

## Impact of Nurses' Poor Sleep Hygiene on Patient's Care at ICUS

BAYOUMI M<sup>1,2</sup>, AHMED S<sup>3</sup>, ABDELGAYED A<sup>4</sup>

<sup>1</sup>Lecturer, Medical-Surgical Nursing, Faculty of Nursing, Beni-Suef University, Egypt.

<sup>2</sup>Assistant professor, Medical-Surgical Nursing, Nursing Division, College of Health and Sport Sciences, University of Bahrain, Bahrain.

<sup>3</sup>Demonstrator, Pediatric nursing department, Faculty of Nursing, Beni-Suef University, Egypt.

<sup>4</sup>Teacher at technical high school of nursing, El-Fashen. Beni-Suef University, Egypt.

Corresponding author: Dr. M

agda Bayoumi <http://orcid.org/0000-0003-2808-3103> Email: [mbayoumi@uob.edu.bh](mailto:mbayoumi@uob.edu.bh)

### ABSTRACT

**Background:** The health care environment as the nursing profession has a very sophisticated structure that needs a high level of performance at work, prolonged time commitment, and relevant responsibilities which lead to poor sleep hygiene.

**Aim:** To evaluate the impact of nurses' poor sleep hygiene on patients' care at intensive care units.

**Methodology:** A cross-sectional study was applied on 40 nurses at ICUs. The study utilized a multi-part questionnaire which included items about demographic data, job status characteristics, and professional errors, moreover the Pittsburgh Sleep Quality Index (PSQI).

**Results:** Totally, the PSQI score ranged between 14.00 and 20.00, which means greater score means poor sleeper with a mean+ SD (17.27+ 1.66), it was statistically significant with professional errors.

**Conclusion:** Nurse's poor sleep hygiene is documented among night shift nurse and negatively impact on patients' quality care and safety.

**Keywords:** ICU nurses, sleep hygiene, poor hygiene, patient's care

---

### INTRODUCTION

The health care environment has a very sophisticated structure that needs a high level of performance at work, prolonged time commitment, and relevant responsibilities. Nurses' shift either day or night shift which leads to change in circadian rhythm and impairs cognitive performance, based on more recent studies that reported that the importance of sleep quality and quantity affect whole body system functions<sup>1</sup>.

Nursing profession faced a challenge in the career shortage and the only solution to bridge this gap is to extend work shift hours, whereas nurses reported many problems related to shift rotation between day and night shifts as decrease general health-related quality of life which included physical, emotional, social, psychological and overall health status. Several studies reported that insufficient sleep quantity and quality resulting from nurses' shift rotation affect on nurses' health as well threaten patient safety status<sup>2,3</sup>.

Mueckes (2005), has interpreted the consequences upon night working and poor sleep hygiene which leads to high risk that affects patients' safety and nurses' general health<sup>4</sup>. Furthermore, the night shift and change in the circadian process cause tiredness, fatigue and poor sleep hygiene and may contribute to more patients' errors<sup>5-7</sup>.

Poor sleep hygiene and insomnia are common among shift workers to affect on overall job performance, malpractice in the administration of medication, missed a treatment, omitted treatment, errors in the transmission of physician description, errors in documentation, the omission of an intervention that is needed. Moreover, change in a circadian cycle as shift rotation is considered as a risk factor for the psychological disorder as depression<sup>8,9</sup>.

Sun et al, 2018, studied the sleep problems in shift nurses and addressed some recommendation at both individual and institutional levels, which include improving

sleep patterns, maintain a low-simulation sleep environment, designing a resilient rotating roster, moreover develop rest policy as a nap break for 15-30 minutes, and extra social support<sup>10</sup>.

The extraordinary sleep reported by Worley; (2018), who has been clarified that enough duration of sleep is very important for the quality of life, whereas drops in the duration of sleep below seven hours lead to an increase in the incidence number of disorders to begin<sup>11</sup>. Effect of change in circadian rhythm caused by shift work in another word shift work disorder, which impacts on overall health status, thereby may be manifest by fatigue, tiredness, and loss of concentration. In consequences of rotating shifts, the work performance is reduced, increase the incidence of errors, accidents at work, increase rate of absenteeism, depression<sup>8</sup>.

Measurement of the impact of nurses' poor sleep hygiene on patient care at ICUs is very important and establish proper strategies to prevent professional errors and improve patients' outcomes.

