.010
	No	30.99±8.31		7.11±5.50	
Shoulders	Yes	35.32±6.20	*0.01	10.9±8.20	*0.030
	No	31.09±7.43		7.37±6.00	
Elbows	Yes	33.89±7.51	0.20	10.67±7.70	0.540
	No	32.58±6.32		9.83±2.68	
Hand/Wrist	Yes	33.11±9.45	0.87	11.98±7.59	0.450
	No	32.87±6.13		10.43±6.38	
Back	Yes	34.61±9.20	0.31	9.70±1.58	0.210
	No	33.68±7.22		9.01±6.19	
Low back	Yes	32.90±7.60	0.69	12.88±9.12	*0.004
	No	32.11±8.70		7.99±4.95	
Thighs	Yes	34.01±7.21	0.40	11.55±5.09	0.090
	No	33.67±6.50		9.66±10.90	
Knee	Yes	34.62±8.01	0.23	10.82±2.65	0.590
	No	33.91±7.26		9.21±7.65	
Foot/Wrist	Yes	33.01±7.87	0.51	9.87±9.16	0.410
	No	32.02±8.06		8.11±5.81	

*Significant statistically: T-independent test

The mean (±SD) of occupational stress measured by Altman occupational stress questionnaire in the midwives was 84.84(±11.51). The maximum score of this questionnaire was 112. Among these midwives, 27 (54%) had moderate and 23 (46%) had severe stress. Table 3 shows the frequency of MSDs according to occupational stress and BMI.

Table 3. The frequency of MSDs in different stress levels and BMI groups

Variable	**Stress**				**BMI**				
	Slight N (%)	Moderate N (%)	Severe N (%)	*P*-value	Thin N (%)	Normal N (%)	Overweight N (%)	Fat N (%)	*P*-value
Neck	0	7(25.9)	9(39.1)	0.31	2(12.5)	10(62.5)	3(18.8)	1(6.2)	0.50
Shoulders	0	9(33.3)	13(56.5)	0.10	3(13.6)	10(45.5)	7(3.8)	2(9.1)	0.63
Elbows	0	2(7.4)	6(26.1)	*0.04	0(0.0)	3(37.5)	3(37.5)	2(25)	0.37
Hand/Wrist	0	5(18.5)	8(34.8)	0.19	1(77.7)	5(38.5)	5(38.5)	2(15.4)	0.49
Back	0	3(11.1)	8(34.8)	*0.04	1(9.1)	7(63.6)	2(18.2)	1(9.1)	0.70
Low Back	0	7(25.9)	8(34.8)	0.49	3(20.0)	7(46.7)	1(6.7)	4(26.7)	*0.04
Thighs	0	2(10.9)	8(65.4)	*0.03	0(0.0)	4(50.0)	1(12.5)	3(37.5)	0.12
Knee	0	3(11.1)	5(21.7)	0.44	1(12.5)	5(62.5)	1(12.5)	1(12.5)	0.80
Foot/Wrist	0	5(18.5)	6(26.1)	0.72	2(18.2)	4(36.4)	3(27.3)	2(18.2)	0.22

*****Significant statistically: Chi-square

The results showed a significant relation between occupational stress and some demographic characteristics such as age (P=0.03), weight

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(P=0.01) and job experience (0.009). Occupational stress did not have a significant relation with marital status, education, and height (Table 1). We found a significant relation between MSDs (P=0.04) and occupational stress in midwives in the elbow (P=0.04), back (P=0.04) and thighs (P=0.02). Moreover, a significant relation was found between BMI and MSDs in the low back region (P=0.04)

Multivariate logistic regression was used to show the effect of different factors on MSDs. MSDs were classified as existing and non-existing, and the effect of factors such as age, job experience, BMI, education and marital status were evaluated on MSDs. The results of the multivariate model showed that age and neck disorders; job experience and shoulders (P=0.01), neck (P=0.03) and low back (P=0.03) disorders; BMI and thigh disorders (P=0.04); and occupational stress and shoulder (P=0.02), elbow (P=0.02) and low back (P=0.04) disorders had a significant relation. There was no significant relation between MSDs and marital status or education (Table 4).

