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Research Article

A Quality of Sleep and Factors Affecting Sleep among Nurses: A Cross-sectional Study

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Abstract

Aim: To find the quality of sleep and factors affecting sleep among nurses working in shifts.

Introduction: The sleep is a fundamental right and physiological need of the body. However, having adequate and quality of sleep is more important for work efficiency. Nurses being the health care provider who provides services round o'clock to the patient requires quality sleep.

Methods: This investigation was cross-sectional. Data are obtained thrice, once after each shift from 30 nurses working in the selected hospital utilizing the pittsburgh sleep quality index (PSQI), to assess quality of sleep and the researcher made a Likert scale to assess perceived factors affecting their sleep. A lower score of PSQI on a range of 0–21 indicates better sleep quality.

Results: The mean age of nurses was 24 years and only 20% of nurses were married. About 50 % of the participating nurses had more than 2 years of experience. Two third of nurses were working in ICU. The nurses' overall PSQI score was found better during the evening shift (PSQI score 5) than the morning (PSQI score 5.8) and night (PSQI score 7.6). Factors such as child-rearing activities, educational requirements, daily activities, and food intake are more seen in the morning shift whereas mental stress, the workload at home, and environmental factors are seen more in night shifts.

Conclusion: Nurses experienced better sleep during the evening shift, highlighting the importance of managing factors like child-rearing activities and mental stress for improved sleep quality.

Keywords: Factors affecting sleep quality, nurses, quality of sleep, shift duty, sleep

Introduction

A vital, complex biophysiologic circadian process, sleep affects many of a person's daily physical and mental activities, both directly and indirectly. Melatonin, a chemical released periodically by the pineal gland in the brain, is responsible for the hormonal process of sleep. The pineal body is stimulated by darkness, and as a result, a cyclic pattern of secretion takes place every 24 h. Since melatonin is present in the blood at its highest levels at night, the desire to sleep more frequently.[1]

According to the National Sleep Foundation, one must sleep for 7 h for better cognitive function/productivity. There are several consequences that happen due to sleep deprivation such as increased insulin level, blood pressure and weight, daytime sleepiness, and poor concentration and performance.

One of the most prevalent sleep problems is insomnia, commonly referred to as disturbed sleep. Its symptoms, which include irritability, fatigue, malaise, and a decline in concentration or memory, can be initially recognized. Other symptoms of insomnia include staying asleep or

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difficulty falling, waking up early, and not getting enough restorative sleep. For instance, compared to 18% of daytime employees, 32–54% of nighttime workers claim to experience the aforementioned symptoms of insomnia or daytime sleepiness.

The significance of focusing more on sleep difficulties is highlighted by reports that each year, hospital-related errors result in over 100,000 patient fatalities and over 1.3 million patient injuries.

The social man's circadian rhythmicity is disrupted by exposure to shift employment, especially shift labor, which has a variety of negative implications on health. To guarantee the continuity of care in a hospital setting, such a night shift is required. This work pattern frequently causes sleep and vigilance issues, which might make it difficult to adapt.[2]

Although poor sleep quality is a global issue, there is a huge disparity between nurses' subjective results and the findings of the general public. With a total mean score of 7.13 ± 2.5 on pittsburgh sleep quality index (PSQI-P), the Persian equivalent of the PSQI, nurses working a shift in Iran in 2016 had an 86% of prevalence of sleep disruptions. The most frequent issue among nurses who worked shifts was a delay in the start of sleep. Sleep disorders did not significantly correlate with gender, age, nursing experience, or hospital service department.[3]

At the Farhat Hached Teaching Hospital in Sousse, a cross-sectional study was done on two groups of 50 nurses each to find out how the hospital night shift affects the issues of vigilance, living quality, and sleep quality. An objective analysis of vigilance, a night group's reaction times to several tasks that explored attentional mechanisms, and error rates were significant, necessitating the implementation of both individual and group preventive measures.[4]

