Original Article

The relationship between occupational stress and dysmenorrhea in midwives employed at public and private hospitals and health care centers in Iran (Mashhad) in the years 2010 and 2011

Masoumeh Kordi, Soheila Mohamadirizi[1], Mohamad Taghi Shakeri[2]

Abstract

Background: According to the biopsychosocial model, menstrual symptoms are caused not only by a combination of biological factors such as hormonal disorders and lifestyle, but also by psychological and social factors such as working environment. This study aimed to determine the relation between occupational stress and dysmenorrhea in Iranian midwives.

Materials and Methods: This prospective correlational study was performed on 150 midwives at public and private hospitals and health care centers of Mashhad, Iran. The subjects were selected through two-stage cluster sampling during 2010-2011. At the beginning of the study, participants completed questionnaires containing demographic information, work circumstances, the 21-item Depression, Anxiety, and Stress Scale, and the Job Content Questionnaire. They then completed the short form of daily Menstrual Distress Questionnaire during three consecutive menstrual cycles. Independent Student's *t*-test, one-way analysis of variance, Kruskal–Wallis, Mann–Whitney, and chi-square tests, correlation coefficients, and linear regression analysis were used to analyze the data collected data in $SPSS_{11.5}$.

Results: Dysmenorrhea was observed in 63.3% of the participants. Among these individuals, 15.7%, 45.2%, and 38.9% had mild, moderate, and severe symptoms, respectively. Moreover, 59.3% of the studied midwives had severe occupational stress. There was a significant positive correlation between occupational stress and severity of dysmenorrhea ($P = 0.002$, $r = 0.82$).

Conclusions: Occupational stress is associated with increased risk of severe dysmenorrhea. This finding can be used to guide preventive measures to eliminate or decrease occupational stress and dysmenorrhea among Iranian midwives. However, identification of sources of occupational stress and related workloads is necessary.

Key words: Dysmenorrhea, Iran, midwifery, occupations

Introduction

Dysmenorrhea is one of the most common problems associated with menstruation that imposes enormous health and economic costs on a country.[1] In addition to its impact on women's physical health and quality of life, it reduces the efficiency of their work. The overall cost of lost work days due to dysmenorrhea has been estimated at about 2 billion dollars.[2] The severity and prevalence of dysmenorrhea varies in different societies and ethnics.[3] According to the biopsychosocial model, the symptoms of menstruation are not only a result of biological factors such as hormonal disorders and lifestyle (exercise and nutritional status), but they are also affected by psychological and social factors such as attitudes toward menstruation, anxiety, depression, and interactions with friends, family, and colleagues, as well as psychosocial conditions of working environment.[4-6]

The Demand-Control Model (DCM) is a major theory on psychosocial conditions of working environment, such as occupational stress. Being first described by Karasek in 1979, DCM was later expanded as the Demand-Control-Support Model (DCSM). According to this theory, psychosocial job stress occurs when the psychological demands of work environment are high and control over work is low.[7] Therefore, some occupations have more stress and some have less. The model divides occupations into four groups of active occupations (high psychological demands of work and high decision-making domains),

School of Nursing and Midwifery, [2]School of Health, Mashhad University of Medical Sciences, Mashhad, [1]School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

Address for correspondence: Mrs. Soheila Mohamadirizi, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran.
E-mail: mohamadirizi@yahoo.com

passive occupations (low psychological demands of work and low decision-making domains), low stress (low psychological demands of work and high decision-making domains), and high stress (high psychological demands of work and low decision-making domains).[8] As the American Department of General Information has reported, among available occupations, health care professions have the highest range of occupational injuries.[9] Midwifery is also considered as a high-stress job.[10] Iran is a developing country whose social and economic changes in the process of urbanization have transformed social relations and provided additional job opportunities for women.[11] Identifying and eliminating sources of job stress for women will improve their performance at both work and family environments. However, little attention has been paid to this crucial field all over the world and particularly in Iran.[12]

Stress is a major occupational hazard for all people who work in human services. These safety-sensitive occupations include police officers, firefighters, nurses, midwives, physicians, and supervisors who work at nights or during unusual hours. Such work conditions are accompanied by specific physiological effects on sleep–wake cycles and alertness.[13] Shift work has numerous negative health effects on workers such as nurses and midwives.[14] Bourbonnais, Gallagher, and Larsson considered the psychosocial needs and different levels of control in nursing profession and identified Karasek's model as the best model of occupational stress in nursing and midwifery.[11,15,16]

