

ORIGINAL PAPER

**Sleep Quality among Iranian Nurses Working in Intensive Care Units versus
General Wards: A Cross-Sectional Study**

Homeyra Akbarzadeh, MSc

Department of Nursing, Faculty of Medicine, Islamic Azad University, Sari Branch, Sari, Iran

Hadi Darvishi Khezri, MSc, PhD

Department of Nursing, Faculty of Medicine, Islamic Azad University, Sari Branch, Sari, Iran

Ghahraman Mahmudi, PhD

Department of Nursing, Faculty of Medicine, Islamic Azad University, Sari Branch, Sari, Iran

Mohammad Ali Jahani, PhD

Department of Health, Faculty of Basic Sciences, Babol University of Medical Sciences, Babol, Iran

Homeyra Tahmasebi, MSc

Department of Nursing, Faculty of Medicine, Islamic Azad University, Sari Branch, Sari, Iran

Amir Emami Zeydi, MSc, PhD (c) in Nursing

School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran

Correspondence: Homeyra Akbarzadeh, Sea Road, Islamic Azad University, Sari Branch, Sari, Iran. Email: Akbarzadeh@iausari.ac.ir

Abstract

Background: Patients who hospitalized in ICU (Intensive Care Unit) require more accurate services and cares. Since the undesirable effects caused by sleep disorders of ICU nurses may have undesirable effects on patients, this study was done with the aim of the determination of sleep quality in ICU nurses and it's comparing with the sleep quality of nurses working in surgical and internal wards.

Methods: In this descriptive study, nurses working in the ICU, surgical and internal disease wards of Imam Khomeini Hospital of Sari city were recruited based on inclusion criteria. Then two questionnaire included demographic questionnaire and Pittsburgh Sleep Quality Index (PSQI) questionnaire was completed by subjects.

Results: In this study, 135 nurses working in the ICU, surgical and internal disease units were studied. 76.8% of ICU nurses, %23/9 surgical ward nurses and %18.5 of internal disease units nurses had low sleep quality (PSQI>5). There was significant difference between the global PSQI score of ICU nurses with the global PSQI score of nurses of surgical and internal ward (P-value=0.02, P-value=0.03, respectively). There was no significant difference between the global PSQI score of the surgical ward's nurses and the global PSQI score of the internal ward's nurses (P-value=0.99).

Conclusion: Sleep quality of nurses in the ICU is considerably lower and this disorder is more related to the "Sleep latency" and "Daytime dysfunction". So, it is perhaps with more attention and the improvement of the sleep quality of the ICU nurses can be improved the quality of care provided to critical patients and can be prevented from the undesirable effects of sleep disorder on patients.

Key Words: Nurse, Sleep Quality, Intensive Care Unit

Background

Sleep and rest are very important in human life. Everyone needs different amounts of sleep and rest. Cellular repair, comfort, composure, and mental-physical relaxation is created in sleep. In fact, sleep is a restorative mechanism which help to human physical and mental regeneration (Kazemi et al., 2005). The sleep quality is impaired in staff who try to sleep during the day (Huth et al., 2013). In several studies nurses had complained from problems such as sleep disorders, gastrointestinal disorders and changing social patterns (Hasson and Gustavsson, 2010, Rocha & Martino, 2010). Adverse effects of sleep disorders on general health, life satisfaction, quality of tasks, individual performance and quality of life has previously been demonstrated (Ulfberg et al., 1996, Unruh et al., 2006). Cognitive disorders, affective disorders and depression are the main risk factors caused by sleep disorders (De Martino et al., 2013). It has been shown that sleep deprivation and poor sleep quality can lead to decreased immune function, reduced hypothalamus, pituitary and adrenal gland functions, decreased glucose tolerance and increased blood pressure and cardiovascular risks and reduce the ability of individual skills (Ayas et al., 2003, Learthart, 2000). Moreover, sleep disorder causes problems such as digestive disorders, heart complications, fatigue, lack of mindfulness, inappropriate behavior, emotional conflicts, aggression, severe loss of professional performance, professional and medication errors (Muecke, 2005, Kim et al., 2013). All of this, eventually lead to impairment of the quality of nursing services, delayed healing process of patients, failure to providing accurate and timely care, decreased productivity in nursing management functions. Just a few of the research conducted on the nurses surveys the sleep quality and its component of nurses who work in ICU_s and comparing it with sleep quality of general ward's nurses. Since the patients hospitalized in ICU_s need to more accurate care and services, it seems the nurses working in this unit have lower sleep quality (Muecke, 2005, Kim et al., 2013). In a study that has been conducted by Kamal *et al* to evaluate the sleep quality of nurses working in a general hospital the results showed that there was no significant differences between the sleep quality of nurses working in critical care units (ICU, CCU and Dialysis) with sleep quality of nurses who worked in

