INTERNATIONAL JOURNAL OF RESEARCH IN PSYCHIATRY

P-ISSN: 2789-1623
E-ISSN: 2789-1631
IJRP 2023; 3(2): 06-11
Received: 11-06-2023
Accepted: 18-07-2023

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Impact of shift work on sleep and quality of life among nurses

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DOI: https://doi.org/10.22271/27891623.2023.v3.i2a.44

Abstract
Context: Shift work is known to affect the circadian rhythm causing sleepiness when wakefulness is required. Sleep disturbances and inadequate sleep quality resulting from shift work can contribute to physical and mental health problems in nurses, affecting their overall quality of life.
Aim: To examine the impact of shift work on sleep and quality of life among nurses.
Settings and Design: This was a cross-sectional observational study conducted among nursing staff at a tertiary care hospital.
Methods and Materials: Insomnia Severity Index, Pittsburgh Sleep Quality Index, Epworth Sleepiness Scale, and WHO Quality of Life Scale were applied on shift work nurses (SWN) and nonshift work nurses (NSWN).
Statistical analysis used: Data was analyzed using Fisher Exact and Chi-Square tests.
Results: Insomnia and poor sleep quality were reported by 71.6% and 73.3% of SWN, respectively. A significant association was observed between severity of insomnia and quality of sleep (p=<0.001), severity of insomnia and excessive daytime sleepiness (p=0.007) among SWN. Significantly lower scores on the psychological well-being, social interaction, and environmental satisfaction domains of the WHOQOL-BREF were reported among SWN.
Conclusion: Shift work nurses experienced severe insomnia symptoms, poorer sleep quality, and lower quality of life when compared to non-shift work nurses.
Key messages: Awareness on sleep hygiene can empower SWN to manage challenges. Interventions to mitigate the effects of shift work would contribute to a healthier nursing workforce.

Keywords: Shift work nurses, insomnia, sleep quality, quality of life

Introduction

In the dynamic realm of healthcare, nurses play a pivotal role in providing around-the-clock patient care and ensuring the well-being of patients. However, the demanding nature of their profession often requires them to engage in irregular and prolonged shifts, challenging the natural circadian rhythm. Shift work, characterized by irregular and extended working hours, has become an indispensable component of healthcare delivery. Nurses, as frontline caregivers, frequently bear the brunt of these unconventional schedules, disrupting their natural circadian rhythms.

Although there is no universal definition of "shift work," it is known as working outside of a typical 9 a.m. to 5 p.m. workday and is common for one-fifth of workers worldwide [1]. Shift work is critical in today's industrialized economy, particularly in healthcare and other service sectors where 24-hour access and service are expected. Shift work disrupts the sleep-wake cycle/circadian rhythm and its synchrony with other endogenous biological rhythms that can cause sleepiness when wakefulness is required and insomnia during the main sleep period [2]. Shift work also has the potential to disrupt family and social life, as well as to cause chronic fatigue, somatic symptoms, and sleep problems because it frequently contradicts the diurnal human rhythmic timing system [3].

The pivotal role of sleep in maintaining physical and mental health is universally acknowledged. However, the disruption caused by shift work can lead to sleep deprivation and irregular sleep patterns, posing a significant challenge to the overall health and well-being of nurses. Sleep disturbances and inadequate sleep quality resulting from shift work can contribute to physical and mental health problems, including a reduction in activity and

consciousness levels, fatigue, increased risk of accidents, mood disturbances, and higher rates of anxiety and depression, thereby affecting the overall quality of life of shift work nurses [4].

The complex fabric of shift work can have adverse effects on the overall quality of life of nurses. In the relentless pursuit of patients' wellness, nurses find themselves navigating an intricate balance between providing optimal patient care and safeguarding their well-being. The ramifications of such work schedules on the overall quality of life experienced by shift work nurses were underlined by Al-Hrinat J *et al*. who demonstrated that night shift work can adversely affect nurses' health and well-being, highlighting sleep disturbances as a key mediator in this relationship [5].

As contemporary healthcare systems continue to evolve, understanding and addressing these challenges becomes imperative to ensure the well-being of those who tirelessly dedicate themselves to the noble cause of patient care. Thus, this research aims to study the impact of shift work on sleep and quality of life among nurses.

