Original Article

A Causal Model of Chronic Fatigue in Nurses: The mediating role of organizational spirituality

Hadi Jorfi[1] **Fatemeh Sadat Marashian**[2*]

1. MA in Psychology, Department of Psychology, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran.
2. Assistant Professor, Department of Psychology, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran.

*Correspondence to: Fatemeh Sadat Marashian
  fsmarashian@gmail.com

Abstract

Background & Purpose: Nursing profession often results in chronic fatigue in nurses. Accordingly, the purpose of this study was to provide a causal model of chronic fatigue based on job stressors, sleep quality and morningness/eveningness through the mediation of organizational spirituality among the nurses of Ahwaz City.

Materials & Methods: Path analysis of the correlation method was employed. The sample comprised 300 nurses from Ahwaz City who were selected via multi-stage random sampling method. The research tools included the Osipow Occupational Stress Inventory (1987), The Pittsburgh Sleep Quality Index (1987), Smith, Reilly and Midkiff's Measure of Morningness/Eveningness (1989), Workplace Spirituality Scale by Milliman et al. (2003), and Jason's ME/CFS Fatigue Types Questionnaire (MFTQ) (2009). Data were analyzed using structural equation modeling method.

Results: Direct effect of path coefficients job stressors on chronic fatigue ($p < 0.05$ and $\beta=0.19$), the quality of sleep on chronic fatigue ($p < 0.05$ and $\beta=0.32$), morningness/eveningness on chronic fatigue ($p < 0.05$ and $\beta=-0.11$), job stressors on organizational spirituality ($p < 0.05$ and $\beta=0.16$), morningness/eveningness on organizational spirituality ($p < 0.05$ and $\beta=0.26$) were significant, respectively, but the direct path coefficient of quality of sleep on the organizational spirituality with the coefficient ($p < 0.05$ and $\beta=-0.01$) was not significant, and on the whole, the proposed model data was verified.

Conclusion: It can be concluded that less job stressors lead to less chronic fatigue which improve the quality of sleep and decrease chronic fatigue. Also, the appropriateness of working shifts of nurses with morningness or eveningness factors and the promotion of organizational spirituality lead to lower chronic fatigue in nurses. On the other hand, nurses who experience less job stresses due to spiritual affairs will suffer less chronic fatigue. Moreover, the nurses' sleep quality and the adaptation of working shift with their sleep patterns are the determinant factors of their efficiency.

Keywords: Fatigue Syndrome; Nurses; Negotiating; Spirituality

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1. Introduction

Nursing is one of the stressful jobs for nurses (1) who constitute the largest group of health team staff, and always serve and perform their duties at the head of healthcare, which in most of the cases leads to their chronic fatigue (2). Devoting attention to the phenomenon of chronic fatigue in order to maintain the patient's relationship and his/her satisfaction and safety are of paramount importance in health system, and therefore, its relevant factors should be brought to light (3). One of these factors is the inumerable job stresses in the nursing profession. A study showed that all of the variables of stress and job distress have a significant positive correlation with chronic fatigue (4). In fact, occupational stress is any physical phenomenon or psychological discomfort that can lead to physical harm or psychological discomfort (5), and results in negative outcomes in the performance of individuals and eventually organization in long term (6,7). On the other hand, job stress leads to a decrease in the quality of patient care due to increased work accidents, delays, and absenteeism, as well as a decrease in productivity and organizational commitment (8). This issue causes a reduction in resting time and decreases sleep quality, hence affecting them with different types of sleep disorders. Stress, sleep quality, and perfectionism predicted chronic fatigue, and these three variables can totally explain 55% of chronic fatigue variance (9). In another research, it was found that chronic fatigue syndrome in nurses increased with decreasing sleep quality (10). Also, another study in the Norwegian working population found that occupational stress and role conflict can lead to occupational injuries (11). One of the most important factors that should be