surgical, internal and emergency departments (Kamal et al., 2010). In a study by Rocha *et al* that conducted on 203 nurses working in Emergency, internal, surgical, ICU and bone marrow transplant wards in Brazil, showed that nurses working in surgical and internal departments have significantly lower sleep quality than nurses working in ICU (Rocha & Martino, 2010). Due to the controversies found in the studies, this study was done with the aim of the determining the sleep quality among nurses working in ICUs versus general wards in Sari, northern Iran.

Methods

This study is a cross-sectional descriptive-analytical study that was done in Imam Khomeini Hospital of Sari in year 2013-2014. According to the similar study conducted on the sleep quality of nurses (Rocha & Martino, 2010), the sample size was calculated 130 person. Inclusion criteria were nurses working in the ICU, internal, and surgical wards of Imam Khomeini hospital of Sari city and full-time nurses with a baccalaureate degree. Exclusion criteria were having a history severe psychiatric illnesses, anemia, intestinal disease, thyroid disorders, and unwillingness to participate in the study. To conducting this study, written informed consent from nurses and permission to conduct the study was obtained by the research committee of Islamic Azad University, Sari branch. Then two questionnaire included demographic questionnaire and Pittsburgh Sleep Quality Index (PSQI) was completed by nurses. The first questionnaire included age, sex, marital status, work experience, night shift working frequency per month, the average number of shifts per month, morning and afternoon shifts (combined or long shifts) and the average number of shifts per month and the type of shifts (fixed and circulating). The second questionnaire was the PSQI standard questionnaire.

The PSQI is a seven domain (19 item) self-rated questionnaire evaluating usual sleep habits during the last month. The seven domain scores including: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, daytime dysfunction, sleep fragmentation, and use of sleep aid medications; combine to provide a global sleep quality index score. Each domain has a rating of 0 to 3. The score above 1 in each domain indicates a disturbance in this area. (Kashi et al., 2007). The

possible scores range from 0–21, with greater than five indicative of impaired sleep quality (Mondal et al., 2013). The reliability of this scale is calculated 0.83, and its validity with the sensitivity of %89.6 and the specificity of %86.5 has been reported at the appropriate level. the reliability and validity of the questionnaire also assessed and proved in the study was conducted in Iran (Afkham Ebrahimi et al., 2008). After completing the questionnaire, data were collected. SPSS 16 Software were used for data analysis, Chi-square test & Fisher's exact test were used for the comparison of the qualitative data between groups and ANOVA test were used for comparing the quantitative data between the three sectors. A P-value less than 0/05 were considered to be statistically significant.

Results

Of the 148 nurses who working in the ICUs, internal and surgical wards, 10 nurses were reluctant to participate in the study. 3 subjects were excluded due to the hypothyroidism and finally 135 nurses of the ICU, internal and surgical units were studied.

There was no significant differences among nurses in ICU, surgical and internal wards in terms of age, sex, work experience, average number of shifts per month, the average number of night shifts per month, shift (fixed and circulating), marital status, and the average number of long day shifts (morning and afternoon shifts) per month (Table 1).