### METHODS

**Aim:** The study aimed to evaluate the impact of nurses' poor sleep hygiene on patients' care at intensive care units.

**Research design:** A cross-sectional study was applied to evaluate the impact of sleep quality on work performance.

**Study Setting:** Intensive care units at central El. Fashen's government hospital, Beni-Suef City.

**Study period:** The study was conducted between March 2019 and May 2019.

**Study Sample:** Purposive sample consisted of all nurses (n=40) who were working in ICUs.

**Research questions:** Is the nurse's poor sleep hygiene affect negatively on work performance and patients' care?

**Tools of the study:**

**Tool I:** Nurse's Demographic data: (Age, Gender, year of experience, marital status, level of education, number of children, and caring for sick or aged adults at home).

**Tool II:** Job-status characteristics and professional errors [Number of hours /week, Have second shift at another institute, Did Error of mistake last during last two-night shift, Did you harm yourself (accident or injury) during last two night shifts, and Using stimulant to be awake].

Validity has been done by 10 expertise in the field.

**Tool III: the Pittsburgh Sleep Quality Index (PSQI):** consists of seven domains: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction over the last month. Scoring of the answers ranged from 0 to 3 scale, whereby 3 reflects the negative extreme on the Likert scale. Moreover, the total score has a range of 0-21; the higher score indicates worse sleep quality, whereas the PSQI has internal consistency and a reliability coefficient (Cronbach's alpha) of 0.83 for its components<sup>[12]</sup>.

**Ethical considerations:** This study was approved by the director of El-Feshen's government hospital, Beni-Suef City, The oral verbal consent of the nurses was obtained prior to the administration of the questionnaire. The head nurse and nursing staff were informed about the purpose of the study and the researcher was explained that the participation not obligatory and they had the right to refuse to participate, and all right of confidentiality was maintained.

**Statistical Analysis:** The statistical package for social sciences (SPSS ver.22) was used for data entry and analysis. Data were presented using: Descriptive statistics in the form of frequencies, percentages. Bivariate correlation analysis was used for assessment of the inter-relationships among quantitative variables.

**RESULTS**

The socio-demographic characteristics of Nurses in the study sample are described in table 1. Nurses' age ranged 21 and 35 years, with a mean ± SD 26.20±4.05. The majority were female (70%), married (57.5%), have children (60%), caring for sick or aged adult at home. Regards the level of nursing degree around 35% holding bachelor's degree and 42.5% having a technical degree, with years of experience ranging between 1 to16 year and mean±SD was 5.6 ±4.38.

Table 2 illustrates the Job status characteristics and professional errors, the total number of hours/week ranged between 48 to 72 hrs, with a mean ± SD 68.40 ±8.67. One-third of the study sample have a second shift at another institute (27.5%). Unfortunately, nurses acknowledge unintentionally they made many errors at night shift because of losing concentration-related not adequate sleep and continuous hours of work, around half of them drinking caffeine as a stimulant to be awake (50%).

PSQI Global Scores distribution ranged between 0 and 21, the higher score reflects the worse sleep quality, as figure 1 describes the nurses' sleep quality was worse and ranged between 14 to 20, the highest percentage (25%) located at PSQI score 17 and above PSQI score from 18 to 20 (41%).

Table 1: Nurses Demographic data

	n
<b>Age</b>	
21-25	20(50%)
26-30	18(45%)
31-35	2(5%)
<b>Mean ±SD</b>	26.20±4.05
<b>Gender</b>	
Male	12(30%)
Female	28(70%)
<b>Year of Experience</b>	
1-2 years	12(30%)
3-5 years	11(27%)
6-10 years	10(25%)
11-15 years	6(15%)
> 15 Years	1(2.5%)
<b>Mean ±SD</b>	5.6± 4.38
<b>Material status</b>	
Single	13(32.5%)
Married	23(57.5%)
Divorced	3(7.5%)
Widowed	1(2.5%)
<b>Level of education</b>	
Diploma	9(22.5%)
Institute	17(42.5%)
Bachelor	14(35%)
<b>Number of children</b>	
No child	16(40%)
One child	11(27.5%)
Two children	7(17.5%)
Three children	6(15%)
<b>Caring for sick or aged adults at home</b>	
Yes	23(57.5%)
No	17(42.5%)

Table 2: Job status characteristics and professional errors:

	n
<b>Number of hours per week</b>	
Minimum 48 hrs	6(15%)
Maximum 72 hrs	34(85%)
<b>Mean±SD</b>	68.40±8.67
<b>Have second shift at another institute</b>	
Yes	11(27.5%)
No	29(72.5%)
<b>Did error of mistake last during last two night shift?</b>	
Yes	26(65%)
No	14(35%)
<b>Did you harm yourself (accident or injury) during last two night shifts?</b>	
Yes	6(15%)
No	34(85%)
<b>Using stimulant to be awake</b>	
Caffeine	20(50%)
Chocolate	12(30%)
Stimulant drug	4(10%)
Nothing	4(10%)