Materials and Methods

The present study was a cross-sectional study conducted among nurses of a tertiary care hospital over 3 months between 1 Jan 2023 and 31 Mar 2023, after obtaining institutional ethical clearance.

Written informed consent was obtained from all participants after introducing them to the purpose of the research, confidentiality and personal data protection are guaranteed, assuring them of the voluntary nature of research participation. Nurses between 18 and 55 years of age, willing to give informed consent were included after excluding those who were currently pregnant and those with a history of chronic medical illnesses such as diabetes mellitus, hypertension, hypothyroidism, and connective tissue disorders.

Nurses who were specifically assigned to shift work for 3 months were grouped under Shift work nurses (SWN) while the nurses who were on general day duty (8 am to 4 pm) for an equivalent duration of 3 months were grouped under Nonshift work nurses (NSWN). The study sampled 60 nurses in each group by purposive sampling.

Socio-demographic data was obtained including age, socioeconomic status, marital status, and family type. Social support and a family history of psychiatric illness were also recorded.

Insomnia severity index (ISI), Pittsburgh sleep quality index (PSQI), Epworth sleepiness scale (ESS) and World Health Organisation Quality of Life Scale (WHOQOL-BREF) were used to assess insomnia, quality of sleep, daytime sleepiness, and quality of life, respectively.

The Insomnia severity index (ISI) is a 7-item self-report questionnaire assessing the nature, severity, and impact of insomnia. The recall period is the "last month" and the dimensions evaluated are: severity of sleep onset, sleep maintenance, early morning awakening problems, sleep dissatisfaction, interference of sleep difficulties with daytime functioning, noticeability of sleep problems by others, and distress caused by the sleep difficulties. A 5-point Likert scale is used to rate each item (0 = no problem; 4 = very severe problem), yielding a total score ranging from 0 to 28. A total score between 0-7 is interpreted as the absence of insomnia, 8-14 as sub-threshold insomnia, 15-21 as moderate insomnia, and 22-28 as severe insomnia [6]. A study by Bastien CH *et al*. reported adequate psychometric properties for the English version of the questionnaire [7].

The Pittsburgh Sleep Quality Index (PSQI) is a 19-item questionnaire evaluating sleep quality and disturbances over the past month. The first 4 items are open questions, whereas items 5 to 19 are rated on a 4-point Likert scale. Individual item scores yield 7 components. A total score, ranging from 0 to 21, is obtained by adding the 7 component scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. A score > 5 suggests poor sleep quality. It has a diagnostic sensitivity of 89.6% and a specificity of 86.5% in distinguishing good and poor sleepers [8].

The Epworth sleepiness scale (ESS) is a self-administered questionnaire with 8 questions that measure daytime sleepiness. Respondents are asked to rate, on a 4-point scale (0-3), their usual chances of dozing off or falling asleep while engaged in eight different activities. The ESS score (the sum of 8 item scores) can range from 0 to 24. Higher scores indicate higher daytime sleepiness. Scores between 0-5 indicate lower normal daytime sleepiness, 6-10 normal daytime sleepiness, 11-12 mild excessive daytime sleepiness, 13-15 moderate excessive daytime sleepiness, and 16-24 severe excessive daytime sleepiness [9]. The questionnaire had a high level of internal consistency as measured by Cronbach's alpha (0.88) [10].

The World Health Organisation Quality of Life Scale (WHOQOL-BREF) is a 26-item version of the WHOQOL-100 assessment. It consists of four domains related to quality of life: physical health (7 items), psychological health (6 items), social relationships (3 items), and environmental health (8 items); it also contains one facet on overall quality of life and general health. Each item is scored from 1 to 5 on a five-point ordinal scale. The scores are then transformed linearly to a 0-100 scale. Higher scores indicate better quality of life. Analyses of internal consistency, discriminant validity and construct validity through confirmatory factor analysis, indicate that the WHOQOL-BREF has good to excellent psychometric properties of reliability and validity [11].

Data was entered in Microsoft Excel and analyzed with Statistical Package for Social Sciences (SPSS) software version 26.0 using appropriate statistical tests. P value ≤ 0.05 was taken as statistically significant.

