

Original Research Article

A CROSS-SECTIONAL STUDY OF SLEEP PATTERNS AND PSYCHIATRY MORBIDITY AMONG SHIFT WORKERS AT GOVERNMENT HOSPITALS

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ABSTRACT

Background: Shift work is increasingly recognized as a major occupational stressor, particularly among healthcare workers, where irregular schedules disrupt circadian rhythms and predispose to poor sleep and psychiatric morbidity. Aim: To study the association between shift work, sleep patterns, and psychiatric morbidity among healthcare workers in government hospitals.

Materials and Methods: This cross-sectional study was conducted among 368 participants (Cases: 184 shift-working nurses; Controls: 184 office staff) employed in government hospitals under Andhra Medical College, Visakhapatnam. Data were collected using a structured proforma, the Pittsburgh Sleep Quality Index (PSQI), and the General Health Questionnaire-12 (GHQ-12). Group differences were analyzed using Chi-square and t-tests, and logistic regression identified predictors of poor sleep quality.

Results: Poor sleep quality was significantly more prevalent in shift workers than controls (71.7% vs. 40.2%, $p < 0.001$). Psychiatric morbidity was higher among cases (53.2% vs. 25.0%, $p < 0.001$). Shift workers had shorter sleep duration (5.3 ± 1.2 vs. 6.8 ± 1.1 hours), longer sleep latency (32.5 ± 14.8 vs. 21.2 ± 11.6 minutes), and lower sleep efficiency (74.2% vs. 82.1%), all $p < 0.001$. Poor sleep was strongly associated with higher GHQ-12 scores, anxiety, depression, and stress ($p < 0.001$). Logistic regression identified high night-shift frequency (aOR 2.75), job stress (aOR 3.42), longer service (>10 years, aOR 1.89), and age >40 years (aOR 1.65) as significant predictors of poor sleep.

Conclusion: Shift work is strongly associated with disrupted sleep and increased psychiatric morbidity among healthcare staff. Occupational health strategies focusing on shift scheduling, stress management, and early screening are vital to mitigate these risks.

Keywords: Shift work. Sleep patterns. Psychiatric morbidity.

INTRODUCTION

Shift work, a hallmark of modern healthcare systems, has become an unavoidable occupational requirement in government hospitals worldwide. The continuous demand for round-the-clock medical services necessitates that physicians, nurses, and other healthcare staff work in rotating or permanent night shifts, thereby disturbing the natural circadian rhythm. The circadian system is closely aligned with the 24-hour light–dark cycle and regulates essential physiological processes such as sleep–wake cycles, hormone release, metabolism, and cognitive performance. When workers are compelled to remain

awake and active during the biological night and attempt to sleep during the biological day, profound circadian misalignment occurs. This mismatch not only reduces the duration and quality of sleep but also predisposes individuals to significant psychiatric morbidity including anxiety, depression, irritability, and stress-related disorders.^[1]

The concept of “shift work disorder” has gained recognition in occupational psychiatry and sleep medicine, referring to a constellation of insomnia, excessive sleepiness, and functional impairment specifically attributable to irregular work schedules. Epidemiological evidence suggests that healthcare professionals are at heightened risk because their

work often involves high responsibility, long duty hours, and rotating shifts. Multiple cross-sectional and longitudinal studies consistently demonstrate that night shift workers, compared with day workers, have poorer sleep efficiency, greater sleep fragmentation, and longer sleep latency. In addition, the accumulation of sleep debt across successive night shifts is rarely compensated during rest days, resulting in chronic sleep restriction. These sleep disruptions are strongly associated with psychiatric morbidity, particularly depression and anxiety, due to the bidirectional relationship between sleep quality and mental health.^[2]

The psychosocial dimension further complicates the problem. Healthcare workers in government hospitals often face heavy workloads, overcrowded facilities, and limited resources. These stressors amplify the adverse consequences of shift work by inducing burnout, lowering job satisfaction, and weakening coping strategies. Several meta-analyses show that shift workers report significantly higher levels of psychological distress and psychiatric symptoms compared to day workers. In addition, lifestyle factors such as irregular meal timing, caffeine or alcohol use, and reduced opportunities for social interaction further compound the risk of psychiatric morbidity. Importantly, psychiatric conditions among healthcare professionals not only affect their personal well-being but also compromise patient safety, treatment outcomes, and overall quality of healthcare delivery.^[3]

Sleep disturbance itself acts as a predictor of psychiatric morbidity. Workers with chronic insomnia have markedly increased odds of developing major depressive disorder, substance abuse, or suicidal ideation. Conversely, untreated psychiatric conditions exacerbate sleep difficulties, creating a vicious cycle. This reciprocal interaction highlights the need to assess sleep and psychiatric morbidity together in shift workers. Identifying the prevalence and predictors of poor sleep in this high-risk population is crucial for implementing early interventions such as psychoeducation, shift scheduling reforms, and occupational health programs tailored to healthcare professionals in government hospitals.^[4]

Aim: To study the association between shift work, sleep patterns, and psychiatric morbidity.

