Prevalence of Restless Legs Syndrome and Its Relationship with Fatigue in Critical Care Nurses

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Abstract

Background: The critical care unit is inherently stressful due to its complexity, leading to fatigue and consequences such as restless legs syndrome (RLS). This study aimed to investigate the prevalence of RLS and its relationship with fatigue in critical care nurses.

Patients and methods: This cross-sectional study was performed with 200 nurses of critical care units of Shahroud hospitals in 2019 using the census sampling method. Data collection tools included the RLS questionnaire and the Multidimensional Fatigue Inventory. Data analysis was performed using descriptive and inferential statistics (multiple linear regression analysis).

Results: The results showed that 72% of the subjects had moderate to high RLS, and their mean fatigue was 55.31 ± 10.53. By increasing one point in the score of RLS and 1 year of critical care nursing experience, the fatigue score increases by 0.3 and 0.71.

Conclusions: Considering the relationship between fatigue and RLS in critical care nurses, supportive interventions seem necessary to reduce the effects of these two components.

Keywords: Critical care, Fatigue, Nurse, Restless legs syndrome, Willis-Ekbom syndrome.

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Highlights

- Restless legs syndrome and fatigue and are common complaints of nurses working in critical care units.
- Restless legs syndrome is one of the related and aggravating factors of fatigue.

Introduction

Nurses working in intensive care units provide care services clinically while encountering various psychological stressors that are due to the type of work environment and the special conditions of their job.[1] Severe stress experienced by nurses in these work environments can affect their minds and work processes and may lead to fatigue.[2] Fatigue is defined as a relatively constant feeling of lack of interest and difficulty concentrating on ongoing activities[3] so that this problem is more common in intensive care unit nurses.[4] It should be noted that fatigue, in reality, has negative consequences, including a decrease in the ability to process information, the level of safety, the level of physical and mental health and an increase in reaction time, individual functioning, and disruption of quality of life.[5] Nurse fatigue is a serious problem that has negative consequences on patients' safety and nurses' health. Excessive job demand can exacerbate nurse fatigue, limiting nurses' ability to do their job professionally.[6] According to studies, fatigue in nurses is associated with psychological distress such as work-related stress.[7]

One of the negative consequences that nurses face due to their job's nature concerning fatigue is restless legs syndrome (RLS) or Willis-Ekbom Disease. RLS was characterized by stretching, crawling, and deep tingling in the legs. This feeling occurs more often while resting.[8] This neurological complication is usually defined by insisting on moving the legs and is often accompanied by unpleasant sensations deep in the legs. Symptoms typically begin or worsen at rest, especially in the evening and at night, and are often relieved by activities such as rubbing, stretching, or walking. The pathophysiology of RLS is still unknown. However, the dopaminergic system has been shown to play a major role in

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developing this syndrome, as low-dose levodopa improves the symptoms of RLS.[9] This syndrome has many complications and increases the incidence of mental disorders, decreased quality of life, sleep disorders, increased risk of cardiovascular disease and mortality, increased depression and anxiety, daily fatigue, impaired ability to work, and social isolation.[10] There is a family history in about 50% of cases, which indicates an important genetic risk factor. There is also a significant association with low serum ferritin levels, uremia, and pregnancy. People with RLS have less sleep, which is often associated with periodic limb movements that increase the risk of depression and anxiety and ultimately reduce life quality.[11] Healthcare workers are among those who deal with RLS, and on the contrary, they have a low quality of sleep due to

the nature of their job.[12] It should be noted that the prevalence of RLS in nursing staff is approximately 25%, and this syndrome in healthcare workers is also associated with shift work disorder.[13] Nurses suffer from fatigue and muscle cramps due to prolonged standing, excessive use of muscles, and poor posture while working. Some hypotheses to explain the RLS mechanism include changes in dopamine levels, iron deficiency, and poor nutrition.[8]

As mentioned above, fatigue can play an important role in causing RLS in nurses working in the critical care unit. However, no study has been conducted concerning this issue in the critical care unit, so the present study was designed to determine the prevalence of RLS and its relationship with fatigue in critical care nurses (CCN).