It has been demonstrated that sleep deprivation impairs nurses' assessment and execution, resulting in mistakes and mishaps. Hospitals either mandate or approve long shifts for nurses (more than 12 h) and numerous shifts per week (up to and exceeding 60 h) due to a shortage of nurses and an increase in the need for nursing care. As a result of these extended work hours, many nurses are providing patient care while they are sleep-deprived. There were strong correlations between nurses' shift work status and their quality of sleep.[5] Insomnia or excessive drowsiness linked to working shifts is referred to as "shift-work disorder" by the American Academy of Sleep Medicine.[6] Over 70.0% of nurses stated that they had symptoms connected to work in rotational shifts, such as stress and poor sleep.[7,8] Regardless of the type of shift, an investigation of Japanese nurses found that the nurses who work rotational shifts endure longer working days, stressful environmental risk factors, and demanding labor. Due to the absence of breaks, nurses working alternate day and night shifts reported higher gastrointestinal and musculoskeletal illnesses.[9-11] The amount of sleep was a significant predictor of the likelihood that medical professionals would make mistakes. For instance, when nurses put in at least 12.5 uninterrupted hours, the probability of error nearly doubled.[11] In conclusion, inadequate sleep due to hospital shift work may affect nurses' physical health as well as the standard of care they provide.[12]

Knowing the evidence about sleep as one of the vital components of physical and mental well-being and improving vigilance among nurses, the goal of the current investigation was to recommend a strategy to improve sleep quality after determining the quality of sleep and other elements affecting sleep among shift nurses working in the Fortis Health Care Ltd, Mumbai.

Problem statement

A cross-sectional study to find the quality of sleep and factors affecting sleep among nurses working in a shifts.

Objectives

The objectives of the study are as follows:

- To identify the quality of sleep among shift nurses using PSQI
- To identify factors affecting the quality of sleep during three shifts
- To find a correlation between the quality of sleep and selected variables.

Hypothesis

- There is a correlation between factors affecting sleep and the quality of sleep.

Research Methodology

A cross-sectional research design was used. Thirty shift nurses were selected conveniently from Fortis Health Care Ltd irrespective of their area of work. Information was gathered by utilizing the Pittsburgh quality index scale and the Likert scale on perception about factors affecting sleep at the end of each shift duties-morning, evening, and night. The data were analyzed as mentioned below:

- Section A: Demographic data-it included age, sex, marital status, no of children <1 year, and working pattern. Data were analyzed using frequency and percentage.
- Section B: Pittsburgh quality index scale.

The PSQI, a self-report questionnaire with a reliability score of 0.83%, evaluates sleep quality over a period of 1 month.[13]

The measure consists of 19 distinct components that work together to provide seven components and a single overall score. The seven components are subjective sleep quality, effectiveness of routine sleep, latency, length of sleep, use of sleep aids, interruptions in sleep, and dysfunction throughout the day. It takes 5–10 min to complete the questionnaire.

Each item is weighted between 0 and 3. The seven component ratings, which range from 0 to 21 and represent various aspects

of sleep quality, are then added up to create the global PSQI score.

- Section C: Perception regarding factors affecting the quality of sleep such as stress, pain, workload, child assignment, and children getting up in the middle of sleep was collected using the Likert scale and analyzed by calculating shift-wise mean score of Likert scale
- Rank correlation test conducted to correlate sleep quality index score with selected factors (physical complaint, mental stress, workload at home, environmental factors, child-bearing activities, educational requirements of the child, daily activities, and food intake) affecting sleep.

Results

Demographic findings

The average age of nursing staff that took part in a study was 24 years with a range of 22–28 years. Only 20% of nurse participants were married and remaining others disclosed that they were single. Table 1 and Figure 1 show that 50% of the participants had more than 24 months experience of working in a shift work pattern. Although 19 (44.5%) nurses were working in the intensive care unit, only 12 (40%) of the nurses said that nurse-patient ratio is 1: 2–1:3 during the shift duty, and none reported ratio of 1:1.

Sleep quality

The higher score of nurse's duration of sleep (2), sleep disturbances (1.8), subjective sleep quality (1.5), daytime dysfunction (0.9), and PSQI score (7.3) during night shift work indicates poor sleep quality during night shift [Table 2]. During morning shift work, nurses sleep latency is poor which indicates they fall asleep late in comparison to other shifts. For a few nurses' habitual sleep efficiency (0.2) gets affected during the evening shift. Except for the sleep disturbances score, scores of all other components of sleep during morning shift work were found higher compared to evening shift work.

