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ORIGINAL RESEARCH

The Correlation Between Night Shift Work Schedules, Sleep Quality, and Depression Symptoms

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Purpose: Poor sleep and depressive symptoms are two negative effects of night shift work on physical and mental health. This study evaluated the correlation between sleep quality and depression symptoms among nurses in Saudi Arabia. Specifically, we assessed depressive symptoms and sleep quality observed among nurses who worked night shifts and compared the outcomes with those who worked exclusively day shifts in hospital settings.

Patients and Methods: A total of 191 participants (55.5% men, 44.5% women) participated. The response rate was 63.6%. The hospital anxiety and depression scale (HADS) and Pittsburgh Sleep Quality Index (PSQI) were used to assess depression score and sleep quality, respectively.

Results: Nurses who worked night shifts had substantially higher PSQI ratings ($p<0.05$) than those who worked day shifts. In addition, there was a clear relationship between the HADS and PSQI scores. According to the binary logistic regression, longer working hours and inadequate sleep were both independently linked to depressive symptoms among nurses.

Conclusion: Poor sleep quality brought on by night shifts may explain why Saudi nurses who work night shifts experience higher rates of depression than those who work day shifts only.

Keywords: depression, sleep quality, nurse, night shift

Introduction

As a result of rising demand for high-quality treatment, greater public expectations, and increasing financial restrictions, nurses are more frequently exposed to acute and chronic occupational stressors—which puts them at risk for developing psychiatric illnesses, including depression and depressive symptoms.[1] The rate at which the nurse population reports symptoms of depression is double that of the general population.[2] In the Kingdom of Saudi Arabia (Saudi Arabia), a recent spate of violent assaults on medical personnel has drawn global attention.[3] A survey of 738 Saudi nurses found that 11.1% and 32.9% experienced physical and nonphysical violent incidents, respectively.[4] The risk of being assaulted puts Saudi nurses under significant psychological strain—the early detection of depression among Saudi nurses facilitates the prevention of negative effects on patients, caregivers, and healthcare organizations.[5]

Care is provided in hospitals around-the-clock, seven days a week, and nurses' routines—including night shift work schedules—are largely unchangeable.[6] Working a night shift can negatively affect social connections and work–life balance, leading to more emotional anguish,[7] and is linked to a higher chance of developing depressive symptoms.[8,9]

Night shift working practices disrupt cortisol and melatonin cycles,[10] which directly impact sleep quality.[11] Insufficient sleep following working overnight is a prevalent concern for night shift workers.[12] According to one study, nurses who worked night shifts had poorer quality sleep than their counterparts who worked day shifts,[13] and the lack of sleep had an adverse effect on their health. Poor sleep quality is also associated with depressive symptoms. According to an epidemiological investigation, up to 90% of those with symptoms of depression had experienced sleep problems.[14] Similarly, less sleep over six months is associated with more severe depression in individuals who have experienced a depressive episode.[15]

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Although studies illustrate how poor sleep may play a role in the link between working nights and a disordered state of physical and mental health,[16,17] no study has focused on the relevance of sleep quality in terms of the correlation between symptoms of depression and night shift working patterns among nurses. The researcher investigated to determine any correlation between night shifts, sleep quality, and depression symptoms among Saudi nurses, we hypothesized that poor sleep quality might contribute to the link between the two. The current study has two main goals: (1) to investigate the correlation between symptoms of depression and night shift working patterns among nurses, and (2) to understand the correlation between symptoms of depression and sleep quality among the nurse population.

Methods

Participants and Study Design

This cross-sectional study was conducted between March and April 2023 in Medical City in the Province of Riyadh (Central Saudi Arabia). A barcode consisting of the consent form, demographic items, and questionnaire was sent to nurses' email addresses using Google Forms. A total of 300 nurses were asked to complete a self-administered questionnaire. All responses were anonymous. Nurses were asked to provide written consent to participate in the study and to answer self-administered anonymous surveys. Those who did not consent to participate were excluded from the study. One hundred ninety-one nurses completed the questionnaire (response rate: 63.6%). According to self-report, nurses working day shifts were those whose work shifts did not include night work, as defined by having a work schedule that only included day shift. Nurses who self-reported working night shifts were those whose schedules included night work, which was defined as working after midnight. The night shift spanned from 11:00 p.m. to 8:00 a.m., whereas the day shift spanned 8:00 a.m. to 11:00 p.m.

The Ethics Committee of Medical City approved this study. This study was conducted following the principles of the Declaration of Helsinki. After reading the investigation's purpose statement, each participant signed an informed consent form.

Evaluation of Clinical Variables

Participants' sociodemographic information and other clinically significant characteristics were gathered using a study questionnaire. The following tools were used to collect data on clinical variables.