Objectives

1. To assess the changes in sleep patterns associated with shift work.
2. To evaluate psychiatric morbidity in relation to altered sleep patterns and stress in shift workers.
3. To identify predictors of poor sleep quality among shift-working healthcare staff.

MATERIALS AND METHODS

Source of Data: The study population comprised healthcare personnel employed in government hospitals. Cases were nursing staff engaged in regular

shift work, while controls were office staff working fixed day schedules. Both groups were recruited from the Government Hospital for Mental Care, Government Hospital for Chest and Communicable Diseases, and Government ENT Hospital, Visakhapatnam.

Study Design: A cross-sectional, observational design was employed.

Study Location: The research was conducted at three government hospitals under Andhra Medical College, Visakhapatnam:

- Government Hospital for Mental Care
- Government Hospital for Chest and Communicable Diseases
- Government ENT Hospital

Study Duration: The study was conducted over two months, from August 2025 to September 2025, following approval from the Institutional Scientific and Ethics Committee.

Sample Size: The total sample size was 368 participants, comprising:

- Cases (shift workers): 184
- Controls (non-shift workers): 184

The calculation was based on an assumed prevalence of 40% psychiatric morbidity among shift workers, with a 95% confidence interval and a precision of 5%.

Inclusion Criteria:

- Age between 21 and 60 years.
- Nursing staff currently engaged in rotating or fixed night shifts (cases).
- Office staff employed in government hospitals with fixed day shifts (controls).
- Participants providing informed consent.

Exclusion Criteria:

- History of pre-existing psychiatric or sleep disorders not related to occupation.
- Current use of medications affecting mood or sleep (e.g., sedatives, antidepressants).
- Acute or severe medical illness at the time of study participation.

Procedure and Methodology: After obtaining ethical clearance, administrative permission was sought from the respective hospitals. Participants were approached individually, the study purpose was explained, and written informed consent was obtained. Confidentiality was assured throughout. A pre-designed and pre-tested questionnaire was administered in a face-to-face interview format. Data collection included:

Socio-demographic details: age, gender, marital status, education, years of service, and work pattern.

Sleep quality: assessed using the Pittsburgh Sleep Quality Index (PSQI), which evaluates domains such as sleep duration, latency, and efficiency.

Psychiatric morbidity: screened using the General Health Questionnaire-12 (GHQ-12).

Lifestyle and occupational factors: details of shift schedule, substance use (caffeine, alcohol, tobacco), and exercise.

Sample Processing: Each questionnaire was checked for completeness. Where clinically indicated, participants with high GHQ-12 scores or

severe sleep impairment were referred to psychiatry services for further evaluation and management.

Statistical Methods: Data were entered into Microsoft Excel and analyzed using SPSS software (version 25). Descriptive statistics such as mean, standard deviation, and percentages were calculated. Group differences in continuous variables were assessed using the Mann–Whitney U test. Categorical variables were compared using the Chi-square test. Logistic regression was applied to evaluate associations between shift work, poor sleep, and psychiatric morbidity while adjusting for confounders. A p-value <0.05 was considered statistically significant.

Data Collection: Data collection was completed by direct interviews and administration of structured questionnaires in hospital settings. All participants were recruited voluntarily after informed consent, and privacy was strictly maintained.

RESULTS

The demographic profile of the participants showed no significant difference in mean age between shift workers (34.6 ± 6.8 years) and controls (35.2 ± 7.1 years, $p = 0.435$), and the proportion of females was also comparable (68.5% vs. 65.2%, $p = 0.517$). However, marked differences were observed in sleep quality and psychiatric morbidity. Poor sleep quality, defined by a PSQI score ≥ 5 , was significantly more prevalent among cases (71.7%) compared to controls (40.2%), with a highly significant chi-square statistic ($\chi^2 = 41.6$, $p < 0.001$). Similarly, psychiatric morbidity, assessed using GHQ-12, was more common in shift workers (53.2%) than in non-shift workers (25.0%), again reaching strong statistical significance ($\chi^2 = 30.5$, $p < 0.001$).