The majority (58.8%) of nurses experienced fairly good sleep (mean PSQI 1.2) for three shifts.

Figure 1 depicts that compared to the evening shift, the PSQI score is higher in the night and morning shift, indicates that sleep quality is hampered more in the morning and night than in the evening shift work.

Perceived causes of poor PSQI

Factors such as child-rearing activities, educational requirements, daily activities, and food intake are more seen in morning shift whereas mental stress, the workload at home, and environmental factors are the causes of poor sleep quality perceived during night shift work [Table 3].

There is a significant correlation between disturbance in sleep due to environmental factors and PSQI score during morning and night shift work at $P < 0.05$. Whereas sleep disturbance due to physical complaints and PSQI score is correlated

Table 1: Distribution of participants based on sociodemographic characteristics ($n=30$)

S. no.	Characteristics	Frequency	Percentage
1	Age (years)		
	22–24	23	76.3
	25–27	4	13.7
	28–30	3	10.0
2	Marital status		
	Single	24	80
	Married	6	20
3	Experience of shift duty in months		
	0–24	50	15
	25–48	23.2	7
	49–72	20	6
	73–96	6.6	2
4	Work pattern		
	ICU	19	63.3
	Ward	11	36.6
5	Nurse: Patient ratio during shift		
	1:2	9	30
	1:3	3	10
	1:4	1	3.3
	1:5	5	16.6
	1:6	11	36.6
	1:7	1	3.3

ICU: Intensive care unit

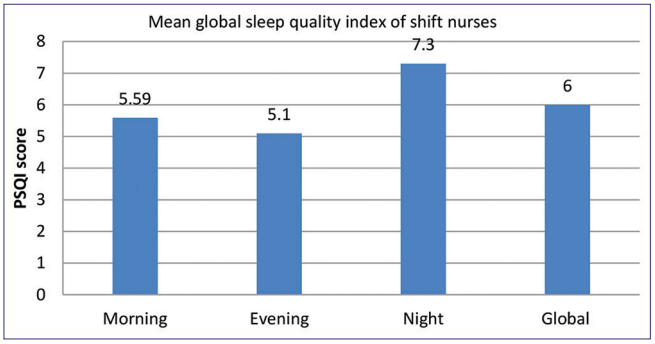

Figure 1: Shift-wise and global Pittsburgh sleep quality index score of the participants

at a 95% level of significance during evening shift work. During the night shift work, delay in sleep due to physical complaints and disturbed sleep due to environmental factors are the two major causes of higher PSQI score at $P < 0.05$ [Table 4 and Figure 2]. This is in accordance to the findings of the study conducted by other researchers, namely, Akbari *et al*.[3] and Dorrian *et al*.[11,14]

Discussion

In the present study, global PSQI score ranged between 4 and 8 (mean PSQI-6) similar to studies conducted in Brazil and Iran (5–7.3 score) PSQI among various categories of nurses working in shift.[14-17] Majority (61.1%) of nurses experienced fairly good sleep (mean 1.2). Only 45.06% of nurses cannot get sleep within half an hour for average <1 in 3 weeks. In comparison, sleep disturbances quoted in other studies are 86–65.1%.[17-19] The present study shows that 51.1% of shift nurses experienced

Table 2: Shift-wise distribution of participant's components of sleep quality score ($n=30$)