Nurses' sleep quality was assessed using the Arabic version of the Pittsburgh Sleep Quality Index (PSQI). The PSQI is a 19-item, psychometrically validated approach to measure sleep quality and disruption. The index has a score ranging from 0 to 21. A score cut off < 5 indicates good sleep quality, while a score cut off > 5 indicates poor sleep quality.[18,19] In the present study, the seven component scores of the PSQI had an overall Cronbach's alpha of 0.60.

The Arabic version of the Hospital Anxiety and Depression Scale (HADS) was used to measure depressive symptoms.[20,21] The participants were asked to respond to each item on a questionnaire containing questions about how they felt over the past week using a 7-item Likert 4-point scale ranging from 0 (normal) to 3 (severe). Items 2, 4, 6, 8, 10, 12, and 14 relate to the depression subscale. With higher scores indicating higher symptom levels. Participants who received a score of >7 were deemed to have depressed symptoms. Cronbach's alpha of the HADS Depression subscale in the present study was 0.65.

Statistical Analyses

ANOVA assessed continuous variables, whereas the chi-squared test was performed for categorical variables. Fisher's exact test was also performed with categorical variables if the underlying assumptions of the chi-square test were unmet. The Pearson correlation coefficient (rp) assessed the bivariate relationship between HADS and PSQI measurements. Binary logistic regression analysis was used to determine the impact of working a night shift on sleep quality and depression symptoms. To limit the impact of potential confounders, we included factors with $p<0.05$ in the univariate analysis in the logistic regression analysis. Outcomes were represented as an adjusted OR (95% CI). IBM® SPSS®

Statistics Version 28.0 (IBM Corp., Armonk NY [USA]) was used to perform the statistical analyses. Statistical significance was set at 0.05. significant.

Results

Among the nurses surveyed, 73.3% (140 out of 191) were revealed to be suffering from depressive symptoms. Compared with nurses who exclusively worked day shifts, nurses who worked night shifts were less likely to be married and younger and self-reported higher PSQI scores (all $p<0.05$; see Table 1). Moreover, the PSQI and HADS scores were positively correlated ($rp = 0.327$, $p<0.001$).

This study used the depression scores among nurses as the dependent variable. Table 2 shows that logistic regression analysis, controlling for age, marital status, and work hours, found no independent association between night shifts and the depression scores (OR, 0.74; 95% CI, 0.36–1.53, $p = 0.419$). Nurses found to have poor-quality sleep were identified as being at an elevated risk of depressive symptoms (OR, 4.62; 95% CI, 2.26–9.43, $p<0.001$), as were those who worked longer hours (OR, 0.93; 95% CI, 0.87–1.00, $p = 0.049$).

Table 1 Demographic, Lifestyle and Clinical Characteristics of Two Groups

Variables	Day Shift (n = 105)	Night Shift (n = 86)	95% CI	p-value
Age (years), M±SD	31.7±6.6	30.1±4.1	30.74–32.38	0.002
Gender, n(%)				0.189
Male	63 (60%)	43 (50%)		
Female	42 (42%)	43 (50%)		
Height (cm), M±SD	167.7±9.1	164.8±9.4	165.10–167.77	0.029
Weight (kg), M±SD	76.4±18.1	70.6±17.8	71.24–76.42	0.028
Marital status, married, n(%)	68 (64.8%)	41 (47.7%)		0.019
Education, n(%)				0.678
Diploma	21 (20%)	13 (15.1%)		
Undergraduate degree	78 (74.3%)	68 (79.1%)		
Graduate degree	6 (5.7%)	5 (5.8%)		
Work hours/week, M±SD	43.9±6.7	43.8±6.1	42.99–44.82	0.886
PSQI, M±SD	6.4±2.5	7.4±3.3	6.40–7.26	0.027
HADS, M±SD	8.0±0.8	8.1±0.8	7.91–8.14	0.958
Depression, n(%)				1.000
Yes	77 (73.3%)	63 (73.3%)		
No	28 (26.7%)	23 (26.7%)		
Sleep quality, n(%)				0.654
Good sleep quality	40 (38.1%)	30 (34.9%)		
Poor sleep quality	65 (61.9%)	56 (65.1%)		

Abbreviations: PSQI, Pittsburgh Sleep Quality Index; HADS, Hospital Anxiety and Depressive Disorders Rating Scale; M, Mean; n, Sample size; SD, Standard deviation; %, Percent of participants.

Table 2 Binary Logistic Model of the Clinical Determinants of Depressive Symptoms Among Nurses

Variables	OR	95% CI	p-value
Night shift	1.34	0.65–2.77	0.419
Age	0.96	0.90–1.04	0.349
Marriage	0.55	0.23–1.30	0.175
Work hours/week	0.93	0.87–1.00	0.049
Poor sleep quality	4.62	2.26–9.43	<0.001

Discussion

This study has three key findings. First, the depressive symptoms experienced by nurses who worked night shifts were similar to those observed among nurses who worked day shifts exclusively. Second, poor sleep quality was associated with a higher prevalence of depressive symptoms among nurses. Third, nurses who worked night shifts experienced poorer sleep quality than those who worked exclusively day shifts. Thus, the higher prevalence of depressive symptoms among nurses who work night shifts may be attributed to poor sleep quality resulting from working night shifts.