considered in the assignment of people, such as nurses who have work shift systems, is their morningness/eveningness. The results of different studies showed that people can be placed on the two ends of a continuum based on the boarding types or morningness/eveningness which is defined as one of the individual differences in the boarding rhythms (12). Morning-oriented people (also known as "early birds") sleep and get up early. Evening-oriented people sleep and get up late. These people have more efficacy and show the highest level of awareness in the evening (13). Research results have shown that work system factors, such as repetitive work, work shifts and night work shifts, can lead to chronic fatigue (14,15). In research, it was indicated that morningness/eveningness was sifnificantly correlated with collective fatigue. Moreover, chronic fatigue was significantly higher in evening-oriented individuals as compared to the morning-oriented (16). The results showed that anxiety, depression, and stress in pregnant women had an inverse relationship with spirituality and social support (17). Research has also shown that one of the strategies that can facilitate the management of job stressors and improve the sleep quality, as well as reducing the chronic fatigue is organizational spirituality. Organizational spirituality involves trying to find the ultimate goal of a person for work life in order to establish a strong relationship between the individual and his colleagues and the other people who somehow participate in his/her work. It also involves the compatibility and unity between one's basic beliefs and the values of his/her organization (18). In line with the above-mentioned studies, the present research seeks to answer this question that whether or not there is a causal relationship

between job stress, sleep quality, and morningness/eveningness with chronic fatigue through the mediation of organizational spirituality in nurses. Therefore, a model has been designed in this study that explores the direct and indirect effects of job stress, sleep quality, and morningness/eveningness on the chronic fatigue of nurses through the mediation of organizational spirituality.

2. Materials and Methods

The research employed a correlational design and path analysis as a multivariate correlation method. In this study, in order to achieve a research model, the structural equations modeling was used based on causal relationships between variables. The most important feature of this technique as a broad theoretical framework is its flexibility in terms of the application, the possibility of the participation of latent variables, application of multiple sizes of possible errors, adaptation of hypothesis distributing, and the ability to work with different types of data. The research population comprised all male and female nurses working in Ahwaz hospitals (n= 3500 people), out of which a sample of 300 people (100 men and 200 women) was selected via multi-stage random sampling method. (Inclusion criteria: Minimum age 25 years and shift nurses / exclusion criteria: physical and mental illness, psychiatric drug use, and noncooperation). Firstly, five hospitals were randomly selected from Ahwaz hospitals and then, six wards were again randomly selected from each hospital and finally, 10 nurses were selected from each ward based on the list of nurses employed in that hospital (A total of 60 patients from each hospital). The researchers provided the nurses with the questionnaires to answer subsequently by

referring to the specified hospitals, ensuring the required coordination for one-month research conduction, describing the research objectives, and maintaining the confidentiality of the survey results. The following standard tools were used to collect the data. Also, to analyze the data, descriptive statistics, such as calculating frequency, percentage, mean, standard deviation, along with the correlation coefficients matrix between variables and the proposed model of modeling structural equations and the relationship between the final boot patterns of the bootstrap using AMOS/18 Software were used.

Jason's ME/CFS Fatigue Types Questionnaire (MFTQ): This 14-item scale was designed and developed by Jason (2009), and is scored on Likert Scale (12). The reliability and validity of this questionnaire were reported to be 89% and 78%, respectively (19). In this study, the reliability of this questionnaire was found to be 0.88 based on Cronbach's alpha.

Workplace Spirituality Scale by Milliman et al. (2003) has 20 items which assesses three components of meaningful work (at the individual level, Questions 1-6), shared feelings in work communities (at group level, questions 7-13), and alignment with organizational values (at Organizational level, questions 13 to 20) that are scored on a 5-point Likert Scale (from strongly disagree = 1 to fully agree = 5). In a study conducted by Beikzad et al. (2011), the reliability coefficient of this questionnaire was obtained to be 0.89 (20). In the current study, the reliability of this questionnaire was also equal to 0.89 based on Cronbach's alpha.

Osipow Occupational Stress Inventory is a 60-item questionnaire scored on a 5-point Likert Scale (from never-1 to most of the

time-5). In Sharifian research, the reliability coefficient of this scale was obtained to be 0.89 (21), while in this study, the reliability of this questionnaire was equal to 0.88 based on Cronbach's alpha.

The Pittsburgh Sleep Quality Index is a 19-item questionnaire which is scored on a 4-point Likert Scale from 0 to 3. The reliability coefficient (test-retest) of this questionnaire has been reported to be between 0.93 and 0.98 (22), whereas in the current study, the reliability of this questionnaire was equal to 0.90 based on Cronbach's alpha.

