

Assessment of the Sleep Quality among Female Nurses Working Night Shifts

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Abstract

Background: Sleep is vital, but issues are mounting. Sleep deprivation is dangerous for hospital nurses. This reduces nurse productivity and increases patient-harming medical mistakes. Shift work affects sleep and circadian rhythms; therefore, night shift female nurses' sleep is important. Nurses and patients lose sleep amid disturbances. **Objectives:** The study examined night-shift female nurses' sleep quality. **Methods:** A cross-sectional study was conducted in Dhaka Medical College's Physiology Department from January to December 2019 among 160 female nurses aged 24-50 who work night shifts from 8 p.m. to 8 a.m. in In-patient department of Medicine, Surgery, Obstetrics, and Gynecology. Pittsburg Sleep Quality Index and nurse demographics were obtained. After informed consent was signed, the individual was thoroughly questioned and recorded in the predesigned data form. Statistics were done with Excel and SPSS-26. **Results:** Mean BMI was 23.91 ± 1.64 kg/m², and systolic and diastolic blood pressures were 105.63 ± 11.10 and 69.94 ± 6.68 mmHg, respectively, without statistical significance ($p > 0.05$). The Pittsburgh Sleep Quality Index (PSQI) components showed significant results ($p < 0.001$), with mean scores for subjective sleep quality (1.09 ± 0.35), latency (1.95 ± 0.84), duration (1.77 ± 0.72), and additional parameters resulting in a mean global PSQI score of 7.94 ± 1.76 . Highest number of respondents were belonging to age group 31-40 and 68.75% were married and in medical wards (42.50%). The lowest sleep quality was seen in Obstetrics & Gynecological wards, with 54 nurses scoring over 5 on the global PSQI ($p < 0.001$). About 69% of nurses had a PSQI score > 5 , suggesting poor sleep quality, associated with age, marital status, and ward type ($p < 0.001$). **Conclusion:** Female nurses need sleep hygiene instruction, shift schedule adjustments, and stress management to sleep better. These obstacles affect nurses' well-being and care quality.

Keywords: High-stress, Circadian rhythms, Sleep quality, PSQI.

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INTRODUCTION

Nursing is an occupation that generally entails shift work since nurses must provide continuous health care around the clock. Shift employment disrupts normal circadian rhythms; therefore, nurses tend to suffer from a condition known as 'shift lag' and desynchrony [1]. Female nurses have also been found to have worse overall health and sleep problems than male nurses [2]. The healthcare industry is recognized for its demanding and high-stress work environment, where nurses play a critical role in patient care. Nurses often face irregular

work schedules, including rotating shifts, night shifts, and early morning shifts, which can significantly disrupt their circadian rhythms and impact their sleep quality. Among these, night shifts are particularly challenging as they often require nurses to wake up early, potentially leading to reduced sleep duration and impaired sleep quality.

Sleep is essential for maintaining both physical and mental health, and poor sleep quality is associated with various adverse outcomes, including increased risk of chronic illnesses, impaired cognitive function, and

decreased work performance. For female nurses, who often juggle both professional responsibilities and personal obligations, the challenge of achieving adequate and restorative sleep can be even more pronounced. Sleep deprivation is an essential predictor of the emergence of several chronic diseases such as hypertension, cardiovascular disease, and diabetes, thus both the quality and amount of sleep must be considered. However, as modern work has become more sophisticated, working hours have grown longer, and tasks that must be completed without interruption have increased, reducing people's sleep time and worsening their sleep quality [3]. Shift workers, in particular, have abnormal sleep patterns due to changes in work hours, and as a result, they suffer from a variety of health issues caused by irregular physiological rhythms [4]. It is vital to look at solutions because irregular sleep patterns can harm nurses' health and have a detrimental impact on their work [5].