Results

The study included an equal number of shift work nurses (*n*=60; 50.0%) and non-shift work nurses (*n*=60; 50.0%).

The mean age of the participants was 31.62 years (SD = 8.29). Majority of the shift work nurses (SWN) and non-shift work nurses (NSWN) were between 18-30 years of age (*n*=32; 53.3% in each group), married (SWN: *n*=43; 71.7%, NSWN: *n*=42; 70.0%), belonged to nuclear families (SWN: *n*=41; 68.3%, NSWN: *n*=46; 76.7%) and were from middle socioeconomic status (*n*=56; 93.3% in each group) and reported satisfactory social support (SWN: *n*=59; 98.3%, NSWN: *n*=57; 95.0%). Additionally, 10.0% (*n*=6) of the SWN and 5.0% (*n*=3) of the NSWN had a family history of psychiatric illness, as depicted in Table 1.

A significantly higher proportion of SWN scored high on the Insomnia severity index, as compared to NSWN. About 46.7% (*n*=28) of SWN and 16.7% (*n*=10) of NSWN

reported sub threshold insomnia, while moderate insomnia was reported by 23.3% (*n*=14) of SWN and 11.7% (*n*=7) of NSWN. Severe insomnia was reported by 1.7% (*n*=1) and 8.3% (*n*=5) of SWN and NSWN, respectively. Scores on the Pittsburgh Sleep Quality Index found 73.3% (*n*=44) of SWN and 51.7% (*n*=31) of NSWN to be poor sleepers. Mild excessive daytime sleepiness on the Epworth sleepiness scale was reported by 31.7% (*n*=19) of SWN and 35.0% (*n*=21) NSWN, moderate excessive daytime sleepiness by 35.0% (*n*=21) SWN and 18.3% (*n*=11) NSWN, while severe excessive daytime sleepiness was reported by 5.0% (*n*=3) and 6.7% (*n*=4) of SWN and NSWN, respectively, as shown in Table 1.

A statistically significant association was observed between the severity of insomnia and quality of sleep among SWN (χ^2=14.837; p=<0.001), as shown in Table 2. Those without insomnia (classified as "No insomnia" on the ISI) demonstrated better sleep quality, while nurses with higher severity of insomnia (Classified as "Moderate" and "Severe") had poorer sleep quality.

No significant association was found between excessive daytime sleepiness and quality of sleep among SWN (χ^2=4.802; p=0.204), as depicted in Table 3. Differences observed between variations in daytime sleepiness levels across different categories of sleep quality were not statistically significant.

A significant association was observed between the severity of insomnia and excessive daytime sleepiness among SWN (χ^2=22.069; p=0.007), as shown in Table 4. SWN without insomnia (classified as "No insomnia" on the ISI) showed a range of excessive daytime sleepiness levels on the ESS, with a significant proportion experiencing mild and excessive daytime sleepiness. SWN with higher severity of insomnia (classified as "Moderate" and "Severe") tended to have higher levels of daytime sleepiness.

Significant differences were observed in specific domains of the WHOQOL-BREF to assess the quality of life among SWN and NSWN, as depicted in Table 5. Psychological well-being domain: Shift work nurses reported significantly lower scores in the psychological quality of life domain (p=0.001), indicating poor mental well-being and excessive stress compared to NSWN. Social interaction domain: Shift work nurses reported significantly poor social quality of life (p=0.04), suggesting less social interactions and lower support within their social circles when compared to NSWN. Environmental satisfaction domain: Shift work nurses perceived significantly lower environmental quality of life (p=0.021), reflecting potential dissatisfaction with their work environment, when compared to NSWN. No statistically significant differences in the physical quality of life domain between the two groups were observed (p=0.921).