PSQI components	Morning shift			Evening shift			Night shift			Average shift Mean
	f	%	Mean	f	%	Mean	F	%	Mean	
Subjective sleep quality			1.03			1			1.5	1.2
1 score (fairly good)	29	96.7		30	100.0		15	50.0		
2 score (fairly bad)	1	3.3			0.0		15	50.0		
Sleep latency			1.7			1.3			1.1	1.4
0 score normal	9	30.0		17	56.7		12	40.0		
1 score	15	50.0		11	36.7		18	60.0		
2 score	3	10.0		3	10.0					
3 score	3	10.0		3	10.0					
Sleep duration			0.56			0.4			2	1
>7 h	15	50.0		18	60.0		30	100.0		
6–7 h	13	43.3		12	40.0		0	0.0		
5–6 h	2	6.7		0	0.0		0	0.0		
Habitual sleep efficiency			0.1			0.2			0	0
>85%	27	90		24	80.0		30	100.0		
75–84%	3	10		6	20.0		0	0.0		
Sleep disturbances			1.3			1.5			1.8	1.5
1 score (some disturbance)	21	70		15	50.0		6	20.0		
Score (fairly bad disturbance	9	30		15	50.0		24	80.0		
Use of sleep medication			0.1			0.3			0	0.1
0 score (not taken in a week at all)	27	90		24	80.0		30	100.0		
1 score (once in a week)	3	10		3	10.0		0	0.0		
2 score (once -twice in a week	0	0.0		3	10.0		0	0.0		
Daytime dysfunction			0.8			0.4			0.9	0.7
0 score	18	60		20	66.7		12	40.0		
1 score	3	10		8	26.7		11	36.7		
2 score	9	30		2	6.7		5	16.7		
3 score	0	0		0	0		2	6.7		

PSQI: Pittsburgh sleep quality index

Table 3: Perceived causes of poor sleep quality and its mean score

Causes of poor sleep quality	Shift work duty of nurses		
	Morning	Evening	Night
Suffering from physical complaints	2.87	3.17	3.1
Mental stress unable to fall asleep	3.17	3.06	3.3
Workload at home reduces sleeping hours	2.23	1.7	2.7
Disturbance due to environmental factors	2.93	3.13	3.6
Disturbed sleep due to child-rearing activities	1.23	1.2	1.2
Time consumption in meeting educational requirement of children	1.33	1.23	1.3
Compulsion on completion of daily activities before sleeping	2.43	2.03	2.2
Intake of food on regular interval disturbs sleep	1.73	1.4	1.6

Table 4: Spearmon's coefficient of rank correlation between PSQI and perceived causes of poor sleep quality

Shift work	Morning		Evening		Night	
	Rho	*P*-value	Rho	*P*-value	Rho	*P*-value
Causes of poor sleep quality						
Physical complaints	0.24	0.20	0.43	0.02*	0.40	0.03*
Mental stress	0.32	0.08	0.31	0.10	0.36	0.05*
Workload at home	0.10	0.61	0.00	0.99	0.29	0.12
Environmental factors	0.44	0.01*	0.33	0.08	0.51	0.01*
Child rearing practices	−0.03	0.88	0.22	0.25	−0.12	0.53
Educational requirements of children	0.09	0.65	0.17	0.37	0.01	0.97
Daily activities	0.12	0.52	0.10	0.59	−0.05	0.78
Food intake	−0.10	0.60	0.22	0.24	0.17	0.37

*Significant correlation, PSQI: Pittsburgh sleep quality index

some degree of sleep disturbance. The nine experienced once or twice a week sleep disorders and the remaining 21 experienced less than once a week. This justifies that few nurses (10–20%) used sleep medication during morning and evening shifts. Only two nurses reported <6 h duration of sleep during the morning shift. The majority had sleep ranged between 6 and above 7 h/day. Only 23.3% of participants experienced daytime dysfunction once or twice a week. Sleep efficiency was found good (>85%) among the majority, especially during the night shift work pattern. Unlike other studies,[20] in the present study