Female sleep patterns influence the menstrual cycle (follicular phase, ovulation, luteal phase, and menstruation), pregnancy, postpartum recovery, and menopause [5]. Furthermore, female nurses can be influenced by environmental factors such as family obligations (household chores, childcare, etc.) and work stress, which can result in difficulty falling asleep, frequent awakening, premature awakening, unhealthy behaviors such as increased alcohol and sleep medication consumption, and mood disturbance. Furthermore, the inability to adapt to stressful schedules has been shown to affect adversely the job satisfaction of nurses in Bangladesh as well as in other countries, which may lead to change in career away from nursing [6].

The Pittsburg Sleep Quality Index (PSQI) is an important tool for subjective assessment of quality and pattern of sleep in adult population. It is developed by Buysse *et al.*, in 1989. It differentiates poor or good sleep by assessing seven areas of sleep. The areas are subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medication and daytime sleep dysfunction over the last month. The PSQI has 18 self-rated questions and seven components. The scoring of each component and question-answer are based on Likert Scale from 0-3 where 3 means negative extreme. The global PSQI Score is the summation of scores of seven components. It is ranging from 0 to 21. A Global PSQI Score 5 or above indicates poor sleep quality. The PSQI has internal consistency and reliability coefficient of 0.83 for its

seven components. It was translated into more than 56 languages [7].

Understanding the sleep quality of female nurses working night shifts is crucial, as poor sleep can affect not only their health and well-being but also their ability to provide optimal care to patients. Moreover, persistent sleep disturbances may lead to long-term health consequences, including burnout, depression, and cardiovascular issues [8]. This study aims to assess the sleep quality among female nurses working night shifts and to identify factors that may contribute to sleep disturbances in this population. By exploring the relationship between work schedules, workload, and sleep quality, this research seeks to provide insights that could inform strategies to improve the work environment and support the health and well-being of female nurses. Ultimately, such improvements could enhance both the quality of life for nurses and the quality of care provided to patients.

METHODOLOGY

This cross-sectional study was conducted in the Department of Physiology at Dhaka Medical College, Dhaka, from January 2019 to December 2019. 160 female nurses participated in the study, selected according to inclusion and exclusion criteria, with ages ranging from 24 to 50 years, who worked night shifts from 8 p.m. to 8 a. m in the In-Patient departments of various wards of Medicine, Surgery, Obstetrics and Gynecology. Upon obtaining consent and verifying eligibility requirements, data was gathered from female nurses regarding the factors of interest using a predesigned structured questionnaire via interview and observation. The study groups' BMI was calculated by measuring their height and body weight. The individuals' normal cardiovascular status was assessed by measuring their blood pressure and health status was examined through a complete history and clinical examination. The Bengali version of the Pittsburg Sleep Quality Index questionnaire was used to evaluate the sleep quality of the study participants. Statistical analyses of the data were conducted utilizing Microsoft Excel and Statistical Package for Social Sciences (SPSS-26).

RESULTS

This study was conducted to assess the sleep quality among 160 female nurses working night shifts in In-Patient departments of various wards of Medicine, Surgery, and Obstetrics and Gynecology by purposive sampling method.

Table-I: General characteristics of the night-shift nurses. (N=160)

Characteristics	Mean±SD	Range	p value
BMI (kg/m ²)	23.91±1.64	18.5-24.9	0.760 ^{ns}
Systolic pressure (mmHg)	105.63±11.10	90-130	0.761 ^{ns}
Diastolic pressure (mmHg)	69.94±6.68	60-90	0.342 ^{ns}

Table-I shows that the BMI range of the study subjects was 18.5–24.9 kg/m². The mean±SD BMI was 23.91±1.64 kg/m². The systolic blood pressure range of study subjects was from 90–130 mmHg. The mean±SD

systolic blood pressure was 105.63 ± 11.10 mmHg. And the diastolic blood pressure ranged from 60 to 90 mmHg. The mean±SD diastolic blood pressure was 69.94±6.68, which was not statistically significant.