Table 3: Relation between identified PSQI as assessed among nurses in the study sample and their professional error during night shift

	(mean±SD)	Min-Max
PSQI	17.27±1.66	14.00-20.00
Professional Error	1.35 ±0.48	1.00-2.00

P value<0.000\*

Mann-Whitney test: -12.500

The relation between identified of the Pittsburgh Sleep Quality Index (PSQI) as assessed among nurses in the study sample and their professional errors during the night shift is presented in table 3. Totally, the PSQI score ranged between 14.00 and 20.00, which means greater score means poor sleeper with a mean+ SD (17.27+ 1.66), it was statistically significant with professional errors. Table 4 describes the correlation matrix foregoing models, the significant correlation either positive or negative between the variables, which included in the matrix were

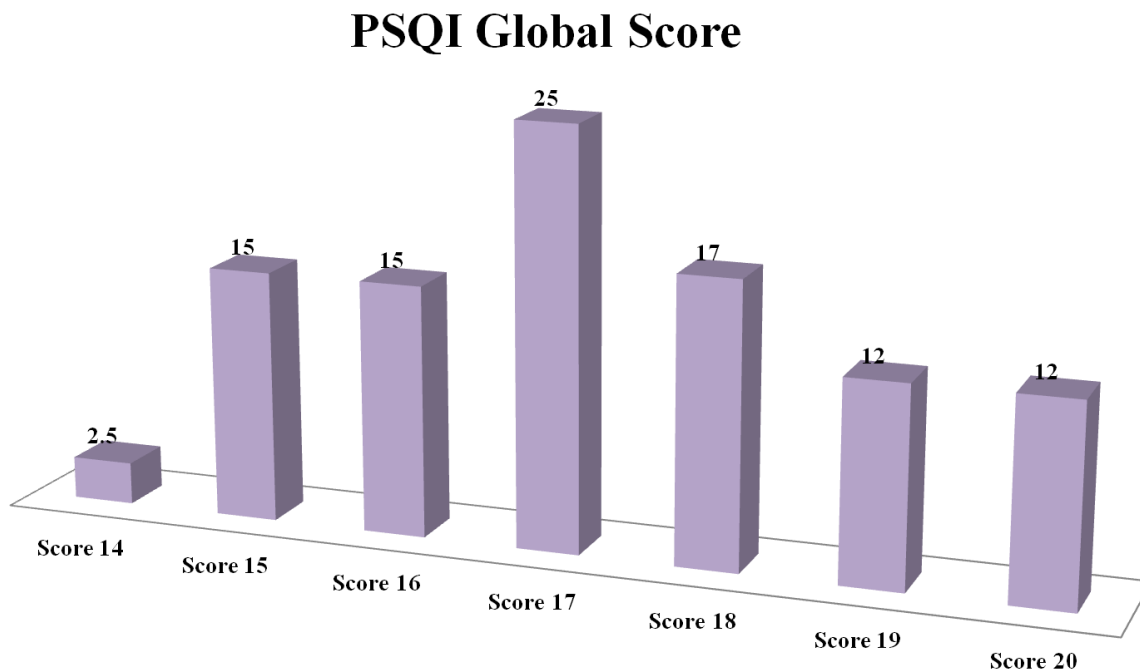
PSQI and its domains and nurses' professional error during the night shift. The table shows, positive significant correlation between PSQI score with subjective sleep quality (r=0.746), sleep latency(r=0.584), sleep duration(r=0.475), use of sleep medication (r=0.866). The inverse significant correlation showed between the professional errors with PSQI score (r=-0.761), subjective sleep quality (r=-0.519), sleep latency (r=-0.644), habitual sleep efficiency (r=-0.585).