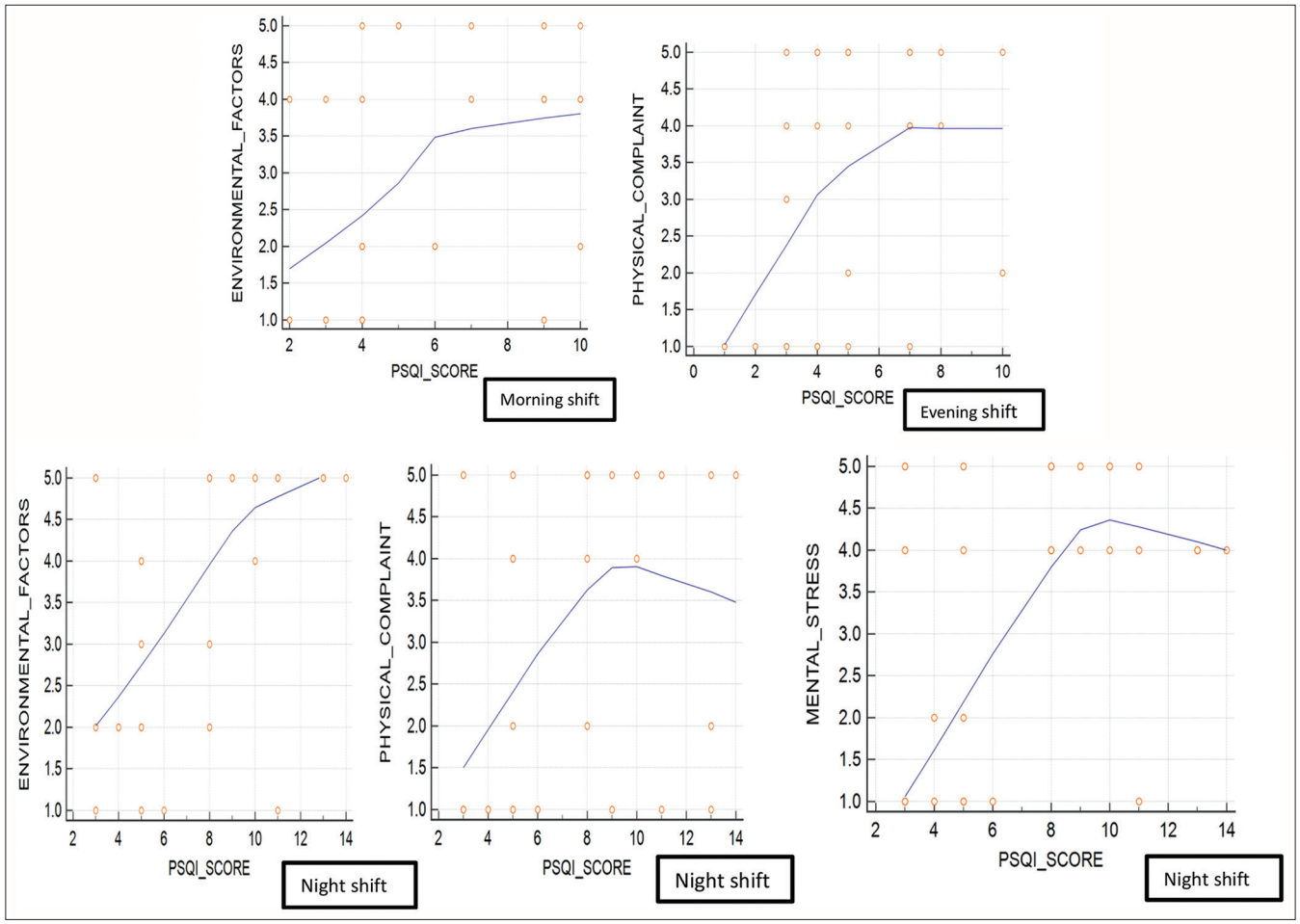

Figure 2: Significant correlation between Pittsburgh sleep quality index score and causes of poor sleep quality

compared to morning and evening shifts, poor PSQI score were found during night shift work. Among female nurses employed in other Brazilian and international institutions, the incidence of poor sleep quality was 65.1%[21] as opposed to 69.9%,[22] which is higher than in other vocations. In studies involving orchestration musicians, a mean PSQI score in the current research had comparable to those scores.[14]

Conclusion

The researcher would like to conclude that physical complaints, mental stress, and environmental factors were the commonly perceived variables influencing nurses' sleep quality. The study suggests taking a variety of actions to address these variables, such as keeping a sufficient nurse-patient ratio and educating nurses' families about the value of good sleep for shift workers and their part in reducing avoidable environmental factors. Similarly, energy conservation and stress relieving techniques should be taught and reinforced, respectively, among nurses.

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Conflicts of Interest

A conflict of interest does not exist.