MATERIALS AND METHODS

The present study was a cross-sectional study, and the study population included 208 nurses working in critical care units of three hospitals in Iran between September 20 and November 28, 2019. For this purpose, nurses who had all the inclusion criteria for the study were considered a research sample and entered the study using the census sampling method according to the necessary criteria after obtaining their informed consent. Inclusion criteria included having at least 1 year of work experience and at least a bachelor's degree in nursing. People taking medications and supplements, taking painkillers and narcotics in the 72 hours before the study, taking psychiatric drugs, people with neuromuscular disorders and arthritis, pregnant women, people with sores and inflammation body organs, heat-sensitive individuals, and individuals with vascular disease and diabetes were not eligible for the study. Eight nurses were excluded from the study due to having heat sensitivity or diabetes. The required information was collected using three questionnaires: demographic characteristics, RLS, and multidimensional fatigue inventory (MFI). Demographic characteristics included age, gender, employment status, second job, shift work, nursing work experience, critical care work experience, and overtime hours per month. The International RLS Study Group first developed the Restless Legs Syndrome Questionnaire in 2003. The standard Restless Legs Syndrome Questionnaire consists of 10 four-point items with a minimum score of 0 and a maximum of 40. Scores between 0–10 are considered mild, 11–20 as moderate, 21–30 as severe, and 31–40 as very severe RLS. The International RLS Study Group evaluated the Restless Legs Syndrome Questionnaire's reliability, and its Cronbach's alpha was reported between 0.93 and 0.98.[14] The reliability of the Persian version of the Restless Legs Syndrome Screening Questionnaire was obtained by calculating Cronbach's alpha of 0.75 in the Farajzadeh study.[15]

Smets first developed the Multidimensional Fatigue Inventory (MFI) in 1996.[16] This questionnaire consists of 20 items and five subscales of general fatigue, physical fatigue, decreased activity, decreased motivation, and mental fatigue to measure fatigue. The questionnaire's scoring is as a Likert scale with five options from 1 = yes, it is completely true, to 5 = no, it is completely wrong. Questions 2, 5, 9, 10, 13, 14, 16, 17, 18, and 19 are scored in reverse as 5 completely true to 1 completely wrong. To obtain the overall score of the questionnaire, the scores of all items were added up. The total score of each domain is 4–20, and the total score of fatigue, which is determined by the sum of the domains' scores, can be between "20 and 100." A higher score indicates higher levels of fatigue.[16] This questionnaire was used in many different groups of people in many cultures[17–19] and has shown to be valid in the Iranian population.

For example, in the study of Nouri Azari et al., the reliability of the Persian version of this tool using Cronbach's alpha coefficient was calculated 0.88.[20]

Ethical Consideration

The present study was approved by the ethics committee of Shahroud University of Medical Sciences with the ID of IR.SHMU. REC.1397.219. Data were analyzed by descriptive statistics (mean, standard deviation, frequency, and percentage) and inferential statistics tests (Chi-square test and multiple linear regression analysis by Backward method), and the significance level for all statistical tests was considered 0.05.

RESULTS

The results of the present study are related to 200 critical care nurses. In the present study, 78% of the sample were females, and the subjects' mean age was 33.53. The present study showed that most of the nurses understudied had tenure. Descriptive information of nurses participating in the study is listed in Table 1.

The present study results showed that 72% of the subjects were diagnosed with moderate and high RLS. Also, the mean of fatigue was reported to be 55.31 ± 10.53 (Table 2).

Table 1: Demographic characteristics of nurses participating in the study, Shahroud, Iran

Variable	N (%)
Gender	
Male	44 (22)
Female	156 (78)
Employment status	
Formal employment	100 (50)
Contract employment	53 (26.5)
Human resources plan	27 (13.5)
Contractual employment	20 (10)
Second job	
Yes	11 (5.5)
No	189 (94.5)
Shift	
Fixed shift	4 (2)
Shift rotation	196 (98)
	Mean (SD)
Age (years)	33.53 (6.23)
Nursing work experience (years)	9.27 (5.72)
Overtime of the previous month (hours)	45.43 (27.91)

N, frequency; %, percentage; SD, standard deviation

Table 2: Frequency distribution of RLS and mean fatigue in nurses, Shahroud, Iran

Variable	N (%)	Mean (SD)
RLS		
Mild	56 (28)	
Moderate	73 (36.5)	16.57 (9.43)
Severe	60 (30)	
Very severe	11 (5.5)	
Fatigue		55.31 (10.53)

RLS, restless legs syndrome; N, frequency; %, percentage; SD, standard deviation

Table 3: Prevalence of RLS by demographic characteristics of nurses, Shahroud, Iran