Table 1: Association between Shift Work, Sleep Patterns, and Psychiatric Morbidity

Variable	Cases (n=184)	Controls (n=184)	Test of Significance	95% CI	p-value
Mean Age (years)	34.6 ± 6.8	35.2 ± 7.1	$t = 0.78$	-1.84 to 0.64	0.435
Female sex, n (%)	126 (68.5%)	120 (65.2%)	$\chi^2 = 0.42$	–	0.517
Poor Sleep Quality (PSQI ≥ 5), n (%)	132 (71.7%)	74 (40.2%)	$\chi^2 = 41.6$	–	<0.001*
Psychiatric Morbidity (GHQ-12 ≥ 3), n (%)	98 (53.2%)	46 (25.0%)	$\chi^2 = 30.5$	–	<0.001*

Table 2: Changes in Sleep Patterns Associated with Shift Work

Sleep Parameter (PSQI domains)	Cases (n=184) Mean $\pm$ SD	Controls (n=184) Mean $\pm$ SD	Test of Significance	95% CI	p-value
Sleep Duration (hrs)	5.3 ± 1.2	6.8 ± 1.1	$t = 12.4$	-1.78 to -1.22	<0.001*
Sleep Latency (min)	32.5 ± 14.8	21.2 ± 11.6	$t = 8.07$	8.6 to 14.0	<0.001*
Sleep Efficiency (%)	74.2 ± 8.4	82.1 ± 7.6	$t = -9.54$	-9.6 to -6.2	<0.001*
Daytime Dysfunction, n (%)	110 (59.8%)	58 (31.5%)	$\chi^2 = 28.9$	–	<0.001*

Shift workers demonstrated significantly poorer outcomes across all key domains of sleep quality. Average sleep duration was reduced to 5.3 ± 1.2 hours in cases compared to 6.8 ± 1.1 hours in controls ($p < 0.001$). Sleep latency was also markedly prolonged among shift workers (32.5 ± 14.8 minutes vs. 21.2 ± 11.6 minutes, $p < 0.001$). Sleep efficiency

was lower in cases (74.2%) compared to controls (82.1%), with a mean difference of nearly 8% ($p < 0.001$). Furthermore, daytime dysfunction, characterized by fatigue and reduced alertness, was significantly more frequent in shift workers (59.8% vs. 31.5%, $p < 0.001$).

Table 3: Psychiatric Morbidity in Relation to Altered Sleep Patterns and Stress

Variable	Poor Sleep (PSQI ≥ 5) n=206	Good Sleep (PSQI < 5) n=162	Test of Significance	95% CI	p-value
Mean GHQ-12 Score	5.6 ± 2.1	2.8 ± 1.5	$t = 13.9$	2.4 to 3.2	<0.001*
Anxiety Symptoms, n (%)	88 (42.7%)	26 (16.0%)	$\chi^2 = 30.8$	–	<0.001*
Depressive Symptoms, n (%)	72 (35.0%)	22 (13.6%)	$\chi^2 = 24.9$	–	<0.001*
High Stress (self-reported), n (%)	102 (49.5%)	34 (21.0%)	$\chi^2 = 35.4$	–	<0.001*

Participants with poor sleep (PSQI ≥ 5) exhibited significantly higher psychiatric morbidity than those with good sleep. The mean GHQ-12 score was nearly double in the poor sleep group (5.6 ± 2.1) compared to the good sleep group (2.8 ± 1.5 , $p < 0.001$). Anxiety symptoms were reported by 42.7% of those with poor sleep, in contrast to only 16.0% among

good sleepers ($p < 0.001$). Similarly, depressive symptoms were more prevalent in the poor sleep group (35.0%) compared to the good sleep group (13.6%, $p < 0.001$). High levels of self-reported stress were also significantly greater in participants with poor sleep (49.5% vs. 21.0%, $p < 0.001$).

Table 4: Predictors of Poor Sleep Quality among Shift-Working Healthcare Staff (Logistic Regression)

Predictor Variable	Adjusted OR	95% CI	p-value
Female gender	1.32	0.82 – 2.12	0.248
Age > 40 years	1.65	1.01 – 2.72	0.043*

Years of Service > 10	1.89	1.12 – 3.19	0.017*
Night Shifts ≥ 10/month	2.75	1.72 – 4.39	<0.001*
High Job Stress	3.42	2.12 – 5.51	<0.001*
Caffeine Use > 3 cups/day	1.78	1.05 – 3.02	0.031*

Multivariate logistic regression identified several predictors of poor sleep among shift-working healthcare staff. Female gender was not significantly associated with poor sleep (OR = 1.32, $p = 0.248$). However, age above 40 years significantly increased the odds (OR = 1.65, 95% CI: 1.01–2.72, $p = 0.043$). Longer years of service (>10 years) was also a predictor (OR = 1.89, $p = 0.017$). High frequency of night shifts (≥10 per month) nearly tripled the risk of poor sleep (OR = 2.75, $p < 0.001$). Job stress emerged as the strongest predictor (OR = 3.42, 95% CI: 2.12–5.51, $p < 0.001$). Additionally, high caffeine consumption (>3 cups/day) significantly increased the likelihood of poor sleep (OR = 1.78, $p = 0.031$).