Smith, Reilly and Midkiff's Measure of Morningness/Eveningness was designed and developed as an improvement to other scales on this subject. This scale is a combination of 13 items (23) in which the scores less than 23 are indicative of

eveningness, the scores between 23 and 43 are indicative of the middle type, and the scores above 44 are indicative of morningness (24). In the present study, the reliability of this questionnaire was equal to 0.79 based on Cronbach's alpha.

3. Result

Out of the 300 nurses participating in the study, 100 were men and 200 were women, 162 were single, and 138 were married. Using descriptive indices, the mean and standard deviations of the sample were 36.88 and 3.42 for age, 183.77 and 13.23 for job stressors, 37.35 and 3.88 for sleep quality, 37.32 and 5.6 for morningness/eveningness, 62.32 and 7.55 for organizational spirituality, and 40.79 and 5.3 for chronic fatigue, respectively.

Table 1. Correlation matrix between research variables in the sample

	Research variable	1	2	3	4	5
1	Job stressors	1	**-0.155	-0.050	*0.148	**0.224
2	Sleep quality		1	**0.364	0.087	**-0.408
3	Morningness/eveningness			1	**0.259	**-0.285
4	Organizational spirituality				1	**-0.198
5	Chronic fatigue					1

**. P<0.01
*. P<0.05

As shown in Table 1, most of the obtained correlation coefficients between the research variables are significant at P <0.05.

Direct hypotheses

Table 2. Structural Model: The paths and standard coefficients of direct effects between research variables in the final model

Path**	Final model	
	β	P
Job stressors ➡ Organizational spirituality	.16·	.00·
Sleep quality ➡ Organizational spirituality	-	-
Morningness/eveningness ➡ Organizational spirituality	.26·	.00·
Organizational spirituality ➡ Chronic fatigue	-0.16	.00·
Chronic fatigue Job stressors ➡	.19·	.04·
Sleep quality ➡ Chronic fatigue	.32-·	.00·
Morningness/eveningness ➡ Chronic fatigue	.11-·	.00·

**The dotted path is related to the proposed model and has been eliminated from the final model due to its non-meaningfulness. Therefore, the reported non-meaningful path coefficient is related to the proposed model.
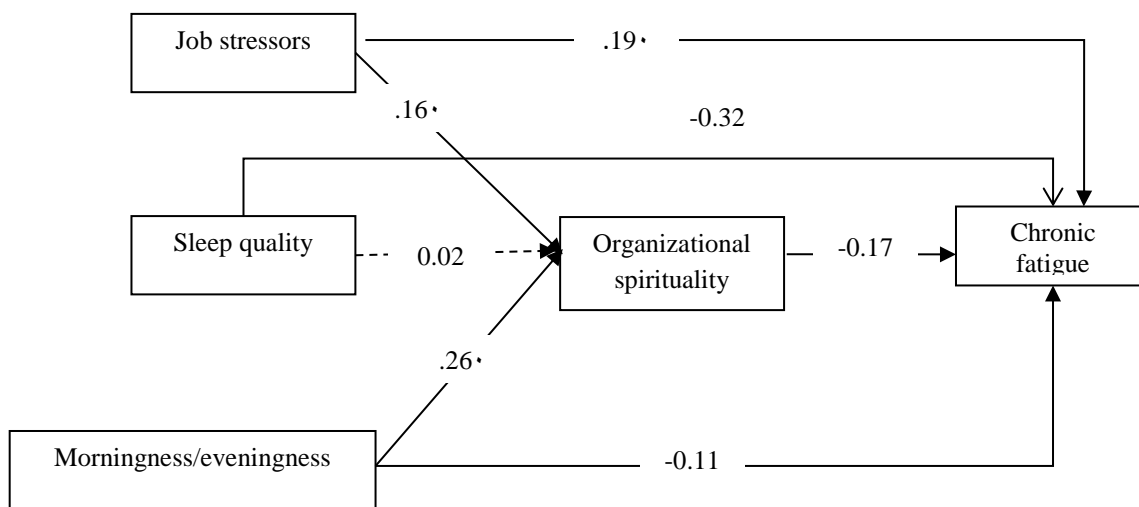
Figure 1. Output of the final modified model with the standard coefficients of the paths in the staff

As it is illustrated in the final model, the direct route coefficient of the sleep quality on organizational spirituality (p <0.05 and β=-0.01) was not significant, and is shown as a dot chain.