Variable	Mild	Moderate	Severe	Very severe	p value
		N (%)			
Gender					
Male	9 (20.4)	23 (52.3)	11 (25)	1 (2.3)	0.088
Female	47 (30.1)	50 (32.1)	49 (31.4)	10 (6.4)	
Employment status					
Formal employment	33 (33)	40 (40)	23 (23)	4 (4)	
Contract employment	14 (26.4)	15 (28.3)	18 (34.0)	14 (11.3)	0.348
Human resources plan	5 (18.5)	9 (33.3)	12 (44.4)	5 (3.7)	
Contractual employment	4 (20)	9 (45)	7 (35)	0 (0.0)	
Age (years)					
≤30	18 (24.3)	29 (39.2)	24 (32.4)	3 (4.1)	
31–40	29 (29.6)	33 (33.7)	30 (30.6)	6 (6.1)	0.883
≥41	9 (32.1)	11 (39.3)	6 (21.4)	2 (7.1)	
Nursing work experience (years)					
≤5	15 (23.8)	22 (34.9)	22 (34.9)	4 (6.3	
6–10	14 (20.6)	26 (38.2)	23 (33.8)	5 (7.4)	
11–15	18 (45.0)	14 (35.0)	8 (20.0)	0 (0.0)	0.396
16–20	7 (35.0)	8 (40.0)	4 (20.0)	1 (5.0)	
≥21	2 (22.2)	3 (33.3)	3 (33.3)	1 (11.1)	
Critical care work experience (years)					
≤5	32 (23.9)	48 (35.8)	43 (32.1)	11 (8.2)	
6–10	19 (35.8)	23 (43.4)	11 (20.8)	0 (0.0)	0.042
≥11	3 (38.5)	2 (15.4)	6 (46.1)	0 (0.0)	
Overtime of the previous month (hours)					
≤40	33 (29.5)	45 (40.2)	30 (26.8)	4 (3.6)	
41–80	13 (19.1)	24 (35.3)	24 (35.3)	7 (10.3)	0.041
≥81	10 (50.0)	4 (20.0)	6 (30.0)	0 (0.0)	
Second job					
Yes	1 (9.1)	4 (36.4)	3 (27.3)	3 (27.3)	0.834
No	52 (27.5)	70 (30.7)	57 (30.2)	10 (5.3)	
Shift					
Fixed shift	4 (57.1)	1 (14.3)	2 (28.6)	0 (0.0)	0.761
Shift rotation	11 (5.7)	58 (30.1)	72 (37.3)	52 (26.9)	

N, frequency; %, percentage; RLS, restless legs syndrome

Table 4: The role of independent variables on fatigue score in critical care nurses

Variables	β	SE	t	p
Constant value	55.16	3.535	15.603	<0.001
Gender				
Female	ref			
Male	−3.034	1.745	−1.739	0.084
RLS	0.305	0.076	3.99	<0.001
Nursing work experience (years)	−0.321	0.163	−1.967	0.051
Critical care work experience (years)	0.718	0.278	2.581	0.011

SE, standard error; p, p-value; RLS, restless leg syndrome

Table 3 shows the prevalence of RLS according to the demographic characteristics of nurses. The Chi-square test's significance level shows no significant difference in the prevalence of RLS in terms of gender, employment status, age, nursing experience, second job, and type of shift ($p > 0.05$). There was a significant difference in the prevalence of RLS in critical care work experience and overtime hours done in the previous month ($p < 0.05$).

The multivariate linear regression analysis results showed that the variables explain 10.4% of fatigue variance within the model. The regression model showed that increased score of RLS and increased working hours in the critical care unit (taking into account the variables within the model) cause fatigue in nurses so that by increasing one point in the score of RLS and 1 year of nursing work experience in critical care units, fatigue score will be increased by 0.3 and 0.71, respectively (Table 4).