Table 4. The P-value of the relation between some risk factors and MSDs from multivariate logistic regression

Musculoskeletal disorder		Variable					
		Age (yr)	Work Experience	BMI	Marital Status	Education	Job Stress
Neck	*P*-Value	0.65	*0.03	0.47	0.74	0.19	0.6
	CI %95	0.84-1.12	1.01-1.39	0.76-1.14	0.10-5.18	0.34-2.14	0.89-1.06
	OR	0.968	1.197	0.929	0.718	0.860	0.978
Shoulders	*P*-Value	*0.03	*0.01	0.8	0.46	0.15	*0.02
	CI %95	1.01-1.21	1.02-1.27	0.86-1.21	0.08-3.18	0.44-2.43	1.02-1.44
	OR	1.06	1.092	1.02	0.504	1.03	0.96
Elbows	*P*-Value	0.73	0.1	0.15	0.33	0.72	*0.02
	CI %95	0.82-1.15	0.97-1.39	0.94-1.49	0.02-3.59	0.07-4.2	1.03-1.26
	OR	0.97	1.15	1.18	0.29	1.78	1.02
Hand/Wrist	*P*-Value	0.62	0.35	0.052	0.7	0.99	0.98
	CI %95	0.84-1.11	0.92-1.26	0.99-1.64	0.10-4.48	0.01-3.45	0.9-1.1
	OR	0.96	1.07	1.28	0.69	1.12	0.99
Back	*P*-Value	0.18	0.48	0.42	0.99	0.99	*0.02
	CI %95	0.94-1.42	0.72-1.32	0.76-1.68	0.06-2.56	0.08-1.32	1.01-1.49
	OR	1.16	0.91	1.04	1.22	0.88	0.97
Low Back	*P*-Value	0.17	*0.03	0.05	0.60	0.82	*0.04
	CI %95	0.82-1.22	1.01-1.42	0.54-1.03	0.84-1.76	0.66-1.33	1.2-1.57
	OR	1.01	1.11	0.99	1.04	1.12	0.92
Thighs	*P*-Value	0.85	0.11	*0.04	0.99	0.91	0.05
	CI %95	0.74-1.31	0.65-1.67	1.01-1.31	0.05-3.44	0.54-2.63	0.74-1.44
	OR	0.86	0.95	1.01	1.21	1.05	0.45
Knee	*P*-Value	0.63	0.08	0.87	0.67	0.97	0.49
	CI %95	0.64-2.24	0.98-2.12	0.99-1.71	0.98-1.66	0.89-1.71	0.52-1.01
	OR	0.87	0.32	0.46	0.61	0.88	0.40
Foot/Wrist	*P*-Value	0.71	0.95	0.29	0.86	0.97	0.31
	CI %95	0.99-1.14	0.66-1.41	0.89-1.44	0.96-1.29	0.02-2.45	0.94-1.49
	OR	1.08	0.92	0.91	1.12	1.02	1.04

DISCUSSION

The results of this study showed that 67.7% of midwives have MSDs in at least one of their body parts. In addition, about 54% of the midwives experienced average and 46% of them experienced severe stress. There was a significant relation between MSDs and occupational stress. Age, job experience, occupational stress and BMI were the main effective factors on MSDs in midwives.

According to our results, 27% of the midwives had to limit the work as a result of MSDs, which shows the high prevalence of these disorders among the midwives. In this study, the highest frequency of MSDs among the midwives was seen in the shoulder, neck and lower back. In a similar study about the MSDs of midwives in Hamedan, the highest frequency of these disorders was seen in the shoulder, lower back and wrist [4]. A study about midwives from Kerman reported that the highest frequency of MSDs was in the foot, knee and lower back. However, the prevalence of MSDs was also high in the back, neck, wrist and shoulder [9].

Researchers and psychologists evaluated the role of stress in different occupations. The effect of stress on health and job efficiency of the health and medical workers due to their complicated work nature was strong and this factor has been regarded as an important and effective factor [26]. Midwifery is associated with unique stress factors that is specific for this type of job and in the labour units. These factors include the working environment, observing patients pain and suffer, encountering emergency cases, and the burden of protecting patient's well-being [24].