Table II: Seven components and mean global scores of Pittsburgh Sleep Quality Index (PSQI) of the study subjects (N=160)

Parameters	Mean ±SD	Min-max	p value
Components of BPSQI			
Subjective sleep quality	1.09±0.35	(0-2)	<0.001***
Sleep latency	1.95±0.84	(0-3)	<0.001***
Sleep duration	1.77±0.72	(0-3)	<0.002***
Habitual sleep efficiency	0.26±0.44	(0-1)	<0.001***
Sleep disturbances	1.01±0.08	(0-2)	<0.001***
Daytime dysfunction	1.87±0.50	(0-2)	<0.001***
Global BPSQI score	7.94±1.76	(2-10)	<0.001***

Table II shows that seven components and mean global scores of the Bengali Pittsburgh sleep quality index (BPSQI). It was observed that the mean (± SD) scores of subjective sleep quality, sleep latency, sleep duration, Habitual sleep efficiency, Sleep

disturbances, Daytime dysfunction and Global BPSQI score were 1.09±0.35, 1.95±0.84, 1.77±0.72, 0.26±0.44, 1.01±0.08, 1.87±0.50, and 7.94±1.76, respectively. The p value was statistically significant (p<0.001).

Table-III: Age distribution of the study subject (N=160)

Age (years)	N=160	%	p value
24-30	50	31.26	
31-40	71	44.37	
41-50	39	24.37	
Total	160	100.0	
Age (years)	43.8±5.6	24-65	0.556 ^{ns}

Table III shows the age distribution of the study population. It was observed that 50 (31.26%) belonged to the age range of 24–30 years, 71 (44.37%) belonged

to the age range of 31–40 years, and 39 (24.37%) belonged to the age range of 41–50 years. The majority of the patients fell within the age range of 31–40 years.

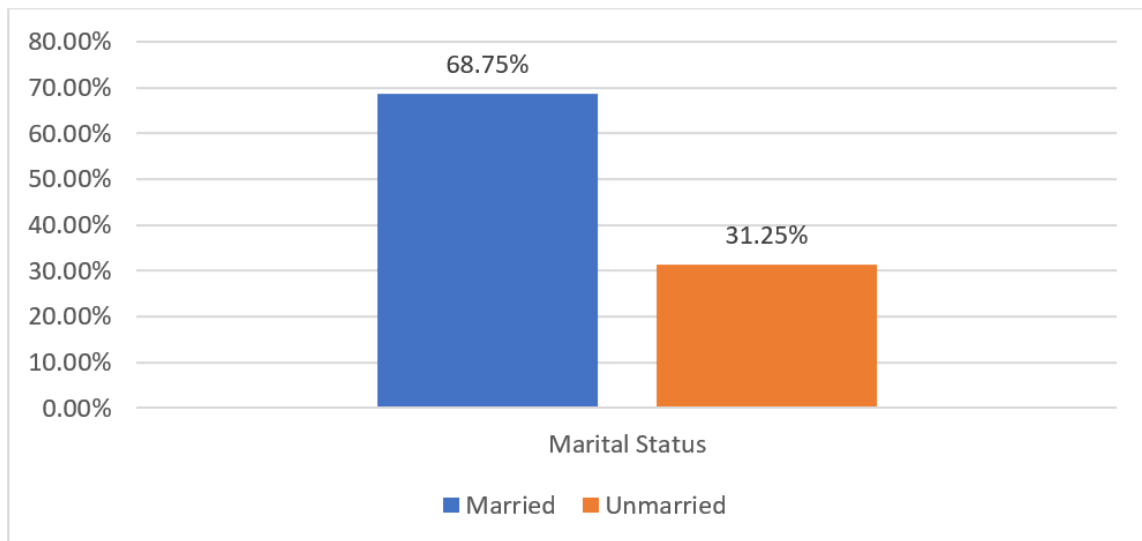


Fig I: Distribution of the Marital Status of study population (N=160)

Figure I show marital status of study population. It observed that, 110(68.75%) were married and 50(31.25%) were unmarried.