Discussion

The present study results showed that more than one-third of the subjects experienced RLS to a severe and higher degree. While the results of the study of Uekata et al., which aimed to investigate the effect of circulating shift program, chronotype, and RLS on the sleep quality of female nurses and midwives in Japan, showed that the prevalence of RLS and restlessness foot movement was 2.5 and 15.5%, respectively.[21] Also, the results of Kamble et al.'s study in India, which aimed to examine the prevalence of RLS in nurses, showed that approximately 23% of nurses reported severe RLS, and its overall rate in all nurses studied was reported to be moderate.[8] Besides, the results of the study by Waage et al., which was conducted in Norway with the same goal, showed that the prevalence of RLS in nurses is 12.4%, and the overall prevalence is 26.8%, which is higher than the obtained values in the present study.[13]

Possible reasons for discrepancies in the findings include differences in the sample size of their study and the present study, studying the individuals of the same gender in the Uekata et al.'s study, and the same work environment in the present study.[21] It can be assumed that CCN suffers from more stress, prolonged standing, job burnout, and work pressure than nurses working in other units, which is itself a possible cause of more severe RLS. On the contrary, differences in India, Japan, and Norway's health policies compared with Iran, in determining the ratio of the number of nurses to patients, can be one of the causes of work stress, burnout, and unfavorable outcomes as RLS.

The results of the present study showed that the overall mean of fatigue among the studied nurses was 52.50 ± 11.80, which is in line with the findings of studies conducted by Bazazan et al. in Iran that had a total mean score of nurses' fatigue of 52.50 ± 11.80 and 50.53 ± 12.85.[7,22] Deravin et al. showed that stressful workplace conditions could negatively affect nurses' mental health and make them feel tired.[23] The high prevalence of fatigue among nurses can be attributed to various factors such as job demand, job control, skill selection, sleep deprivation, and work shifts.[24,25] Fatigue may also be a predictor of burnout. Self-reported fatigue is involved in the onset of emotional fatigue and depersonalization.[26]

The present study results showed that the prevalence of RLS is higher in nurses who have more work experience in critical care units. Consistent with this finding, the results of a study by Sharifian et al., which aimed to investigate RLS in male shift workers, showed that higher work history is a risk factor for RLS that may occur due to aging.[27]

According to the study results, increasing working hours in the critical care unit increases fatigue in nurses. Saleh et al. also showed that higher work experience in neonatal wards is one of the factors associated with higher compassion fatigue.[28] Long-term working in critical care units due to the high sensitivity of nursing care compared to other wards, frequent deaths, multiple cardiopulmonary resuscitation operations, and constant monitoring of patients can be possible causes of fatigue in nurses in these wards.

The present study results also showed that increasing the rate of RLS is significantly associated with fatigue. The results of studies show that RLS also causes mental and physical disorders, such as depression and anxiety, increased risk of cardiovascular disease, fatigue, obesity, sleep apnea, erectile dysfunction in men, diabetes, and osteoporosis, and has a negative effect on the quality of life.[29–31] However, another risk factor that is specific to nurses (especially CCN) is standing for a long time. In this way, it is possible that long stays at the patient's bedside cause muscle cramps, inappropriate physical postures during clinical work, etc., leading to fatigue in these people, which over time has caused RLS in them. In this case, it can be assumed that fatigue and RLS may be another cause or effect of each other in different cases.

Our study has several limitations such as the low sample size and the nature of the design (cross-sectional as opposed to longitudinal). Since the working conditions of Iranian nurses are changes monthly, it wasn't possible to control some participants characteristics. It is not possible to control such as the nurse-to-patient ratio, average working hours per week, number of days off in a week, number of night shifts in a month, and some variables that may affect fatigue and RLS, for example, sleep quality. Despite these limitations, our findings have important implications for research and practice.

Conclusion

According to the findings of this study, it can be considered that RLS is an important factor in the occurrence of fatigue in CCN. Simply because other studies have identified fatigue as a factor in developing RLS, each of these cases may have a different cause or effect.

Author Contributions

Maryam Ameri, Hossein Ebrahimi, and Seyedmohammad Mirhosseini conceptualized the work process. A formal analysis of the article was conducted by Mohammad Hasan Basirinezhad. Maryam Ameri and Seyedmohammad Mirhosseini examined the investigation processes. The methodology was carried out by Mohammad Hasan Basirinezhad and Hossein Ebrahimi, especially project administration and supervision were undertaken by Hossein Ebrahimi.

The original draft was prepared and written by Maryam Ameri, Mohammad Hasan Basirinezhad, Seyedmohammad Mirhosseini, and Hossein Ebrahimi, and then Seyedmohammad Mirhosseini and Hossein Ebrahimi reviewed and edited the final draft. Lastly, all the authors have reviewed and approved the final version of the manuscript.

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