Table 1: Sample characteristics

Variable		SWN (n=60)	NSWN (n=60)	p value
Mean age		30.68±7.19	32.55±9.23	0.399
Age	18-30 years	32 (53.3%)	32 (53.3%)	0.856
	31-40 years	22 (36.7%)	20 (33.3%)	
	41-50 years	4 (6.7%)	3 (5.0%)	
	51-60 years	2 (3.3%)	4 (6.7%)	
	61-70 years	0 (0.0%)	1 (1.7%)	
Socioeconomic status	Upper	2 (3.3%)	2 (3.3%)	1.000
	Middle	56 (93.3%)	56 (93.3%)	
	Lower	2 (3.3%)	2 (3.3%)	
Marital status	Single	16 (26.7%)	17 (28.3%)	1.000
	Married	43 (71.7%)	42 (70.0%)	
	Divorced	1 (1.7%)	1 (1.7%)	
Family type	Nuclear	41 (68.3%)	46 (76.7%)	0.307
	Joint	19 (31.7%)	14 (23.3%)	
Social support	Satisfactory	59 (98.3%)	57 (95.0%)	0.619
	Unsatisfactory	1 (1.7%)	3 (5.0%)	
Family history of psychiatric illness	Yes	6 (10.0%)	3 (5.0%)	0.491
Insomnia severity index (ISI)	No	17 (28.3%)	38 (63.3%)	<0.001
	Subthreshold	28 (46.7%)	10 (16.7%)	
	Moderate	14 (23.3%)	7 (11.7%)	
	Severe	1 (1.7%)	5 (8.3%)	
Pittsburgh Sleep Quality Index (PSQI)	Good sleepers	16 (26.7%)	29 (48.3%)	0.014
	Poor sleepers	44 (73.3%)	31 (51.7%)	
Epworth Sleepiness Scale (ESS) - Daytime sleepiness	Normal	17 (28.3%)	24 (40.0%)	0.206
	Mild excessive	19 (31.7%)	21 (35.0%)	
	Moderate excessive	21 (35.0%)	11 (18.3%)	
	Severe excessive	3 (5.0%)	4 (6.7%)	

* *p*<0.05 is statistically significant

Table 2: Association between severity of insomnia and sleep quality among shift work nurses

Insomnia Severity Index	Pittsburgh Sleep Quality Index			Fisher's Exact Test	
	Good	Poor	Total	χ^2	p value
No	10 (62.5%)	7 (15.9%)	17 (28.3%)	14.837	<0.001
Subthreshold	6 (37.5%)	22 (50.0%)	28 (46.7%)		
Moderate	0 (0.0%)	14 (31.8%)	14 (23.3%)		
Severe	0 (0.0%)	1 (2.3%)	1 (1.7%)		
Total	16 (100.0%)	44 (100.0%)	60 (100.0%)		

p<0.05 is statistically significant

Table 3: Association between sleep quality and daytime sleepiness among shift work nurses

Pittsburgh Sleep Quality Index	Epworth Sleepiness Scale					Fisher's Exact Test	
	Normal	Mild excessive	Moderate excessive	Severe excessive	Total	χ^2	p value
Good	7 (41.2%)	6 (31.6%)	3 (14.3%)	0 (0.0%)	16 (26.7%)	4.802	0.204
Poor	10 (58.8%)	13 (68.4%)	18 (85.7%)	3 (100.0%)	44 (73.3%)		
Total	17 (100.0%)	19 (100.0%)	21 (100.0%)	3 (100.0%)	60 (100.0%)		

$p<0.05$ is statistically significant

Table 4: Association between severity of insomnia and daytime sleepiness among shift work nurses

Insomnia Severity Index	Epworth Sleepiness Scale					Fisher's Exact Test	
	Normal	Mild excessive	Moderate excessive	Severe excessive	Total	χ^2	p value
No	7 (41.2%)	4 (21.1%)	6 (28.6%)	0 (0.0%)	17 (28.3%)	22.069	0.007
Subthreshold	9 (52.9%)	13 (68.4%)	6 (28.6%)	0 (0.0%)	28 (46.7%)		
Moderate	1 (5.9%)	2 (10.5%)	8 (38.1%)	3 (100.0%)	14 (23.3%)		
Severe	0 (0.0%)	0 (0.0%)	1 (4.8%)	0 (0.0%)	1 (1.7%)		
Total	17 (100.0%)	19 (100.0%)	21 (100.0%)	3 (100.0%)	60 (100.0%)		

$p<0.05$ is statistically significant

Table 5: Differences in mean scores across various domains of the WHOQOL-BREF among SWN and NSWN

Domains		Mean	S. D	p value
Physical	SWN	112.50	21.03	0.921
	NSWN	111.98	34.49	
Psychological	SWN	80.94	25.61	0.001*
	NSWN	96.35	24.39	
Social	SWN	45.00	15.39	0.04*
	NSWN	51.46	18.57	
Environmental	SWN	127.81	28.80	0.021*
	NSWN	142.71	40.05	

$p<0.05$ is statistically significant

Discussion

The present study was conducted to examine the impact of shift work on sleep and quality of life among nurses.