Indirect hypotheses

Table 3. The correlation between independent, dependent, mediating variables and bootstrap results

Path	Bootstrap value	Min	Max	Level of sig.
Job Stressors ➡ **Organizational Spirituality** ➡ **Chronic Fatigue**	-0.011	-0.021	0.004–	.005،
Organizational Spirituality ➡ **Sleep Quality Chronic** ➡ **Fatigue**	-0.004	-0.030	0.020	.727،
Morningness/Eveningness ➡ **Organizational Spirituality** ➡ **Chronic Fatigue**	-0.046	-0.081	-0.019	.009،

0.05< *P

The results in Table 3 indicate the bootstrap score for the eighth hypothesis to be equal to -0.011. The lower limit of the confidence interval was -0.021, and the upper limit was calculated to be -0.004. The obtained significance level was equal to 0.005, and the re-sampling number of bootstrap was 2000. Given that zero was outside the confidence interval, the indirect effect of job stressors on chronic fatigue by the mediating role of organizational spirituality was significant, and the eighth hypothesis of the proposed model was confirmed.

Moreover, the results in Table 3 indicate the bootstrap score for the ninth hypothesis to be equal to -0.004. The lower limit of the confidence interval was also -0.030, and the upper limit was calculated to be 0.020. At the same time, the obtained significance level was equal to 0.727, and the re-sampling number of bootstrap was 2000. Given that zero was inside the confidence interval, the indirect effect of sleep quality on chronic fatigue by the mediating role of organizational spirituality was not significant, resulting in the ninth hypothesis of the proposed model to be rejected.

What is more, the results in Table 3 illustrate the bootstrap score for the tenth hypothesis to be equal to -0.046. The lower limit of the confidence interval was -0.081, and the upper limit was calculated to be -0.019. The obtained significance level was equal to 0.009, and the re-sampling number of bootstrap was 2000. Given that zero was outside the confidence interval, the indirect effect of morningness/eveningness on chronic fatigue by the mediating role of organizational spirituality was significant, leading to the tenth hypothesis of the proposed model to be confirmed.

Table 4. The fitness indices in the modified model

Fitness indices	CMIN	GFI	RMR	IFI	PNFI	CFI	NFI	FMIN
Acceptable value	>0.8	>0.8	<0	>0.8	>0.8	>0.8	>0.8	>0.8
Final modified model	0.000	1.00	0.000	1.00	0.000	1.00	1.00	0.000

Table 4 shows the paths and standard coefficients in the final modified models. Given that this model is a completely viewed model, so the values of variables like X^2, χ^2/df are Zero cannot calculate RAMSE, as well. As observed in Table 4, the indices are: CMIN=0.000, GFI=1.00, RMR=0.000, IFI=1.00, PNFI=0.000, CFI=1.00, NFI=1.00, and FMIN =0.000. Therefore, the modified model was considered as an acceptable fit index.

4. Discussion

As the results of the present study showed, job stressors correlated to chronic fatigue both directly (P <0.05, β=0.194) and indirectly (P <0.05 and boot strap= -0.011) and to morningness/eveningness both directly (P <0.05, β=0.115) and indirectly (P <0.05 and boot strap= -0.046). In other words, whatever the job stressors in the workplace are more, more chronic fatigue can be experienced by nurses and vice versa. Also, whatever nurses are appointed to work opposite the circadian cycle, they will suffer more from chronic fatigue. But the quality of sleep was only found to be related to the chronic fatigue directly (P <0.05, β=0.321). However, sleep quality is only directly correlated to chronic fatigue. The results of structural equations modeling revealed that job stressors were both directly and indirectly correlated to chronic fatigue by the mediating role of organizational spirituality (4,7). In the explanation of this finding, it can be concluded that job stressor, as one of the most important characteristics of the work environment, is followed by physical or emotional burnout, which results from actual or mental problems, and nurses are more likely to experience more chronic fatigue due to a high volume of job stressors as compared to others (17). Therefore, we

have to seek ways to counteract the negative outcomes of job stress considering the nature of nursing jobs that are stressful. One of the best strategies for adapting and coping with stress is to utilize positive benefits of religiosity and religious beliefs and applying the spirituality in organizations. As it is clearly stated in Rade Surah, Verse 28 of the Holy Quran, "by the remembrance of Allah, hearts are assured". Research done in this area showed that organizational spirituality reduced stress and improved the perception of occupational stress through various factors, and consequently affected physical and mental health and lives of individuals by reducing chronic fatigue. In fact, organizational spirituality can be considered as a mediating factor between job stresses and tolerance of work-related fatigue that improves one's perceptions of work-related issues and increases their resilience (25).