Table 1 : Demographic and profesional characteristics of ICU, surgical and internal wards nurses

Variable	Ward			Test P value
	ICU (N=69)	Surgery (N=35)	Medical (N=31)	
Age (year)	30.29	33.20	31.42	ANOVA 0.16
	28.87 to 31.72	30.25 to 36.16	28.26 to 34.59	
Work Experience (month)	57.03	90.52	62.04	ANOVA 0.06
	45.26 to 68.81	58.11 to 122.93	34.45 to 89.62	
Average number of shifts per month	31.19	32.03	32.75	ANOVA 0.06
	30.48 to 31.91	31.06 to 33.01	31.46 to 34.03	
Average number of night shifts per month	6.48	7.43	7.71	ANOVA 0.06
	5.96 to 7.01	6.57 to 8.29	6.46 to 8.97	
Average number of long day shifts (morning and afternoon shifts) per month	2.21	2.18	2.52	ANOVA 0.62
	1.86 to 2.56	1.52 to 2.84	1.95 to 3.09	
Sex	Male	4 (11.4%)	5 (16.1%)	Fisher's exact test 0.06
	Female	67 (97.1%)	31 (88.6%)	
Marital Status	Single	26 (37.7%)	6 (17.1%)	Chi-square 0.08
	Married	43 (62.3%)	29 (82.9%)	
Long day shifts (morning and afternoon shifts)	Yes	60 (87%)	25 (71.4%)	Chi-square 0.15
	No	9 (13%)	10 (28.6%)	
Shift	Fixed	3 (4.3%)	1 (2.9%)	Fisher's exact test 0.06
	Circulating	66 (95.7%)	34 (97.1%)	

Data are expressed as the mean (95% CI), or number (%)

The global PSQI scores of ICU nurses was 8.16; 95% CI 7.50 to 8.83, the global PSQI scores of surgical nurses was 6.43; 95% CI 5.30 to 7.57 and the global PSQI scores of internal

unit nurses was 6.46; 95% CI 5.37 to 7.55. %76.8 of ICU nurses, %23.9 of the nurses of surgical unit, and %18.5 who working in the nurses of internal wards had poor sleep quality

(PSQI>5). The comparison of the sleep quality among the nurses of three wards showed a significant differences between the sleep quality of the internal and surgical wards nurses with the sleep quality of ICU nurses (P=0.02, P=0.03, respectively), but no significant

differences were observed between the sleep quality of internal wards nurses with the sleep quality of surgical wards nurses (P=0.99). ICU nurses with poor sleep quality have a sleep latency and daytime dysfunction (Table 2).

Table 2: The change in components of sleep quality of ICU nurses

Components of sleep quality		Poor Sleep quality (PSQI>5) (N=53)	Chi-Square test P value
Subjective sleep quality	Poor*	27 (50.9%)	0.89
	Good**	26 (49.1%)	
Sleep latency	Poor	44 (83.1%)	<0.0001
	Good	9 (16.9%)	
Sleep duration	Poor	28 (52.9%)	0.68
	Good	25 (47.1%)	
Habitual sleep efficiency	Poor	20 (38.8%)	0.07
	Good	33 (62.2%)	
Sleep disturbances	Poor	1 (1.9%)	<0.0001
	Good	52 (98.1%)	
Use of sleeping medication	Poor	1 (1.9%)	<0.0001
	Good	52 (98.1%)	
Daytime dysfunction	Poor	35 (66.1%)	0.02
	Good	18 (33.9%)	

*The score of 2 and 3 for each component was considered as a poor

**The score of 0 and 1 for each component was considered as a good

Data are expressed as the number (%)

Discussion

The results of this study showed that 76.8% of nurses working in the ICUs of Imam Khomeini Hospital of Sari city, northern Iran, had poor sleep quality. Nurses in all three wards had impaired sleep quality, but this condition was more significant in ICU nurses. Sleep disorder in ICU nurses is considerably higher than that of nurses in surgical and internal wards. Probably more stress in ICU lead to impaired sleep quality in ICU nurses (Cavalheiro et al., 2008).

