

Investigating the Status of Fatigue and the Factors Affecting it among Women Workers in Iran: A Cross-Sectional Study in Kashan 2018

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Abstract

Aims: Fatigue is a state in which a person's energy is completely depleted due to excessive physical or mental work. In addition to the importance of women workers and the effects of fatigue on them, limited studies have been conducted in this field in the world, especially in Iran. The present study was conducted to investigate the prevalence of fatigue and related factors among women workers in one of the cities of Iran. **Materials and Methods:** A cross-sectional study was performed among women workers in Kashan in 2018. The sample size was 265 participants from 300 workers. The data collection tool was the multidimensional fatigue inventory questionnaire. Data were analyzed via SPSS version 16. **Results:** The lowest and highest total score was 38 and 78, respectively. The mean score of activity decrease was 11.78, which was the highest score among questionnaire. Factors such as overtime, number of children, and work experience showed a statistically significant relationship with the total fatigue score ($P < 0.05$). **Conclusion:** According to the results, a large percentage of participants had a high score of fatigue. Managements should identify and modify the factors affecting fatigue to reduce the worker's fatigue. It seems that further studies are needed to reveal the relationship between fatigue and other variables to provide a deeper understanding of the causes of fatigue.

Keywords: Fatigue, mental fatigue, multidimensional fatigue inventory, working women

INTRODUCTION

The complexity of the concept of fatigue and the lack of a single definition of it has led to the definition of fatigue from different perspectives.^[1] In this way, fatigue is said to be a state in which a person's energy is completely depleted due to excessive physical or mental work.^[2,3] In other words, fatigue is be exhausted of the body or mind that can be caused by stress, overwork, medication, physical illness, or mental illness.^[4] It can be divided into three types: Mental, physical, and neurological.^[5] Mental fatigue means fatigue of the central nervous system, normal or physical fatigue is generally referred to as muscle fatigue, and nervous fatigue refers to nervous

disorders due to mental or physical work that leads to nervous disorders.^[4]

Fatigue has become an integral part of life today. Even for many people, complaining about it has become a habit, which has made fatigue seem simple and insignificant.^[6] A study by van Dijk *et al.* found that about 20% of the population surveyed expressed some form of fatigue. Other studies have reported a fatigue rate of 45%–75%.^[7] Fatigue causes

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various complications and diseases such as: Cardiovascular, mental illness, personal injury, decreased work efficiency, increased accidents, slowness of mind and forgetfulness, insomnia, weakness and memory loss, pain, Muscular pain, increased morbidity, imbalance, as well as increased reaction time and are the most common complaints of people from fatigue.^[8,9] Therefore, fatigue can be considered a financial and life-threatening factor in human societies. According to studies in the US, the damage caused by fatigue is estimated at about \$ 18 million. It has also been observed that people who feel tired are less likely than the control group to follow principles and take safety precautions, especially in the workplace.^[10]

Several factors such as long working hours, excessive ambient heat that lead to increased heart rate,^[11,12] lack or excess of light, poor and irregular sleep, physiological and neurological disorders, monotonous activity, social and family problems, and night shifts can play a role in the onset or persistence of fatigue.^[13] Various studies have shown that in addition to environmental factors, people's gender also affects the prevalence of fatigue, and the prevalence of fatigue among women is significantly higher than men.^[6] The female workforce increased significantly from 13.76 million in 1950 to 27.01 million in 1955 after World War II, with the share of female workers in the total labor force in 1995 being about 40%. The 36.5% and 57% of female workers were married.^[14] This high prevalence has led some countries, such as Japan, to enact laws to reduce women's fatigue and workload.^[15] Furthermore, a study by He showed that women are easily disturbed by changes in the external environment and the accuracy of their work is reduced, but they adapt more quickly to the environment and can return to normal.^[16] In addition to work, women are also affected by a variety of external environmental factors, such as home activities and childcare. In addition, environmental factors, physiological factors such as significant changes in sex hormones, can lead to changes in their physical and mental condition, therefore, fatigue and stress caused by work among women workers due to work added to the home.^[15]

Although women workers are important and the effects of fatigue on them are significant, limited studies have been conducted in this field in the world, especially in Iran. Therefore, the present study was conducted to investigate the prevalence of fatigue and related factors among women workers in one of the cities of Iran.