In Tehran (Iran), Nikkhoo showed that 56% of midwives had severe occupational stress.[17] Overall, more than 80% of direct patient care is managed by midwives and nurses who comprise the largest category of every health system.[18]

Stress can affect the physical function of the body including endocrine factors. Stress events may permanently alter the hypothalamic-pituitary-gonadal (HPG) regulation of one's reactions.[18] Menstrual function is influenced by stressors that activate the HPG axis. This activation leads to menstrual disorders such as irregular menstrual cycle pattern and menstrual symptoms, especially painful menstruation.[19]

Laszlu *et al*. found 15.5% of working women to have dysmenorrhea. They reported a significant association between this complication and occupational stress.[20] However, Lin and colleagues failed to establish a relation between job stress and menstrual symptoms despite the high prevalence of job stress among nurses (72%).[21] Gordley and colleagues observed dysmenorrhea in 13.2% of nurses but did not find a significant relationship between occupational stress and dysmenorrhea.[22]

Apparently, the findings of previous studies on the relation between job stress and dysmenorrhea in nursing and other occupations are contradictory.[20-22] On the other hand, no Iranian research has evaluated the possible association of occupational stress and dysmenorrhea among midwives. Considering the broad health, social, and economic effects of occupational stress and the increasing number of working women in Iran, we tried to determine the prevalence of occupational stress and its relation with dysmenorrhea in Iranian midwives.

Materials and Methods

In a prospective correlational study during October 2010–February 2011, midwives in public and private hospitals and health care centers of Mashhad (Iran) were evaluated. After the approval from the ethics committee of Mashhad University of Medical Sciences was obtained, introduction letters were obtained from the School of Nursing and Midwifery of the mentioned university and delivered to hospital authorities. Using a pilot study on 10 midwives and the correlation formula, the sample size was calculated as 120 people. Considering a 20% increase in volume due to random sampling, the final sample size was estimated at 150. In order to have access to all midwives from different modalities, hospitals and health care centers were selected as a sample frame of this study.

Multistage sampling with initial classes of midwives in hospitals and midwives in health centers was performed to select subjects. From all midwives working in health care centers, 60 eligible subjects were selected using proportional to size sampling. Afterward, nine proportional to size clusters were selected from the list of 21 hospitals. Convenience sampling was then used to select 10 eligible midwives from each cluster. Subsequently, the researcher referred to each of the selected hospitals and health care centers, introduced herself, and stated the objectives of the study. She identified eligible individuals based on a checklist of inclusion criteria.

After providing written consents, the subjects completed a questionnaire including demographic, menstrual, and job characteristics and lifestyle, the 34-item Job Content Questionnaire (JCQ), the 21-item Depression, Anxiety, and Stress Scale (DASS-21), and the short form (16-item) Menstrual Distress Questionnaire (MDQ).

The original MDQ was developed by Rudolf Moos in 1968 at the University of New York.[23] The reliability and validity of the 16-item MDQ have been supported by empirical research in Taiwan. For a sample of 20-40-year-old women, Chen reported an internal consistency of 0.83.[23] Content

validity index (CVI) of the MDQ was also determined as 0.87 by six Taiwanese experts.[23] The short form MDQ uses 16 questions to assess four dimensions of pain, control, autonomic reactions, and fluid. The items are scored based on a five-point Likert scale from zero (none) to four (very severe). The answers are then analyzed to detect menstrual disorders such as dysmenorrhea according to the length, duration, and regularity of menstrual cycles. The total scores of the 16-item MDQ range from 16 to 64.[24] The participants were asked to fill out the 16-item MDQ for three consecutive menstrual cycles. As the participants had to record the number of blood-stained sanitary pads during the three menstrual cycles, we could calculate the amount of menstrual bleeding (in milliliters) based on Higham Chart.[25]