Kamal *et al* in their study did not find any significant difference between the sleep quality of nurses working in critical care units (ICU, CCU and Dialysis) with the sleep quality of nurses who working in surgical, internal and emergency wards (Kamal et al., 2010). Although, another study showed that nurses in the surgical and internal wards

have lower sleep quality than nurses working in ICU, emergency and bone marrow transplantation wards which these results are inconsistent with result of the present study. The researcher outlined the reasons for these differences as the existence of the patients requiring more complex care in this units, medications infusion, monitoring vital signs, and high workloads and existence of more stress in these units (Rocha & Martino, 2010). But, seems patients hospitalized in the ICU compared with the patients hospitalized in other units have more serious illness and need more care (Cavalheiro et al., 2008). ICU is very stressful environment due to the complexity and the type of patients hospitalized in this unit. Also, the use of complex equipments such as ventilators, arterial blood gas analyzers, etc. is considered as another challenge in this unit (Cavalheiro et al., 2008).

The evaluation of the components of the sleep quality revealed, there was a severe disorder in the component of «sleep latency» and «daytime dysfunction» but no significant changes were observed in subjective sleep quality, sleep duration, sleep disturbances, habitual sleep efficiency and use of sleeping medication. Bagheri *et al.*, in their study showed that the majority of nurses have sleep disorder at the onset of sleep and the duration of night sleep in them is short. The survey and the comparison of the components of sleep quality to separate categories didn't perform in this study (Bagheri *et al.*, 2006). In another similar study, it was reported that more than 50% of impaired sleep quality of nurses is related to the onset and continuation of the sleep, waking up early (sleep latency & sleep duration) (Kolagari, 1998) and daytime dysfunction (Sadegh Niyat, 2001). The present study at the completion of mentioned studies showed, ICU nurses like nurses working in other units had both daytime dysfunction as well as disruption in sleep onset (sleep latency) but disruption of sleep duration were not observed in this study.

Some studies have noted to greater tendency of nurses to take medications to help them sleep (Bagheri *et al.*, 2006, Kageyama *et al.*, 2001); these findings are inconsistent with the results of the present study. One of the limitations of the present study is the relatively small sample size. Therefore, it is recommended that a study to be done to evaluate the sleep quality and its components in the ICU nurses with more samples size and more confounding variable.

Conclusions: Sleep quality of nurses' who working in ICU is significantly low and this condition is more related to the sleep latency and daytime dysfunction. Considering that the presence of nurses with high focus and precision is essential for the correct assessment and providing appropriate and timely care for the sickest patients hospitalized in ICU and according to the results of this study, it is suggested that with more attention to the sleep quality of the ICU nurses and its improvement, quality of care provided to critical patients can be improved and the adverse events of sleep disorder such as mistake in the calculation or prescription of the medications, inability to make decisions in critical situations, lack of proper communication with patients, personal dissatisfaction, reduced cognitive function, memory impairment, and

reduction of readiness and attention on patient can be prevented.

Acknowledgments

We would like to thank Islamic Azad University Research Council and all nurses in Imam Khomeini Hospital of Sari city for their sincere cooperation in this study.