Table IV: Distribution of study population according to type of wards (N=160)

Type of ward/Unit	N=160	%
Medical ward	68	42.50
Surgical ward	50	31.25
Obstetrics & Gynecological ward	42	26.25

Table IV shows the distribution of the study population according to type of ward. It was observed that 68 (42.50%) were medical wards, 50 (31.25%) were

surgical wards, and 42 (26.25%) were Obstetrics & Gynecological wards.

Table-V: Distribution of study population according to Global BPSQI scores (N=160)

Categories	Global score <5	Global score >5	P value
Age group			
24-30	28	17	<0.001
31-40	21	13	
41-50	51	30	
Marital Status			
Married	33	48	<0.001
Unmarried	37	42	
Type of ward/Unit			
Medical ward	26	19	<0.001
Surgical ward	22	29	
Obstetrics & Gynecological ward	20	44	

Table V shows the distribution of the study population according to global BPSQI scores. It was observed that, on the basis of the original PSQI (English), scores less than '5' indicate good sleep quality and score '5' or above indicate poor sleep quality. In this study, according to age group, 28 had a Global score <5 and 17 had a Global score >5, with age group between 24 and 30. According to unmarried status, 37 had a Global score <5 and 42 had a Global score >5. And according to the Obstetrics & Gynecological Ward, 20 had a Global score <5 and 44 had a Global score >5. And the p value was statistically significant ($p<0.001$).

DISCUSSION

This cross-sectional study was carried out in the Department of Physiology, Dhaka Medical College, Dhaka. During one year of study period, total 160 female nurses were included in this study based on inclusion and exclusion criteria with age ranging 24-50 years who worked night shifts from 8 p.m. to 8 a.m. in outpatient departments and various wards of Medicine, Surgery, and Obstetrics and Gynaecology.

In this study, BMI range 18.5-24.9 Kg/m²; the range of systolic blood pressure 90-130mm of Hg and diastolic blood pressure range was 60-90 mm of Hg. Similar type of findings was observed by Al Shammari [9]. In this study, female was included as study subjects. Chien in Taiwan also included female as study subjects [10]. On the contrary, Sepehrmanesh conducted a study on both male and female nurses in Iran [11]. Female are more prone to anxiety and depression than male which may reflect the difference of poor sleep quality than male. Also, there are variations in physiological and psychological aspects between male and female. Female

has also more family pressure than male to take care of her family. Dong observed that female nurses had poor sleep quality than male [12].

In present study, the scores from seven PSQI components were utilized as study parameters to examine the sleep quality of Bangladeshi female nurses. The mean scores of seven components (excluding component 6) differed significantly between the two groups. The mean subjective sleep quality score was high, which was consistent with Aliyu's findings [13]. However, the score was lower than the findings obtained by Vijoykumar [14]. The mean sleep latency score was higher than Tarhan's findings [15]. On the contrary, the mean sleep duration score was consistent with the findings of Vijaykumar's study in India [16]. On the other hand, this score exceeded Lajoie's findings [17]. The prevalence rate of sleep duration score was comparable to score by Akbari [18]. The mean score of habitual sleep efficiency and prevalence rate were comparable to findings reported by Tarhan [15]. On the other, Lajoie *et al.*, found that mean score of sleep efficiency was higher than the finding of present study. The mean score of sleep disturbances was comparable to score observed by Tarhan but lower than the score reported by Lajoie. The prevalence rate of sleep disturbance was similar to the findings observed by Akbari [18]. In this study mean score of daytime dysfunctions was higher than other studies [13, 15]. The prevalence rate of day time dysfunction was lower than Boughattus [19]. The mean global BPSQI score in night shift nurses were comparable to findings reported by other researchers. Aliyu discovered a global PSQI score of 5.7 ± 2.7 in night shift nurses [13].

In current study, 44.37% belonged to the age range of 24–30 years. Another study conducted by Al Shammari where age range was 18-44 years [9]. Other studies showed that the age range of the nurses was predominantly constituted with adults from 31 to 40 years old, differently from the findings of this study. Age is an independent predictor of sleep quality. Tarhan revealed that the advanced age group had poorer sleep quality than the younger age group [15]. This could be attributed to diminished psychophysical adaptation to circadian desynchronization in shift work with older age. In our present study, according to marital status 110(68.75%) were married and 50(31.25%) were unmarried. On the contrary, 1571(56.8%) were single; 1023 (37.0%) were married and 164 (5.9%) were divorced in the study conducted by Sirinara [20].