The results of structural equations modeling confirmed the direct effect of sleep quality on chronic fatigue (P <0.05, β=0.321). It meant that the more people have desirable quality of sleep, the fewer they will report chronic fatigue. This finding was in harmony with the results of certain other studies (see 9, 10, and 11). In the explanation of this finding, it can be stated that many studies showed that people with chronic fatigue syndrome (58%) reported sleep disorders like sleep apnea, and restless legs syndrome (26). It can also be claimed that sleep disorders especially sleep deprivation can be one of the major causes of chronic fatigue in individuals, such that sleep apnea sometimes creates conditions that cause sleep disorder and momentary respirational pause in the individual, which consequently disturbs one's sleep. As a result s/he may feel tired

and be left without energy to do his/her work. Therefore, poor sleep quality lays the ground for chronic fatigue (27). It also seems that confusing work, work-induced stress, physical and psychological activity overload cause sleep disturbances, and as a result, a feeling of fatigue in people, especially the working population. In fact, it can be said that nurses may experience sleep disturbances due to the fact that they are obliged to handle a heavy task in their work environment, such as having to go on a regular basis for patient visit, and working on day or night shift, which may make them feel exhausted throughout the day, and vice versa. Furthermore, the results of this research showed that morningness/eveningness was correlated to chronic fatigue both directly ($P < 0.05$, $\beta = 0.115$) and indirectly through organizational spirituality ($P < 0.05$ and boot strap= -0.046). This finding was found to be in line with the results of two other studies (see 14-16). It can then be reasoned that people are divided into two categories of morning-oriented and evening-oriented people. Morning-oriented individuals sleep and get up early, wake up fully alert, and have more ability and efficacy to work at the beginning of the day in comparison to the evening-oriented people. Therefore, it is natural that morning-oriented nurses experience more chronic fatigue when working in the night shift. On the contrary, evening-oriented nurses can be awake throughout the night and are most active by the end of the day, and may find it discomforting if awakened during the day (28). Therefore, according to the results of this research and the negative relationship between morningness/eveningness and chronic fatigue, it can be concluded that nurses can experience less chronic fatigue if consciously placed on the work shift in accordance to their morningness or eveningness.

Other findings of the present study showed the direct correlation between organizational spirituality and chronic fatigue ($P < 0.05$, $\beta = 0.169$). This finding was consistent with the findings of the research by (17,18). In explaining this finding, it can be stated that the employees achieve inner peace through achieving organizational spirituality, religious practices, and belief in God as infinite power. This inner peace reduces their stress and improves the perception of occupational stress via various factors, consequently affecting physical and mental health and lives of individuals by reducing chronic fatigue (29). Furthermore, an organization can increase its employees' resiliency in tolerating job stressors so as to experience less chronic fatigue through relying on its religious teachings.

5. Conclusion

According to the results of the present study, chronic fatigue is predicted directly and indirectly by job stressors and morningness/eveningness through the mediation of organizational spirituality. In fact, it can be said that nurses who are facing more job stressors in the workplace compared to other people, or those who work opposite the circadian cycle will suffer more from chronic fatigue, but having religious beliefs acts as a mediator variable leads the perception of individuals from a variety of business issues and problems to be affected, and as a result, they report fewer chronic fatigue. The quality of sleep can also impact chronic fatigue directly. In other words, it is reasonably clear that nurses who have favorable quality of sleep experience less chronic fatigue leading them to better job

performance. Therefore, according to the results of the current study, extensive studies and measures are needed to assess and determine the amount of nurses' chronic fatigue to use its results for appropriate planning in order to reduce job stressors and increase the quality of sleep.

Ethical approval

The participants of this research have been ensured of the confidentiality of the questionnaires' results.

Conflict of interest

No conflict of interest has been reported by the authors.

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