The original JCQ consists of 49 items and was designed by Robert Karasek in Massachusetts University in 1979.[26] Validity of JCQ has been established through factor analysis and structural analysis.[26] Because this questionnaire has been in use since 1970s and has had extensive international use, its validity has been verified over time.[26] The overall Cronbach's alpha for the JCQ in nurses has been reported as 0.83.[26] The Persian version of the JCQ includes 34 items in five subscales of decision-making or control over the work, psychological job demands, job insecurity, social support, and problems of unsafe working conditions. The questions are rated based on a four-point Likert scale from zero to three. The total scores range from zero to 133, and are categorized as mild (0-42), moderate (43-84), and severe (85-133) occupational stress. The validity and reliability of the Persian JCQ have been approved by a study on nurses in Tehran (Iran).[27] This questionnaire is used to determine the rate of occupational stress in all occupations and in various fields including psychosocial conditions and employment conditions and specifications.[28]

The DASS-21 measures depression (seven items, $\alpha = 0.94$), anxiety (seven items, $\alpha = 0.87$), and stress (seven items, $\alpha = 0.91$).[29] Previous studies have also supported the validity of the DASS-21 as a tool to distinguish the three constructs of depression, anxiety, and stress.[29] Each phrase is graded on a four-point Likert scale from never (zero) to very high (three). Scores 6-8, 4-5, and 5-6 represent mild depression, anxiety, and stress, respectively. On the other hand, scores of 14, 10, and 17 are interpreted as very severe depression, anxiety, and stress, respectively.

The inclusion criteria were being Iranian, having a phone number, age 20-40 years, body mass index (BMI) less than 30 kg/m^2, and education level of at least an associate degree. Individuals were excluded if they were pregnant or had planned for pregnancy in the next 3 months, had menstrual pain for more than 3 days, had a history of ectopic pregnancy or abortion, used oral and/or injective contraceptive methods, or consumed alcohol or tobacco products. Women suffering from diseases such as endometriosis, chronic pelvic inflammatory disease, vaginal, cervical, uterine, or ovarian cancer, or secondary dysmenorrhea due to systemic lupus erythematosus, hypopituitarism, Cushing's syndrome, sarcoidosis, pituitary tumor, acute hepatitis, acquired immune deficiency syndrome (AIDS), cirrhosis of the liver, hypothyroidism, hyperthyroidism, multiple sclerosis, tuberculosis, or diabetes were also excluded. History of uterine or pelvic surgeries, tubo-ovarian disease, abnormal menstrual periods before working (hypermenorrhea, hypomenorrhea, menorrhagia, oligomenorrhea, polymenorrhea), menopause, being a professional athlete, history of mental illnesses during the year prior to the study, and experience of a stressful or traumatic event during the past 6 months were the other exclusion criteria.

In order to follow-up the research units in each menstrual cycle, four phone calls were made within a week. At the end of each menstrual cycle, the researcher arranged meetings with the participants and collected the forms at their workplace. From the 160 participating midwives, 10 cases were excluded due to unwanted pregnancy ($n = 2$), failure to fully and timely complete the questionnaires ($n = 4$), sudden travel ($n = 2$), and lack of corporation in the second period ($n = 2$). Eventually 150 subjects were analyzed.

Student's *t*-test, one-way analysis of variance (ANOVA), Mann–Whitney and chi-square tests, Pearson and Spearman correlation coefficients, and linear regression models were used to analyze the collected data. All analyses were performed in SPSS for Windows 11.5 (SPSS Inc., Chicago, IL, USA) and *P* values less than 0.05 were considered significant.

Results

The characteristics of the participants are summarized in Table 1. About half of the participants (45.3%) were satisfied with their jobs. Among the 63.0% who had dysmenorrhea, 15.7%, 45.2%, and 38.9% reported mild, moderate, and severe symptoms, respectively. On the other hand, 98.0% of the subjects had premenstrual symptoms, 96.7% had other symptoms during bleeding, and 66.7% had postmenstrual symptoms. Painkillers were used by 67.0% of the midwives to relieve painful menstruation. Ibuprofen was the most common medicine used (34.8%). The menstrual patterns of the participants are shown in Table 2.