In this study, out of the total sample size of 120 participants, 60 were nurses on shift work, while the remaining 60 followed a general shift schedule. The study does not identify any statistically significant differences between SWN and NSWN in terms of the sociodemographic parameters measured. A study by Lin SH and colleagues in China underscored the multifaceted nature of the impact of shift work on nurses, identifying age, shift type, and job satisfaction as critical determinants influencing sleep quality among shift work nurses [12].

In the present study, nurses working shifts had higher levels of subthreshold and moderate insomnia compared to their nonshift counterparts. The study also suggests that shift work nurses generally experience poorer sleep quality compared to general shift nurses, which is supported by the significantly higher proportion of shift work nurses falling into the "poor" category of the Pittsburgh Sleep Quality Index (PSQI) compared to general shift nurses. Studies reported that sleep disturbances are prevalent among nurses who work shifts, with common complaints including insomnia, poor sleep quality, excessive daytime sleepiness, and decreased overall quality of life [13, 14, 15, 16].

A study by Shao MF *et al*. found that nurses who worked rotating shifts or shifts with short recovery time were particularly at risk of experiencing poor sleep quality [17]. According to the study by McDowall K *et al*., nurses engaged in shift work displayed a higher prevalence of poor sleep quality compared to those working regular hours (78% and 59% in SWN and NSWN, respectively), and shift work is the only significant association with poor sleep quality when controlling for other variables [2].

Complementary to these findings, Alshahrani SM *et al*. in their study among healthcare professionals observed that shift workers had significantly poorer sleep quality than day workers, as assessed on the PSQI [18]. One crucial aspect that emerges from the literature is the disruption of circadian rhythms caused by irregular work schedules. The circadian system plays a fundamental role in regulating sleep-wake cycles and other physiological processes [2]. A study by Wu X *et al*. highlighted the significance of maintaining a stable circadian rhythm for optimal sleep quality and overall well-being among nurses [19]. The studies by Shao MF *et al*. and Roman P *et al*. advocate a paradigm shift within healthcare institutions, urging the prioritization of nurses' well-being [17, 20]. This strategic approach emphasizes the provision of robust support systems and resources to equip nurses with the requisite tools to navigate the intricacies of shift work and to uphold optimal sleep hygiene practices.

There was no significant difference in the distribution of the Epworth Sleepiness Scale (ESS) scores between nurses in the shift work and general shift schedules. This suggests that both groups did not experience differences in the levels of excessive daytime sleepiness, despite the differences in insomnia severity and sleep quality. In the study by Westwell A *et al*., more than 25% of nurses and midwives with shift work patterns reported excessive daytime sleepiness [21]. Tiwari V *et al*. and Harlynadia E *et al*. also showed that shift work and excessive daytime sleepiness are directly related to each other [22, 23]. Furthermore, the consequences of excessive daytime sleepiness extend beyond the individual nurse to impact patient care, correlating well with safety issues relating to work [21]. This emphasizes the urgent need for healthcare institutions to address the implications of shift work on their nursing staff, not only for the well-being of the nurses but also to ensure patient safety.