MATERIALS AND METHODS

A cross-sectional study was conducted among all women workers in the industrial estates in Kashan, 2018. The statistical population was all working women in Kashan and the type of sampling was cluster and random. Therefore, using Cochran's formula (Equation 1), a sample size of 300 people was selected and 265 people answered the questionnaires.

Equation 1

$$n = \frac{\frac{Z^2 pq}{d^2}}{1 + \frac{1}{N} \left(\frac{Z^2 pq}{d^2} - 1 \right)}$$

The instrument of this study included two questionnaires include demographic information and multidimensional fatigue inventory (MFI). To conduct the study, the desired industries were first identified and then, the management and occupational health officials of the industry became familiar with the objectives of the study. Then, with the necessary coordination, study questionnaires were provided to the participants. Furthermore, before completing the questionnaire process, the employees were introduced to the objectives of the project and made sure that the information was confidential, and a written consent was obtained from the employees.

Women workers who had more than a year of experience in the industry and did not suffer from mental illness, insomnia, or taking psychotropic drugs included the study. Furthermore, the existence of the mentioned cases and the unwillingness to participate in the study were the criteria for exclusion.

Demographic information questionnaire

Demographic characteristics of participants including age, height and weight index (of which body mass index [BMI] was calculated), marital status, work history, number of children, having or not having overtime, type of shift, job satisfaction, and sleep quality.

Multidimensional Fatigue Inventory questionnaire

The present study used a multidimensional fatigue questionnaire (MFI) to measure fatigue both desirable and undesirable. The questionnaire was first proposed by Smets in 1995,^[17] and its validity and reliability were assessed in various demographic groups, such as cancer patients undergoing radiotherapy, chronic fatigue patients, students, the 1st year of psychology and medicine, soldiers, and 3rd year medical students. This questionnaire has been translated into Persian and its reliability and validity have been investigated.^[18] It also has 20 questions that assess the five dimensions of physical fatigue, decreased activity, decreased motivation, and mental fatigue. It evaluates a deeper understanding based on a 5-point Likert scale (from 1 = yes is absolutely correct to 5 = no is completely wrong). Ultimately, higher scores indicate more fatigue. In fact, MFI measures fatigue as a person feels and expresses. General fatigue related to a person's overall performance during the day, physical fatigue to a physical sensation directly related to fatigue, mental fatigue to reduced cognitive skills, reduced activity to reduce normal and useful daily activities, and reduced motivation to reduce or lack motivation It refers to the beginning of any activity.^[19]

The data were analyzed using SPSS version 16 (IBM SPSS Statistics for Windows, Version 16.0. Armonk, NY: IBM

Corp) and *t*-test statistics and one-way analysis of variance. Furthermore, the manuscript ethic approved by Kashan University of Medical Sciences by ethic No. IR. KAUMS. NUHEPM. REC.1398.006.

RESULTS

The number of participants was 265. The demographic characteristics of the participants are shown in Table 1. The youngest was 17 and the oldest was 59% and 65.7% of the participants were married, 25.7% were single and 8.3% were divorced. Furthermore, the mean standard deviation of age, BMI and history of participants were 30.65 years (6.70), 24.75 years (4.13), and 4.51 years (3.88), respectively.

Figure 1 shows the mean scores obtained from fatigue in five dimensions. According to Figure 1, the mean score of general fatigue, physical fatigue, decreased motivation, mental fatigue, and decreased activity was 10.71, 10.82, 11.34, 10.71, and 11.78, respectively. Furthermore, the lowest overall fatigue score was 38 and the highest was 78, with an average score of 55.38, with 25% of participants achieving a total fatigue score of 60 and above.

Comparison of demographic characteristics and fatigue score participants showed that overtime, number of children, and work experience showed a significant relationship in terms of total fatigue score ($P < 0.05$). The results show that with increasing work experience of more than 9 years and the number of children more than 2 children, the rate of fatigue increases. Hence that physical fatigue, general and total score is higher than the other group. Furthermore, in the five dimensions of the questionnaire, the results show that age, sleep quality and BMI with general fatigue, the number of children with physical fatigue, overtime and shift work with reduced activity, overtime, shift work, and mental problem with reduced motivation and overtime and the number of children was significantly associated with mental fatigue ($P < 0.05$). The mean overall fatigue score was significantly higher in those with a BMI of group 3, obese (<25 groups 1 with normal weight, 25–30 groups 2 overweight, more than 30 with obesity) [Table 2].