Table 1: Characteristics of midwives in private and public hospitals and health centers of Mashhad (Iran)

Characteristic	Mean (standard deviation)
Age (years)	20.31 (3.05)
Body mass index (kg/m^2)	23.97 (1.02)
Daily sleep (hours)	7.10 (1.31)
Night sleep (hours)	6.70 (1.04)
Duration of exercise (minutes per week)	53.0 (5.4)
Age at menarche (years)	13.35 (0.02)
Severity of menstrual pain	5.40 (0.01)
Amount of menstrual bleeding (ml)	80.00 (0.02)
Depression score	8.16 (0.03)
Anxiety score	9.60 (0.05)
Stress score	16.07 (0.02)
Duration of employment (months)	57.28 (0.20)
Working hours per week	43.01 (0.07)
Job stress score	66.20 (0.12)

Table 2: Menstrual patterns of participating midwives (*N*=150)

Variables		*n*	%
Length of menstrual cycle (days)	<24	15	10.0
	24-35	135	90.0
	>35	0	0.0
Duration of menstrual bleeding (days)	<7	63	42.0
	≥7	87	58.0
Amount of menstrual bleeding (ml)	<80	82	54.7
	≥80	68	45.3
Regular menstrual cycles	Yes	142	94.7
	No	8	5.3

Table 3: Prevalence, odds ratios (OR) and 95% confidence interval (CI) of psychosocial work conditions according to Karasek's model

Psychosocial work conditions	*n*	%	OR (95% CI)
Passive	10	6.7	1.0 (0.7-1.3)
Active	21	14.0	1.1 (0.8-1.8)
Low stress	69	38.3	1.5 (1.1-1.9)
Severe stress	70	41.0	2.7 (2.0-3.8)
Total	150	100	—

Mild, moderate, and severe occupational stress was observed in 21.3%, 19.3%, and 59.3% of the participants, respectively. Based on Karasek's model, midwifery is considered as a severely stressful occupation. Accordingly, 80 persons (53.3%) had low decision-making opportunities and 90 subjects (52.3%) suffered from unsafe working conditions. In addition, complaints about the psychological demands of the occupation, job security, and social support were made by 71 (47.3%), 70 (46.6%), and 66 (44%) subjects, respectively [Table 3].

As Table 4 shows, the levels of occupational stress were positively correlated with dysmenorrhea ($P = 0.002$, $r = 0.82$). Although psychosocial job stress had significant relations with duration, length, and regularity of menstrual periods, it had no correlation with the amount of bleeding. Moreover, psychosocial job stress was significantly related with the work environment and length of employment. However, no significant relationships were found between painful menstruation and BMI, exercise duration, age at menarche, working hours, anxiety, depression, or stress.

According to Mann — Whitney and Kruskal — Wallis tests, there were significant relations between occupational stress and job centers, employment status, work shift, and job satisfaction. Severe occupational stress existed in 64.4% of the midwives working in hospitals and 45.7% of those working in health care centers. Contract midwives had more occupational stress than others.

In order to control influential variables, all variables were entered into a general linear regression model.

Discussion

Our findings revealed a positive correlation between occupational stress and dysmenorrhea. The prevalence of dysmenorrhea in our study (approximately 63%) was higher than that reported in similar studies. Method of recording symptoms, considering the severity of symptoms, and differences in the prevalence of menstrual symptoms, especially dysmenorrhea, could be responsible for the inconsistencies between the findings of the two mentioned studies and ours. According to the biopsychosocial model, factors such as age, race, culture, social environment, and mental stress (including social stress in the workplace) can influence on the severity and occurrence of symptoms associated with menstruation.[6]

The difference in the intensity of occupational stress in employed women could also be one of the reasons of differences in the prevalence of menstrual bleeding disorders. According to a study in Yazd (Iran), 73.1% of midwives had moderate occupational stress.[30] Nikkhoo reported severe occupational stress in 56% of midwives in Tehran (Iran).[17] Khalilzadeh used a job stress questionnaire and reported 33.5% of the nurses to have some level of occupational stress.[31] Using Karasek JCQ, Peacock found severe occupational stress in 23% of nurses.[26] However, 60% of our participating midwives had severe occupational

Table 4: Relations between different variables and levels of psychosocial job stress