Table 4: Correlation Matrix of between Global PSQI score and its domains with the professional errors

	PSQI	Subjective sleep quality	Sleep latency	Sleep duration	Habitual sleep efficiency	Use of sleep medication	Daytime dysfunction over the last month
PSQI							
Subjective sleep quality	r=.746** p>0.000						
Sleep latency	r=0.584** p>0.000	r=0.229 p>0.156					
Sleep duration	r=0.475** p>0.002	r=0.212 p>0.188	r=-0.160 p>0.324				
Habitual sleep efficiency	r=0.197 p>0.223	r=0.103 p>0.527	r=-0.018 p>0.912	r=-0.302 p>0.059			
Use of sleep medication	r=0.866** p>0.000	r=0.544** p>0.000	r=0.423** p>0.007	r=0.511** p>0.001	r=0.095 p>0.559		
Daytime dysfunction over the last month	r=-0.092 p>0.572	r=-0.053 p>0.745	r=-0.225 p>0.163	r=-0.353* p>0.026	r=-0.091 p>0.578	r=-0.301 p>0.059	
Professional Error	r=-0.761** p>0.000	r=-0.519** p>0.001	r=-0.644** p>0.000	r=-0.435** p>0.005	r=-0.585** p>0.000	r=-0.076 p>0.642	r=0.144 p>0.374

(Sleep disturbances domain is constant variable)

Figure 1: PSQI Global Scores



## DISCUSSION

Health care providers are working in different work shifts to cover 24 hours per day, however, the shift rotation, particularly that involving night shift causing desynchronization of circadian rhythms, thereby affect in many of normal physiological functions. This study assesses the impact of nurse's poor hygiene on work performance.

The present study was carried out on a convenience sample of 40 nurses. Although not randomly selected. Thus, nurses' mean age was about 26 years, the majority were female (70%), married (57.5%), have children (60%) and caring for sick or aged adults at home. These data are close to that reported by Gómez-García, et al. (2016) who have studied all nurses from different units in the seven hospitals<sup>13</sup>.

The quality of care is an important target for all health care facilities, however aforementioned study findings are agreement with Estabrooks, et al. (2009) who have done a systematic searching on 562 articles to address the effects of shift length on quality of care, and raised an issue related extended hours has been the potential impact on the quality of care and patient safety<sup>14</sup>.

In most health care facilities, nurses are the largest working group between health care provider play an important role to success the health care institution and covered day and night shifts to provide optimal nursing care for sick patients, analyses of the results of the present study have shown that the total number of hours/week ranged between 48 to 72 hours which clarify the long working hours and impact on the quality of care, in accordance with those reported by Estabrooks et al. (2009) have shown that the extended work hours has been the negative impact on the patient's outcomes<sup>14</sup>.

The foregoing present study finding concerning the sleep quality is in agreement with Geiger-Brown, Trinkoff, & Rogers, 2011; who have reported that nurses who work night shifts suffering from poor sleep quality<sup>15</sup>. Furthermore, a recent study done by Sun Q, Ji X, Zhou W, Liu J, 2019, addressed that the higher prevalence of sleep disturbance in shift nurses and based on this results suggested solutions as rescheduling of nurses work time, rest during a night shift, and behavioral intervention<sup>10</sup>.

In fact the sleep disturbance significantly effects on work performance and sequentially threaten patients' safety, in congruence with the present study findings, Miller et al. (2010) proved that the error done by nurses in the night shift was significantly higher than during day shift<sup>16</sup>. Moreover, Admi et al (2008) described that the night shift consequences and jet lag lead to sleep deprivation, headache upon awakenings and fatigue, whereas reported clinical errors influence the patients' safety<sup>17</sup>.

Moreover, Ramdan and Al Saleh (2014), reported that the significant relationship between sleep disturbance and professional errors in an intensive care unit in Saudi Arabia<sup>17</sup>. The present study findings are in line with the study of Gómez-García et al (2016), studied the nurses' sleep quality and found that the global sleep quality score was poor among night shift nurses<sup>13</sup>.

Findings with the global Score distribution, whereas 41% of the study sample reported poor quality of sleep, a similar finding was reported by Mueckes (2005) who have highlighted that nurses night shift have a decrease quantity, quality of sleep and sleep deprivation<sup>18</sup>.

Many published studies have shown the night working shift has a positive significance on nurse's job satisfaction and burnout<sup>19</sup>. Likewise, Killgore, Grugle and Balkin highlighted that the work environment as night shift can induce irritability, create bad moods, impaired communication skills, decrease the ability to cope<sup>20</sup>.

## CONCLUSION

Nurse's poor sleep hygiene is documented among night shift nurse and negatively impact on patients' quality care and safety. Unfortunately, nurses acknowledge unintentionally they made many errors at night shift because of lose concentration-related not adequate sleep and continuous hours of work. Whereas greater score means poor sleeper with a mean+ SD (17.27+ 1.66), it was statistically significant with professional errors.

**Recommendations:** On the basis of a literature review, the following strategies are recommended:

- Establish a night shift hospital policy for providing napping during night shift<sup>21</sup>
- Consider a flexible roster rotation<sup>10</sup>.
- Increase nurse awareness to sleep disturbance effectiveness and how to improve their sleep hygiene<sup>10</sup>.