DISCUSSION

The present study was performed on women workers in Kashan. The results showed that the decrease in activity and then the decrease in motivation had the highest fatigue score and the average total score of fatigue was 55.38% and 25% of the participants obtained the total score of fatigue of 60 and over. Furthermore, the results of factors affecting fatigue showed that overtime, number of children, and work experience were significantly related in terms of total fatigue score.

The highest score on fatigue was for decreased activity and the factors affecting it were overtime and shift work. The two factors of shift work and overtime cause workers to spend more

Table 1: Demographic characteristics of participants

Variables	n (%)
Age (year)	
<30	144 (54.3)
>30	121 (45.7)
BMI	
<25	153 (57.7)
25-30	78 (29.4)
>30	34 (12.9)
Work experience (year)	
<9	222 (83.8)
>9	43 (16.2)
Marital status	
Married	174 (65.7)
Single	68 (25.7)
Divorced	23 (8.7)
Number of children	
No children	145 (54.7)
1	58 (21.9)
2	44 (16.6)
3	16 (6)
4	2 (0.8)
Over time	
Yes	145 (54.7)
No	117 (45.3)
Shift work	
Non-shift work	93 (35.1)
Shift working	172 (64.9)
Job satisfaction	
Yes	207 (78.1)
No	58 (21.9)
Mental illness	
Yes	48 (18.1)
No	517 (81.9)
Sleep quality	
Satisfied	179 (67.5)
Dissatisfied	86 (32.5)

BMI: Body mass index

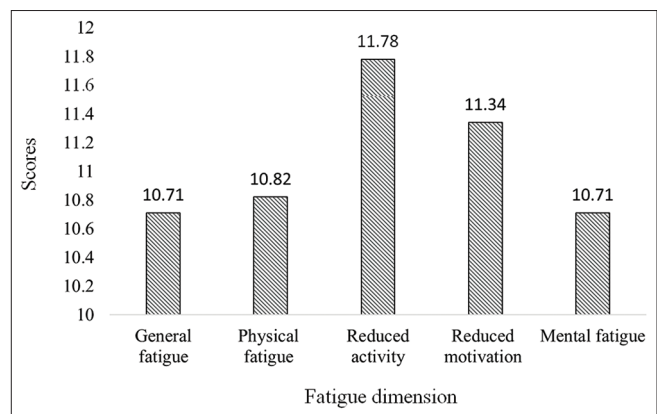


Figure 1: Frequency distribution of the average score of 5 fatigue dimensions

time in their work environment and less social activities. Due to the important role of women in social activities such as raising

Table 2: Relationship between fatigue dimensions with participants' demographic characteristics

Demographic characteristics	Dimensions of fatigue					
	General fatigue	Physical fatigue	Decreased activity	Decreased motivation	Mental fatigue	Total fatigue
Age (year)						
<30	10.46	10.89	11.86	11.21	10.83	55.28
>30	11.02	10.73	11.68	11.05	10.57	55.51
<i>P</i>	0.014*	0.41	0.33	0.24	0.42	0.78
BMI						
<25	10.47	10.85	11.70	11.46	10.70	55.19
25-30	10.80	10.86	11.90	11.06	10.48	55.10
>30	11.53	10.50	11.78	11.50	10.28	56.60
<i>P</i>	0.028*	0.72	0.94	0.39	0.31	0.57
Work experience (year)						
<9	10.58	10.84	11.83	11.41	10.68	55.34
>9	11.73	11.00	11.80	11.13	11.50	57.17
<i>P</i>	0.39	0.18	0.08*	0.45	0.19	0.03
Marital state						
Married	10.61	10.65	11.72	11.22	10.58	57.79
Single	10.79	11.31	11.94	11.53	11.07	56.64
Divorced	11.26	10.74	11.78	11.70	10.65	56.13
<i>P</i>	0.18	0.14	0.73	0.26	0.23	0.14
Number of children						
No children	10.71	11.14	11.98	11.54	11.07	56.44
1	10.64	10.48	11.41	11.05	10.27	53.86
2	11.00	10.75	11.61	11.41	10.34	55.11
3	10.19	9.69	11.94	10.62	10.06	52.50
4	11.50	9.00	11.00	9.50	10.50	51.50
<i>P</i>	0.65	0.022*	0.4	0.32	0.04*	0.041*
Overtime						
Yes	10.74	10.99	12.08	11.57	11.04	56.44
No	10.66	10.60	11.42	11.05	10.30	54.04
<i>P</i>	0.73	0.11	0.012	0.017*	0.008*	0.005*
Shiftwork						
Nonshift work	10.69	11.04	12.07	11.27	10.81	55.88
Shift work	10.73	10.71	11.63	11.38	10.66	55.12
<i>P</i>	0.91	0.16	0.005*	0.01*	0.31	0.56
Job satisfaction						
Yes	10.72	10.87	10.78	11.42	10.67	55.47
No	10.64	10.57	11.71	11.07	10.82	54.82
<i>P</i>	0.79	0.23	0.66	0.22	0.76	0.52
Mental illness						
Yes	11.04	10.87	11.81	10.52	10.56	54.81
No	10.63	10.80	11.77	11.53	10.74	55.48
<i>P</i>	0.52	0.93	0.85	0.001*	0.37	0.53
Sleep quality						
Satisfied	10.48	10.69	11.70	10.50	10.72	55.09
Dissatisfied	11.20	11.11	11.96	11.01	10.68	55.98
<i>P</i>	0.015*	0.17	0.41	0.11	0.62	0.32