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References

1. Sadeghniiat-Haghighi K, Aminian O, Pouryaghoub G, Yazdi Z. Efficacy and hypnotic effects of melatonin in shift-work nurses: Double-blind, placebo-controlled crossover trial. J Circadian Rhythms 2008;6:10.
2. Admi H, Tzischinsky O, Epstein R, Herer P, Lavie P. Shift work in nursing: Is it really a risk factor for nurses' health and patients' safety? Nurs Econ 2008;26:250-7.
3. Akbari V, Hajian A, Mirhashemi MS. Evaluating of sleep quality in shift-work nurses; Iran. J Sleep Disored Ther 2016;5:225.
4. Boughattas W, Maalel OE, Chikh RB, Maoua M, Houda K, Braham A, *et al*. Hospital night shift and its effects on the quality of sleep, the quality of life, and vigilance troubles among nurses. Int J Clin Med

2014;5:572-83.
5. Zhang L, Sun DM, Li CB, Tao MF. Influencing factors for sleep quality among shift-working nurses: A cross-sectional study in China using 3-factor pittsburgh sleep quality index. Asian Nurs Rese (Korean Soc Nurs Sci) 2016;10:277-82.
6. American Academy of Sleep Medicine. International Classification of Sleep Disorders. Diagnostic and Coding Manual. United States: American Academy of Sleep Medicine; 2005. p. 148-52.
7. Chien PL, Su HF, Hsieh PC, Siao RY, Ling PY, Jou HJ. Sleep quality among female hospital staff nurses. Sleep Disord 2013;2013:283490.
8. Asaoka S, Aritake S, Komada Y, Ozaki A, Odagiri Y, Inoue S, *et al*. Factors associated with shift work disorder in nurses working with rapid-rotation schedules in Japan: The nurses' sleep health project. Chronobiol Int 2013;30:628-36.
9. Sveinsdottir H. Self-assessed quality of sleep, occupational health, working environment, illness experience and job satisfaction of female nurses working different combination of shifts. Scand J Caring Sci 2006;20:229-37.
10. Flo E, Pallesen S, Magerøy N, Moen BE, Grønli J, Nordhus IH, *et al*. Shift work disorder in nurses--assessment, prevalence and related health problems. PLoS One 2012;7:e33981.
11. Dorrian J, Lamond N, Van den Heuvel C, Pincombe J, Rogers AE, Dawson D. A pilot study of the safety implications of Australian nurses' sleep and work hours. Chronobiol Int 2006;23:1149-63.
12. Surani S, Murphy J, Shah A. Sleepy nurses: Are we willing to accept the challenge today? Nurs Adm Q 2007;31:146-51.
13. Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburg sleep quality Index: A new instrument for psychiatric practice and research. Psychiatry Res 1989;28:193-213.
14. Pereira ÉF, Teixeira CS, Kothe F, Merino EA, Daronco LS. Sleep quality and quality of life perception in orchestra musicians. Arch Clin Psychiatry 2010;37:48-51.
15. De Castilho Palhares V, Corrente JE, Matsubara BB. Association between sleep quality and quality of life in nursing professionals working rotating shifts. Rev Saude Publica 2014;48:594-601.
16. De Braga LC, De Carvalho LR, Binder MC. Working conditions and common mental disorders among primary health care workers from Botucatu, São Paulo State. Cien Saude Colet 2010;15 Suppl 1:1585-96.
17. Bazrafshan MR, Rahimpoor R, Moravveji F, Soleymaninejad N, Kavi E, Sookhak F, *et al*. Prevalence and effects of sleep disorders among shift work nurses. Jundishapur J Chronic Dis Care 2019;8:e81185.
18. Müller M, Guimarães SS. Sleep disorders impact on daily functioning and quality of life. Psychol Stud 2007;24:519-28.
19. Oler FG, Jesus AF, Barboza DB, Domingos NA. Quality of life of the nursing team in the operating room. Arq Ciênc Health 2005;12:102.
20. Costa G, Sartori S, Akerstedt T. Influence of flexibility and variability of working hours on health and well-being. Chronobiol Int 2006;23:1125-37.
21. Shao MF, Chou YC, Yeh MY, Tzeng WC. Sleep quality and quality of life in female shift-working nurses. J Adv Nurs 2010;66:156572.
22. Mehrdad R, Haghighi KS, Esfahani AH. Sleep quality of professional firefighters. Int J Prev Med 2013;4:1095-100.

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