References

- Afkham Ebrahimi A, Ghale Bandi MF, Salehi M, Kafian Tafti AR, Vakili Y, Akhlaghi Farsi E. (2008). Sleep Parameters and the Factors Affecting the Quality of Sleep in Patients Attending Selected Clinics of Rasoul-e-Akram Hospital. *Razi Journal of Medical Sciences*, 15, 31-38.
- Ayas NT, White DP, Al-Delaimy WK, Manson JE, Stampfer MJ, Speizer FE, Patel S, Hu FB. (2003). A prospective study of self-reported sleep duration and incident diabetes in women. *Diabetes care*, 26, 380-384.
- Bagheri H, Shahabi Z, Ebrahimi H, Alaeenejad F. (2006). The association between quality of sleep and health-related quality of life in nurses. *Hayat*, 12, 13-20.
- Cavalheiro AM, Moura Junior DF, Lopes AC. (2008). Stress in nurses working in intensive care units. *Revista Latino-Americana de Enfermagem*, 16, 29-35.
- De Martino MMF, Abreu ACB, Barbosa MFDS, Teixeira JOEM. (2013). The relationship between shift work and sleep patterns in nurses. *Ciência & Saúde Coletiva*, 18, 763-768.
- Hasson D & Gustavsson P. (2010). Declining sleep quality among nurses: a population-based four-year longitudinal study on the transition from nursing education to working life. *PLoS one*, 5, e14265.
- Huth JJ, Eliades A, Handwork C, Englehart JL, Messenger J. (2013). Shift worked, quality of sleep, and elevated body mass index in pediatric nurses. *Journal of pediatric nursing*, 28, e64-e73.
- Kageyama T, Nishikido N, Kobayashi T, Oga J, Kawashima M. (2001). Cross-sectional survey on risk factors for insomnia in Japanese female hospital nurses working rapidly rotating shift systems. *Journal of human ergology*, 30, 149-154.
- Kamal S, Fatemeh A, Khosro SN, Yousef M, Narges R. (2010). Quality of Sleep and Related Factors among Imam Khomeini Hospital Staff Nurses. *Iran Journal of Nursing*, 23, 18-25.
- Kashi Z, Spahbodi F, Ala S, Hendoe N. (2007). Efficacy of Oral versus Intravenous Vitamin C on Serum Oxalate Level in Hemodialysis Patients. *Medical Journal of Mashad University of Medical Sciences*, 50.

- Kazemi M, Rafiee G, Ansari A. (2005). Factors Relevant to Sleeping Disturbances in Hospitalized Medical-Surgical Patients of Ail Ebne Abitaleb Teaching Hospital of Rafsanjan. *Journal of Rafsanjan University of Medical Sciences*, 4, 270-275.
- Kim HI, Jung S, Choi JY, Kim SE, Jung HK, Shim KN, Yoo K. (2013). Impact of shiftwork on irritable bowel syndrome and functional dyspepsia. *Journal of Korean medical science*, 28, 431-437.
- Kolagari S. (1998). Sleep disorders in nurses working in hospitals Shahid Beheshti University of Medical Sciences. *Shahid Beheshti University of Medical Sciences*, 42-43.
- Learthart S. (2000). Health effects of internal rotation of shifts. *Nursing Standard*, 14, 34-36.
- Mondal P, Gjevre JA, Taylor-Gjevre RM, Lim HJ. (2013). Relationship between the Pittsburgh Sleep Quality Index and the Epworth Sleepiness Scale in a sleep laboratory referral population. *Nature and science of sleep*, 5, 15.
- Muecke S. (2005). Effects of rotating night shifts: literature review. *Journal of Advanced Nursing*, 50, 433-439.
- Rocha MCPD & Martino MMFD. (2010). Stress and sleep quality of nurses working different hospital shifts. *Revista da Escola de Enfermagem da USP*, 44, 280-286.
- Sadegh Niyat K. (2001). The evaluation of Prevalence of sleep disorders in the nursing staff of Tehran Imam Khomeini Hospital and factors affecting on it. *Urmia Medical Journal*, 12, 237-245.
- Ulfberg J, Carter N, Talback M, Edling C. (1996). Excessive daytime sleepiness at work and subjective work performance in the general population and among heavy snorers and patients with obstructive sleep apnea. *CHEST Journal*, 110, 659-663.
- Unruh ML, Buysse DJ, Dew MA, Evans IV, Wu AW, Fink NE, Powe NR, Meyer K. B. (2006). Sleep quality and its correlates in the first year of dialysis. *Clinical Journal of the American Society of Nephrology*, 1, 802-810.