*Significant relationship ($P < 0.05$). BMI: Body mass index

children, home affairs, especially in Eastern countries such as Iran, women workers spend more time on such activities. Low time and high responsibility at home have probably been a factor in increasing fatigue in terms of reduced activity. These results are inconsistent with the study of Watt *et al.* in Denmark. Their results showed that the decrease in activity

had the lowest score among the people of Denmark.^[6] One of the reasons for this difference could be cultural differences and differences in the role of women between the two countries. Furthermore, the study of Halvani in Yazd is similar to the results of the present study, which shows that fatigue is high among women, and this fatigue is due to family problems and

activities at home.^[20] In addition, the results of the present study showed that the physical fatigue score of the number of children was significantly related, and this fatigue was lower in participants with 4 children than in other groups. Having children seems to be part of the family responsibilities of women workers, and they helped their working mothers do their homework, which was less stressful than others, as well as motivating. The responsibility that mothers have for their children makes them feel less tired.

The results of this study showed that the score of general fatigue was significantly higher in participants who stated that they did not have the desired quality of sleep. Sleep disorders can be a factor in dissatisfaction with performance and feeling tired. The results of the present study are consistent by Marzieh N *et al.*^[21] This study showed that there was a significant relationship between fatigue and sleep quality.^[22] It can be said that not compensating for sleep deprivation over time can lead to fatigue and lack of motivation and affect their performance. In addition, fatigue can lead to inattention, which can also affect the quantity and the quality of people's performance has a negative effect and, as a result of individual mistakes, they cause harm to themselves and others.^[22] The results also show that the physical fatigue of single participants is more than married and divorced participants, which was consistent with a study that assessed the fatigue of traffic officers and drivers.^[23] Among the reasons for this are the serious acceptance of responsibilities and adherence to the foundation of the family and efforts as motivational causes that can be considered in reducing the fatigue of married participants. Although psychological factors were assessed, some previous studies have shown the effect of some factors, including motivation, on fatigue. According to Chadhardi and Bahan, there is a significant relationship between fatigue and motivation in activities that decreased motivation is one of the causes of fatigue.^[24] According to Baltmann, on 12,095 workers in the Netherlands, participants who lived alone reported more fatigue than married participants.^[25] The results of Jangian's study also confirm that the rate of fatigue is lower in married participants than in single participants.^[26] No similar studies were found to be effective in expressing the effects of housing status, mental health problems, overtime, job satisfaction, BMI, and the number of children.

CONCLUSION

The results of the present study showed that shift and overtime factors, in addition to social and cultural factors such as family responsibilities among women workers, have led to high overall fatigue among female workers. Recognizing the causes of fatigue can lead to appropriate control strategies to reduce fatigue, and by reducing this psycho-physical factor, increase workers' productivity and also improve their social life. These studies can also improve the productivity of human and financial resources in the industry and prevent major accidents.

Limitations

The present study has limitations. One of the limitations of this study is the study tool, which is a questionnaire, and in such studies, the power of reminders is very important. Other limitations of the present study include the lack of use of other methods of fatigue study, sleep quality and job satisfaction such as laboratory studies, which were excluded from the study due to financial constraints. It is suggested that in future studies, in addition to using instrumental methods instead of questionnaires, such studies be conducted in other cultures to more accurately investigate the cultural differences affecting the fatigue of female workers.

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Conflicts of interest

There are no conflicts of interest.

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