**Conflict of Interest:** The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Acknowledgment:** We would like to express our sincere gratitude to all nurses who were accepted to participate in this study.

## REFERENCES:

1. Briançon-Marjollet A, Weiszenstein M, Henri M, Thomas A, Godin-Ribuot D, Polak J. The impact of sleep disorders on glucose metabolism: endocrine and molecular mechanisms. *Diabetology & Metabolic Syndrome* (2015) 7:25. DOI 10.1186/s13098-015-0018-3.
2. Boivin DB, Boudreau P. Impacts of shift work on sleep and circadian rhythms. *Pathol Biol* (2014);62:292–301.
3. Boissard P, Cartron D, Gollac M, et al. Time and work: duration of work. Dublin, Ireland: European Foundation for the Improvement of Living and Working Conditions, (2003). ISBN 92-897-0154-4.
4. Mueckes S. Effects of rotating night shifts: literature review. *J Adv Nurs* (2005) ;50:433–9.
5. Johnson AL, Jung L, Brown KC, Weaver MT, Richards KC . Sleep deprivation and error in nurses who work the night shift. *The Journal of Nursing Administration*. (2014); 44(1): 17-22.
6. Alemdar DK, Akas YY, Kelimeler A. Medical error types and causes made by nurses in Turkey, *TAF Preventive Medicine Bulletin*.(2013); 21(3): 307-314.
7. Ramadan MZ, Al-Saleh KS. The association of sleep deprivation on the occurrence of errors by nurses who work the night shift. *Current Health Sciences Journal*, (2014), 40(2): 97-103.

8. Richter K, Acker J, Adam S and Niklewski G. Prevention of fatigue and insomnia in shift workers—a review of non-pharmacological measures. *The EPMA Journal* (2016); 7:16.
9. Al-Harby NA. Medical Errors is still continues. Press release, (2007), available at <http://www.alriyadh.com/200702/18/article225849.html>.
10. Sun Q, Ji X, Zhou W, Liu J. Sleep Problems in Shift Nurses: A Brief Review and Recommendations at Both Individual and Institutional Levels. *J NursManag.* (2019). 27 (1), 10-18.
11. Worley S. The Extraordinary Importance of Sleep. *P&T.* (2018); Vol. 43 No. 12.
12. Buysse, D.J., Reynolds III, C.F., Monk, T.H., Berman, S.R., & Kupfer, D.J. The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Journal of Psychiatric Research.* (1989). 28(2), 193-213.
13. Gómez-García. T, Ruzafa-Martínez. M, Fuentelsaz-Gallego.G, Madrid J, Rol.M, Martínez-Madrid. M. Nurses' sleep quality, work environment and quality of care in the Spanish National Health System: observational study among different shifts. *BMJ Open* (2016);6:e012073.
14. Estabrooks A, Cummings G, Olivo S, Squires J, Giblin C, Simpson N. Effects of Shift Length on Quality of Patient Care and Health Provider Outcomes: Systematic Review. *Qual Saf Health Care.* (2009), 18 (3), 181-8.
15. Geiger-Brown, J., Trinkoff, A. M., & Rogers, V. E. The impact of work schedules, home, and work demands on self-reported sleep in registered nurses. *Journal of Occupational Environmental Medicine.* (2011).53, 303–307./doi.org/10.1097/JOM.0b013e31820c3f87
16. Miller AD, Piro CC, Rudisill CN, Bookstaver PB, Bair JD, Bennett CL. Nighttime and Weekend Medication Error Rates in an Inpatient Pediatric Population. *The Annals of Pharmacotherapy.* (2010) 44: 1739-1746.
17. 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? *Nursing Economics.* (2008); 26(4): 250-257.
18. Mueckes S. Effects of rotating night shifts: literature review. *J Adv Nurs* (2005);50:433–9.
19. Stimpfel AW, Sloane DM, Aiken LH. The longer the shifts for hospital nurses, the higher the levels of burnout and patient dissatisfaction. *Health Aff (Millwood)* (2012);31:2501–9.
20. Killgore WDS, Grugle NL, Balkin TJ. Gambling when sleep deprived: don't bet on stimulants. *Chronobiol Int* (2012);29:43–54.
21. Barthe B, Tirilly G, Gentil C, Toupin C. Job demands and resting and napping opportunities for nurses during night shifts: impact on sleepiness and self-evaluated quality of healthcare. *Ind Health.* (2016), 54 (2), 157-62.