Our study's findings of prevalence of depressive symptoms among Saudi Arabian nurses (73.3%) follow the findings reported in other studies.[22,23] This prevalence is higher than that reported in Western nations, including the United States and France.[24,25] This discrepancy may include Saudi Arabian nurses' heavy workload, the poor nurse–patient relationships arising from medical disputes, and increasingly high public expectations of nurses in Saudi Arabia.[26]

Studies have explored the relationships between sleep and physical and mental health in various settings. For example, shift work can result in poor sleep quality and health conditions, including coronary heart disease and diabetes.[27,28] Among older workers (those aged 45 and over), studies have found that good sleep quality potentially enhances cognitive abilities and lessens depressive symptoms.[29] Furthermore, research conducted in various settings has linked shift work among nurses with poor-quality sleep, fatigue, and depressive symptoms.[30–32] Similarly, the nurses in our study who worked night shifts experienced poorer quality sleep and were 462% more likely to suffer from depressive symptoms than their counterparts who worked day shifts. This study contributes to the literature primarily by analyzing the role of sleep quality in the prevalence of depressive symptoms among Saudi Arabian nurses. One possible explanation for the current study's findings is that night shifts disrupt nurses' circadian rhythms, negatively impacting sleep and thus inducing depressive symptoms;[33] previous studies have established a correlation between disturbances in circadian rhythms, sleep quality, and depressive symptoms.[31,34,35] This phenomenon may result from disrupted social routines and abnormal cortisol secretion patterns.[36] Other studies have shown that depressive symptoms are reduced when disturbances in circadian rhythms are addressed.[37]

In accordance with the existing literature, this study identified a positive relationship between depressive symptoms and poor sleep quality.[38,39] The sleep quality of those with depressive symptoms also predicted treatment results. Poor sleep quality predicts a poor response to pharmacological, or non-pharmacological interventions, or both to treat depressive symptoms.[40,41] In the context of Saudi Arabian nurses, this can be inferred from the correlation between working night shifts, depressive symptoms, and sleep quality, which mediates the relationship between depressive symptoms and working night shifts. The role played by poor-quality sleep may be the result of disturbances to circadian rhythms or inadequate rest and recuperation by nurses caused by sleep disorders,[42] and clinical observations have demonstrated that circadian dysregulation may induce different manifestations of mood disorders.[42,43] Individuals experiencing depressive symptoms demonstrate irregularities in the timing of the phases of the diurnal (24-hour) cycle. Specifically, the nocturnal body temperature increased earlier than expected. Individuals experiencing depressive symptoms also secrete more cortisol and experience a phase advance of their circadian rhythms.[44] In healthy individuals, maximal cortisol secretion occurs in the morning, progressively decreasing during the day until it reaches its lowest point in the evening. Individuals with depressive symptoms display reduced melatonin secretion and experience delays in the phases of their circadian rhythms regarding this secretion.[45,46] Other studies report a link between disturbances in social routines and depressive symptoms.[36,47]

Nonetheless, research findings in this area are inconsistent. For example, research conducted among nurses in Norway did not identify any significant correlation between sleepiness and working night shifts.[48] Variations in national healthcare systems, work environments, and workloads may partially explain these contradictory findings.

Limitations

This study has limitations. First, given that this was a cross-sectional study, causation regarding the relationship between working night shifts, depressive symptoms, and sleep quality could not be established. Future studies should adopt a longitudinal design to establish this relationship. Although the causation was not proven, the higher prevalence of poor sleep quality among nurses who work night shifts presents a significant health concern. Second, the questionnaire design

separated work shifts into two binary categories-day and night-without considering more subtle work patterns. Further research should also assess diverse work patterns. Third, selection bias and its impact on the findings is a concern, given that the nurses surveyed in this study who worked night shifts were typically younger than their day shift counterparts. However, these potential confounders were adjusted for in logistic regression analysis. Finally, this study did not measure violence or aggression among nurses.

Conclusion

The results of this study suggest a link between a higher prevalence of depressive symptoms among nurses who work night shifts and poor sleep quality, which is the result of night shift working patterns. This study contributes to the literature in its analysis of the role of sleep quality in the depression scores among Saudi Arabian nurses. In future research, longitudinal studies should be used to establish a causal relationship between working night shifts, depressive symptoms, and sleep quality.

Data Sharing Statement

Upon request to corresponding author.

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Disclosure

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