In addition to sleep disturbances, the impact of shift work extends beyond the physiological realm and extends to the mental and emotional aspects of a nurse's life. Shift work nurses in the present study reported significantly lower scores on the psychological well-being, social interaction, and environmental satisfaction domains of the WHOQOL-BREF indicating an overall lower quality of life, as compared to nonshift work nurses. In line with these findings, Ferri P *et al*. identified shift work as a significant factor contributing to decreased quality of life among nurses

[24]. The findings by Al-Hrinat J *et al*. align with other research in the field, demonstrating that shift work can adversely affect nurses' health and well-being [5]. On the contrary, Warsame S recorded in her study, notably higher scores on the WHOQOL-BREF and concluded that shift work was not a significant predictor in determining nurses' quality of life. She further delved into how nurses work around their unnatural work schedules and continue to adapt to night shifts while maintaining their quality of life outside of work [25]. Various studies conducted globally found a consistent association between shift work and decreased overall quality of life among nurses, emphasizing the universality of this issue [13, 15, 20]. While individual differences and preferences play an important role in adjusting to shift work, the possible impact of shift work on nurses should not be overlooked. These findings on the multifaceted consequences of irregular work hours in the healthcare sector underscore the need to address the implications of shift work on the well-being of nurses, who play a pivotal role in patient care.

This is one of the very few studies addressing sleep and quality of life among nurses, particularly in the southern part of India. The study employed standardized and well-validated questionnaires for the assessments of nurses' experiences and perceptions. However, it was conducted at a single center, which may limit the generalizability of the findings to nurses in other healthcare settings.

Conclusion

The current study supports the notion that shift work has a significant impact on sleep quality and overall quality of life among nurses. Most of the NSWN reported subthreshold insomnia, while SWN suffered moderate to severe insomnia. Quality of sleep was generally poor among SWN, and many of them reported excessive daytime sleepiness. SWN scored low on the psychological well-being, social interaction, and environmental satisfaction domains of the WHOQOL-BREF indicating an overall lower quality of life. These findings emphasize the intricate interplay between shift schedules and various domains of nurses' quality of life, underscoring the need for targeted interventions at both individual and institutional levels, not only to enhance the overall well-being of nurses working different shifts but also to maintain high standards of patient care.

Conflict of Interest

Not available.

Financial Support

Not available.

References

1. McMenamin TM. A time to work: Recent trends in shift work and flexible schedules. Mon Labor Rev. 2007 Dec;130(12):3-15.
2. McDowall K, Murphy E, Anderson K. The impact of shift work on sleep quality among nurses. Occup. Med. (Lond). 2017 Dec;67(8):621-625.
3. Alanazi BG, Alshagraawi SA, Alobaidi IM, Alturki N, Kofi M. Impact of Shift Work on Sleep and the Quality of Life of Healthcare Workers in a Tertiary Hospital, Saudi Arabia. J Family Med Prim Care. 2022 Apr [cited 2023 May 27];6(2):176. Available from: https://doi.org/10.29011/2688-7460.100076. DOI: 10.29011/2688-7460.100076.
4. Bazrafshan M, 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 Jan [cited May 27];8(1):e81185. Available from: https://doi.org/10.5812/jjcdc.81185. DOI:10.5812/jjcdc.81185.
5. Al-Hrinat J, Al-Ansi AM, Hendi A, Adwan G, Hazaimeh M. The impact of night shift stress and sleep disturbance on nurses quality of life: case in Palestine Red Crescent and Al-Ahli Hospital. BMC Nurs. 2024 Jan [cited Jun 3];23(1):24. Available from: https://doi.org/10.1186/s12912-023-01673-3. DOI:10.1186/s12912-023-01673-3.
6. Morin CM, Belleville G, Bélanger L, Ivers H. The Insomnia Severity Index: Psychometric indicators to detect insomnia cases and evaluate treatment response. Sleep. 2011 May;34(5):601-608.
7. Bastien CH, Vallières A, Morin CM. Validation of the Insomnia Severity Index as an outcome measure for insomnia research. Sleep Med. 2001 Jul;2(4):297-307.
8. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. Psychiatry Res. 1989 May;28(2):193-213.
9. Johns MW. A new method for measuring daytime sleepiness: The Epworth Sleepiness Scale. Sleep. 1991 Dec;14(6):540-545.
10. Johns MW. Reliability and factor analysis of the Epworth Sleepiness Scale. Sleep. 1992 Aug;15(4):376-381.
11. Skevington SM, Lotfy M, O'Connell KA; WHOQOL Group. The World Health Organization's WHOQOL-BREF quality of life assessment: psychometric properties and results of the international field trial. A report from the WHOQOL group. Qual. Life Res. 2004 Mar;13(2):299-310.
12. Lin SH, Liao WC, Chen MY, Fan JY. The impact of shift work on nurses' job stress, sleep quality and self-perceived health status. J Nurs. Manag. 2014 Jul;22(5):604-612.
13. Dai C, Qiu H, Huang Q, Hu P, Hong X, Tu J, *et al*. The effect of night shift on sleep quality and depressive symptoms among Chinese nurses. Neuropsychiatr. Dis Treat. 2019 Feb [cited 6 Jun 2023];15:435-440. Available from: https://pubmed.ncbi.nlm.nih.gov/30799922/. DOI: 10.2147/NDT.S190689.
14. Lee LJ, Wehrlen L, Ding Y, Ross A. Professional quality of life, sleep disturbance and health among nurses: A mediation analysis. Nurs. Open. 2022 Nov;9(6):2771-2780.
15. Selvi Y, Güzel Özdemir P, Özdemir O, Aydın A, Beşiroğlu L. Influence of night shift work on psychologic state and quality of life in health workers. Dusunen Adam: J Psychiatry Neurol. Sci. 2010 Dec;23(4):238-243.
16. Dong H, Zhang Q, Sun Z, Sang F, Xu Y. Sleep disturbances among Chinese clinical nurses in general hospitals and its influencing factors. BMC Psychiatry. 2017 Jul [cited 6 Jun 2023];17(1):241. Available from: https://doi.org/10.1186%2Fs12888-017-1402-3. DOI: 10.1186/s12888-017-1402-3.