In our study, 68(42.50%) were medical ward, 50(31.25%) were surgical ward, and 42(26.25) were Obstetrics & Gynecological ward. On the other hand, 77 nurses (43.3%) who worked in medical wards and the majority of nurses were unmarried (163 nurses, 91.6%) observed by Shao. [21] In our study according to global BPSQI scores, based on the original PSQI (English), values less than '5' indicate good sleep quality, whereas scores '5' or higher indicate poor sleep quality. In this study, according to age group, 28 had a Global score <5, and 17 had a Global score >5, with age group ranging from 24-30. According to unmarried status, 37 had a Global score <5, while 42 had a Global score >5. According to the Obstetrics & Gynecological Ward, 20 patients had a Global score <5, whereas 44 had a Global score >5.

The results of this study demonstrate that shift-working nurses' job happiness has an impact on their sleep quality. Nurses who are dissatisfied with their jobs are less likely to sleep well. Wang *et al.*, hypothesized that when nurses face difficult problems and obstacles at work, they may not only experience reduced job satisfaction but also exhibit physiological symptoms such as headaches and insomnia [22]. These circumstances may cause nurses to become tense or irritated, prompting their sympathetic nervous system to release epinephrine, norepinephrine, and cortisol, disrupting their biological clocks. Furthermore, hyperactive brain cells may restrict melatonin production in the pineal body, preventing sleep [23].

Limitations of the study

The present study was conducted in a very short period due to time constraints and funding limitations. The small sample size was also a limitation of the present study.

CONCLUSION

The assessment of sleep quality among female nurses working night shifts reveals several important findings. Night shifts were related with lower self-reported sleep duration and perceived sleep quality

among nurses. The effects of night shifts continued for several days during the recovery period, showing fatigue accumulation. It is crucial for healthcare institutions to consider implementing strategies that can help improve sleep quality among nurses. These may include offering flexible shift schedules, providing education on sleep hygiene, and creating a supportive work environment that acknowledges the challenges of shift work. Ensuring that nurses get adequate rest is essential not only for their health and well-being but also for the safety and quality of patient care.

RECOMMENDATION

This study can serve as a pilot to much larger research involving multiple centers that can provide a nationwide picture, validate regression models proposed in this study for future use and emphasize points to ensure better management and adherence.

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REFERENCE

- Berger, A. M. (2007). Impact of shift work on the health and safety of nurses and patients. *Number 4/August 2006, 10(4)*, 465-471.
- Admi, H., Tzischinsky, O., Epstein, R., Herer, P., & Lavie, P. (2008). Shift work in nursing: is it really a risk factor for nurses' health and patients' safety?. *Nursing economics, 26(4)*, 250.
- Åkerstedt, T., & Nilsson, P. M. (2003). Sleep as restitution: an introduction. *Journal of internal medicine, 254(1)*, 6-12.
- Son, Y. J., & Park, Y. R. (2011). Relationships between sleep quality, fatigue and depression on health promoting behavior by shift-work patterns in university hospital nurses. *Journal of Korean Biological Nursing Science, 13(3)*, 229-237.
- Baker, F. C., & Driver, H. S. (2007). Circadian rhythms, sleep, and the menstrual cycle. *Sleep medicine, 8(6)*, 613-622.
- Burch, J. B., Tom, J., Zhai, Y., Criswell, L., Leo, E., & Ogoussan, K. (2009). Shiftwork impacts and adaptation among health care workers. *Occupational medicine, 59(3)*, 159-166.
- Buysse, D. J., Reynolds III, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry research, 28(2)*, 193-213.
- Aiken, L. H., Clarke, S. P., Sloane, D. M., Sochalski, J. A., Busse, R., Clarke, H., ... & Shamian, J. (2001).