DISCUSSION

In [Table 1], poor sleep quality (PSQI ≥ 5) was markedly higher in shift workers than controls (71.7% vs 40.2%; $\chi^2 = 41.6$; $p < 0.001$) and GHQ-12 caseness similarly differed (53.2% vs 25.0%; $\chi^2 = 30.5$; $p < 0.001$). The magnitude aligns closely with multi-setting estimates: a Vietnamese hospital study reported nearly a three-fold increase in odds of poor sleep among shift workers (OR ≈ 2.98, 95% CI 1.53–5.81), underscoring that the sleep detriment is robust across contexts. Reynolds AC et al (2021).^[5]

Meta-analytic evidence also indicates elevated risk of poor mental health among shift workers-depression and anxiety in particular-though effect sizes vary by occupation and measurement, which matches our strong cross-sectional signal for GHQ-12 morbidity. Mota IA et al (2021).^[6]

[Table 2] demonstrates domain-level sleep impairment typical of circadian misalignment: shorter sleep duration (mean 5.3 h vs 6.8 h), lengthened sleep latency (~33 vs 21 min), reduced sleep efficiency (~74% vs 82%), and more daytime dysfunction (59.8% vs 31.5%), all $p < 0.001$. Similar patterns-shortened sleep, delayed sleep onset, and lower efficiency in night/rotating staff-are consistently reported in healthcare workers and general shift-working samples. A Greek multi-industry study documented impaired sleep characteristics and quality of life in shifts, while Open investigation in night-shift staff found poorer PSQI, longer latency, shorter duration, more disturbances, and more daytime dysfunction-mirroring our profile and reinforcing external validity. Reviews of shift work sleep disorder (SWSD) further explain these objective/subjective decrements as consequences of circadian misalignment and homeostatic sleep debt inherent to nocturnal duty cycles. Choi SJ et al (2020) & Gupta R et al (2020).^[7,8]

[Table 3] links altered sleep to psychiatric burden: participants with poor sleep had substantially higher

GHQ-12 scores and more anxiety, depressive symptoms, and high self-reported stress (all $p < 0.001$). This dovetails with the bidirectional sleep-mental-health literature in healthcare workers, where sleep disturbance is both a correlate and predictor of psychological morbidity. A cross-sectional study in nurses explicitly using GHQ-12 showed that worse sleep and shift-work-related strain track with higher mental ill-health, supporting our pattern. Meta-analytic syntheses in workers more broadly confirm increased prevalence of anxiety and depression among those on nights/rotations, consistent with our effect directions and magnitudes. Almhdawi KA et al (2021).^[9]

[Table 4] identifies actionable predictors among shift workers. Higher night-shift load (≥10/month) and high job stress had the strongest associations with poor sleep (aOR 2.75 and 3.42, respectively), with additional contributions from longer service (>10 years) and older age. Comparable determinants-night-shift frequency, psychosocial stressors, and tenure-emerge across nurse cohorts internationally. Studies of night-shift nurses and mixed healthcare staff repeatedly implicate workload/rotation density and occupational stress as primary drivers of poor PSQI scores, consolidating our multivariable findings and pointing to targets for scheduling reform and stress-reduction interventions. Rana W et al (2020) & GebreEyesus FA et al (2023).^[10,11]

CONCLUSION

This cross-sectional study highlights a significant association between shift work, poor sleep quality, and psychiatric morbidity among healthcare workers in government hospitals. Shift workers demonstrated markedly shorter sleep duration, longer sleep latency, reduced sleep efficiency, and higher levels of daytime dysfunction compared to their non-shift counterparts. Furthermore, poor sleep was strongly linked with elevated anxiety, depressive symptoms, and high stress, indicating that sleep disruption is not only a consequence of irregular schedules but also a predictor of psychiatric morbidity. Multivariate analysis revealed that high night-shift frequency, job stress, longer service duration, and older age were key predictors of poor sleep. These findings underscore the urgent need for organizational policies to optimize shift scheduling, provide stress management interventions, and institute early screening programs to safeguard the mental health and overall well-being of healthcare staff.

Limitations of the Study

Cross-sectional design: The study design precludes causal inferences; observed associations cannot establish temporality between shift work, sleep disturbance, and psychiatric morbidity.

Self-reported measures: Sleep quality and psychiatric morbidity were assessed through self-administered questionnaires, which may be subject to recall bias and reporting errors.

Unmeasured confounders: Variables such as socioeconomic status, family stressors, and underlying medical conditions may have influenced outcomes but were not fully controlled.

Generalisability: The study was restricted to government hospitals in a single urban setting; results may not be generalizable to private institutions or rural healthcare systems.

Short study period: Data were collected over three months, which may not capture long-term variability in shift work effects.

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