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These stress factors are always a threat to the psychological and physical health of these patients. The mean score of occupational stress in this study was 84.84± 11.51, which was slightly different from the score of occupational stress (77.1± 65.02) in midwives in Kerman, Iran [9]. On the other hand, 46% of the midwives under study had experienced severe occupational stress that was consistent with the results of evaluating occupational stress in the midwives of Yazd in Iran [24], and in evaluating occupational stress in female office employees of Ardabil in Iran [2]. In this study, most midwives (54%) stated that they have average occupational stress. In the study done in Kerman most midwives (81.08%) had average occupational stress [9]. Research done in Britain also showed that forty seven percent of midwives had average and 6% had severe occupational stress [25]. A similar research was done on 147 midwives in the hospital of Turkey and their occupational stress was average [27].

In this study, there was a significant relation between age, weight, work experience and occupational stress, but education, marital status, and BMI were not related to occupational stress. Some researchers have suggested that people's characteristics including age, gender, work experience, expectations and personality type can affect stress tolerance [16]. A study performed on midwives showed that younger people suffer more from stress and people with more job experience have less occupational stress in comparison to new employees [25]. The reason for more occupational stress in younger people with less job experience could be the more encounter and preparedness of older people for encountering problems and stressful situations and more compatibility with their environment and occupations.

The result of the multivariate analysis showed that age, job experience, BMI and occupational stress are factors effective on MSDs. There was a significant relation between MSDs in the neck, shoulder and lower back with people's job experience. Another research result also confirmed this fact [28]. In the present study, there was also a significant relation between shoulder pains with age, but in another study there was a significant relation between age and MSDs in midwives' neck [9].

The other result of this study was the relation between MSDs in the thighs and BMI. This result can confirm Lorusso's hypothesis that says BMI can predispose people to MSDs [29]. In one study BMI was related to MS disorders in the knee, elbow, and thigh [9] and it was significantly related to low back pain in another study [6]. A research about the effect of height on MSDs showed that taller people are at a higher risk for acquiring low back MSDs [6].

Researchers think that high workload and shortage in the number of personal can impose stress on people and the physiological response shows itself as muscular tension and MSDs [13]. In this study, a significant association was seen between MSDs in the elbow, shoulder, back and low back and occupational stress.

Studies have reported that physical and psychosocial factors and their combination are related to MS work related disorders among health and medical employees [16-18]. In other studies, occupational burnout was directly related to MSD in different body parts. Besides, occupational burnout was related to occupational stress [3]. Prolonged stress can probably cause occupational burnout [4] and this can indirectly cause MSDs [3].

The relation between lumber disorders and psychosocial and ergonomic factors were evaluated among nurses in the emergency departments of hospitals in Isfahan and the study found a significant relationship between these two factors [13]. In one study a significant association was found between MSDs and occupational stress in the neck and elbow [9]. However, this finding was in contrary to another study [7], in which there was no significant relation between psychological tension and MSDs among the nurses of Shiraz hospitals.

In this study, a direct relation was seen between stress and MSDs, and those who had more stress showed more MSDs.

In this study, no significant relation was found between marital status or education and MSDs. Other researchers did not find any relation between marital status and MSDs [29-30] or between MSDs in midwives and education or marital status either [31].

One of the limitations of our study was its low sample size. That was because only midwives working in hospitals equipped with operation rooms and labour units were enrolled. Midwives working in health centers do not assist in labor and were not included in this study. Therefore, more extensive and specialized research should be done in order to evaluate occupational tension among midwives working in the rural and urban medical centers in relation to their situation, equipment, management, etc.

Another limitation of this study was its cross-sectional nature. Besides, some midwives might have left their occupation because of job stress or MSDs. This effect known as the healthy worker effect might have diluted our results.

CONCLUSION

Most midwives suffer from occupational MSDs and these disorders are probably related to occupational stress. Working in inappropriate situations and not respecting ergonomic rules has a major role in these occupations and its related

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disorders and stress. Therefore, it is suggested that theoretical and practical classes about correct working positions be held for these midwives; and managerial and organizational interventions should be conducted to decrease stress in the working environment of these people.

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