- Nurses' reports on hospital care in five countries. *Health affairs*, 20(3), 43-53.
9. Al Shammari, N. E., Alfaraj, M. H. A., Khallaf, S. A., Aljohani, S. S., & Al Eid, H. S. (2024). Sleep Quality among Saudi Nurses: Cross-Sectional Study. *Saudi J Nurs Health Care*, 7(2), 23-32.
 10. Chien, P. L., Su, H. F., Hsieh, P. C., Siao, R. Y., Ling, P. Y., & Jou, H. J. (2013). Sleep quality among female hospital staff nurses. *Sleep disorders*, 2013(1), 283490.
 11. Sepehrmanesh, Z., Mousavi, G., Saberi, H., & Saei, R. (2017). Sleep quality and related factors among the nurses of the Hospital of Kashan University of Medical Sciences, Iran. *International Archives of Health Sciences*, 4(1), 17-21.
 12. Dong, H., Zhang, Q., Sun, Z., Sang, F., & Xu, Y. (2017). Sleep disturbances among Chinese clinical nurses in general hospitals and its influencing factors. *BMC psychiatry*, 17, 1-9.
 13. Aliyu, I., Ibrahim, Z. F., Teslim, L. O., Okhiwu, H., Peter, I. D., & Michael, G. C. (2017). Sleep quality among nurses in a tertiary hospital in North-West Nigeria. *Nigerian postgraduate medical journal*, 24(3), 168-173.
 14. Vijaykumar, N., Kiran, S., & Karne, S. L. (2018). Influence of altered circadian rhythm on quality of sleep and its association with cognition in shift nurses. *National Journal of Physiology, Pharmacy and Pharmacology*, 8(5), 643-643.
 15. Tarhan, M., Aydin, A., Ersoy, E., & Dalar, L. (2018). The sleep quality of nurses and its influencing factors. *Eurasian Journal of Pulmonology*, 20(2), 78.
 16. Vijaykumar, N., Kiran, S., & Karne, S. L. (2018). Influence of altered circadian rhythm on quality of sleep and its association with cognition in shift nurses. *National Journal of Physiology, Pharmacy and Pharmacology*, 8(5), 643-643.
 17. Lajoie, P., Aronson, K. J., Day, A., & Tranmer, J. (2015). A cross-sectional study of shift work, sleep quality and cardiometabolic risk in female hospital employees. *BMJ open*, 5(3), e007327.
 18. Akbari, V., Hajian, A., & Mirhashemi, M. S. (2016). Evaluating of sleep quality in shift-work nurses. *Iran J Sleep Disord Ther*, 5(225), 2167-0277.
 19. Boughattas, W., Maalel, O. E., Chikh, R. B., Maoua, M., Houda, K., Braham, A., ... & Mrizak, N. (2014). Hospital night shift and its effects on the quality of sleep, the quality of life, and vigilance troubles among nurses. *International Journal of Clinical Medicine*, 5(10), 572-583.
 20. Sirinara, P., Hanprathet, N., Pongpirul, K., & Jiamjarasrangsri, W. (2019). Impact of shift work on sleep quality among nursing staff. *Chulalongkorn Medical Journal*, 63(4), 221-227.
 21. Shao, M. F., Chou, Y. C., Yeh, M. Y., & Tzeng, W. C. (2010). Sleep quality and quality of life in female shift-working nurses. *Journal of advanced nursing*, 66(7), 1565-1572.
 22. Wang, Y., Xie, J., Yang, F., Wu, S., Wang, H., Zhang, X., ... & Yu, S. (2015). Comorbidity of poor sleep and primary headaches among nursing staff in north China. *The Journal of Headache and Pain*, 16, 1-6.
 23. Šimunić, A., & Gregov, L. (2012). Conflict between work and family roles and satisfaction among nurses in different shift systems in Croatia: a questionnaire survey. *Arhiv za higijenu rada i toksikologiju*, 63(2), 189-196.