Variables	Psychosocial job stress				Statistical variables
	Low	Moderate	Severe	Total	
Dysmenorrhea					
No	10 (18.2)	25 (45.4)	20 (36.4)	55 (100)	*P*=0.002 *r*=0.820
Yes	15 (15.7)	43 (45.2)	37 (38.9)	95 (100)	
Menstrual duration (days)					
7<	7 (10.8)	10 (15.4)	48 (73.8)	65 (100)	*P*=0.004 *r*=0.322
7≥	25 (29.4)	20 (23.5)	40 (47.1)	85 (100)	
Menstrual regularity (days)					
<24	4 (26.7)	1 (6.7)	10 (66.7)	15 (100)	*P*=0.031 *r*=0.234
24-35	28 (20.7)	29 (21.9)	78 (57.8)	135 (100)	
Regular menstruation					
Yes	32 (22.5)	30 (21.1)	80 (56.3)	42 (100)	*P*=0.002 *r*=0.336
No	0 (0)	0 (0)	8 (100)	8 (100)	
Employment centers					
Hospitals	15 (46.9)	22 (21.2)	67 (64.4)	104 (100)	*P*=0.001 *Z*=−3.4
Health care centers	17 (37.0)	8 (17.4)	21 (45.7)	46 (100)	
Working hours per week					
≥40	26 (35.6)	14 (19.2)	33 (45.2)	73(100)	*P*=0.038 *r*=0.270
<40	6 (7.8)	16 (20.8)	55 (71.4)	77(100)	

Values are expressed as *n* (%)

stress. Considering that every occupation has its own particular and common stressful factors,[32] differences between midwifery and other occupations in the type and level of such stressors could have been the reason for the different intensities of occupational stress. In addition, the type, validity, and precision of the employed tools can affect the findings. Karasek JCQ is among standard, valid, and reliable tools to particularly assess occupational stress in health-related professions.[33] The results obtained through concrete tools such as Karasek JCQ differ from self-reports and subjective tools. Several studies have suggested the use of theory-based tools to evaluate occupational stress.[33]

We used Karasek JCQ which is based on the control-demand theory of social support. According to this theory, occupational demands include workload and time constraints. Occupational control comprises the ability to make decisions and opportunities to accomplish individual goals. Social support from colleagues and supervisors is a mediator in these two concepts. According to this theory, the highest level of stress is due to the combination of high occupational demands and low occupational control. High occupational demands that are associated with high levels of occupational control are not accompanied by stress since active jobs increase the possibility of defensive behaviors. Passive jobs with high demands and low control do not motivate such behaviors and thus increase stress.[34]

In our study, 56.0% of midwives had high occupational demands, 53.3% had low occupational control, and 41.0% had low social support. Hence, the majority of our participants (41.0%) had highly stressful occupations. A study by Abbaspour in Iran showed that 51.8% of nurses had high occupational demands, 74.5% had low occupational control, and 68.7% had low social support.[35] Fisher reported that occupational demands are associated with physical pain, increased accidents at work, and reduced sleep time. On the other hand, occupational control was found to be associated with longer working hours.[36] Likewise, Bosma and Evolahti indicated that low occupational control reduces individuals' health levels.[37,38]

Another reason for the different levels of occupational stress in the midwives in our study and other jobs can be the individual characteristics of the employees, dominance of leadership and management systems (objective environment), and physical characteristics of the work environment. Personality traits, perception of tension, irritability, coping mechanisms against tension, experienced adjustment rage, work experience, and work shifts are among the factors that can affect job stress. Personal characteristics can have a crucial role on how workers recognize and denote stress. Therefore, people with higher flexibility in coping with stress experience less tension. Communication, management style and leadership, justice, monitoring methods, rules, expectations

of colleagues and patients, knowledge, proficiency, and standards of occupations can be pointed out as examples of objective characteristics of the work environment. Physical characteristics of the workplace include available facilities, physical work conditions, light, and level of sound.[36,38]

Conclusion

Furthermore, despite the emphasis on confidentiality of information in the present study, some participants might have not mentioned all their symptoms. Although individual differences, personality of the subjects, and genetic factors may affect the severity of dysmenorrhea, we tried to control these properties. Finally, since daily recording of symptoms of dysmenorrhea was time-consuming for midwives, they were motivated through phone calls and encouraged to complete the questionnaires properly. There has been little evidence to substantiate the relation between occupational stress and dysmenorrhea among midwives. We evaluated the relationship between occupational stress and midwives' dysmenorrhea in Iranian midwives for the first time. According to our findings, social and professional support should be provided in order to reduce occupational stress. Decreasing psychological demands in the workplace may be essential for reducing stress, and thus improving women's general, and especially menstrual, health. Further studies are needed to identify midwives who are at risk for severe stress levels and severe dysmenorrhea and to employ subsequent beneficial interventions.

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