17. Shao MF, Chou YC, Yeh MY, Tzeng WC. Sleep quality and quality of life in female shift-working nurses. J Adv. Nurs. 2010 Jul;66(7):1565-1572.
18. Alshahrani SM, Baqays AA, Alenazi AA, AlAngari AM, AlHadi AN. Impact of shift work on sleep and daytime performance among health care professionals. Saudi Med J. 2017 Aug;38(8):846-851.
19. Wu X, Lu Y, Xie X, Chen R, Zhang N, Zhou C, *et al*. Association between circadian rhythm and sleep quality among nursing interns: A latent profile and moderation analysis. Front. 2022 Nov [cited 7 Jun 2023];16:995775.
Available from:
https://doi.org/10.3389/fnins.2022.995775.
DOI: 10.3389/fnins.2022.995775.
20. Roman P, Perez-Cayuela I, Gil-Hernández E, Rodriguez-Arrastia M, Aparicio-Mota A, Ropero-Padilla C, *et al*. Influence of Shift Work on The Health of Nursing Professionals. J Pers. Med. 2023 Apr [cited 7 Jun 2023];13(4):627.
Available from: https://doi.org/10.3390/jpm13040627. DOI: 10.3390/jpm13040627.
21. Westwell A, Cocco P, Van Tongeren, M, Murphy E. Sleepiness and safety at work among night shift NHS nurses. Occup Med. (Lond.). 2021 Dec;71(9):439-445.
22. Tiwari V, Patil HC, Patil RK, Gahlot S. Impact of shift work on excessive daytime sleepiness among healthcare professionals and its association with medical incidents: A review. Adesh Univ. J Med Sci. Res. 2021 Jun;3(1):4-10.
23. Harlynadia E, Basrowi RW. Impact of Shift Work on Excessive Daytime Sleepiness among Healthcare Shift Workers. IJCOM. 2023 Jul;3(1):56-62.
24. Ferri P, Guadi M, Marcheselli L, Balduzzi S, Magnani D, Di Lorenzo R, *et al*. The impact of shift work on the psychological and physical health of nurses in a general hospital: a comparison between rotating night shifts and day shifts. Risk Manag Healthc. Policy. 2016 Sep [cited 7 Jun 2023];9:203-211.
Available from:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5028173/. DOI: 10.2147/RMHP.S115326
25. Warsame SA. The effects of night shift work on nurses health and quality of life. [Master's thesis, California State University]. California State University, San Marcos; c2014.
Available from: http://hdl.handle.net/10211.3/120320.

How to Cite This Article
Benerji T, Kharyal M, Siraj SMU, Kodali M, Parvathaneni KM. Impact of shift work on sleep and quality of life among nurses. International Journal of Research in Psychiatry. 2024;4(1):06-11.