Shift Work Disorders Among Healthcare Workers in Jazan Region: Implications for Employee Health and Productivity

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KEYWORDS

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ABSTRACT

Shift Work Sleep Disorders (SWSD) have garnered increasing attention in recent years, yet there remains a limited number of studies investigating their prevalence and symptoms among specific occupational groups. This study aimed to assess the prevalence of SWSD among nurses in the Jazan Region of Saudi Arabia, along with identifying associated factors and challenges faced by this population.

A cross-sectional study design was employed, utilizing a validated questionnaire to evaluate both the prevalence of sleep disorders and the level of awareness regarding these conditions among nurses. The questionnaire encompassed various factors that may contribute to SWSD, including lifestyle choices such as smoking and chewing Qat, as well as demographic variables like age, gender, and work experience.

Through this comprehensive assessment, the study seeks to illuminate the extent of sleep disorders among nurses working in shifts and to identify specific risk factors that may exacerbate these conditions. The findings are expected to provide valuable insights into the challenges faced by healthcare professionals in managing their sleep health, ultimately highlighting the need for targeted interventions and support systems to improve the well-being of nurses in the region.

1. Introduction

Shift work refers to employment schedules that occur outside the traditional daytime hours, typically defined as any work performed between 7 PM and 6 AM. This includes evening, night, and early morning shifts. According to statistics from the U.S. Bureau of Labor, approximately 16% of employees engage in shift work, with 6% working evening hours and 4% working night shifts [1]. While some individuals may prefer these non-traditional work schedules for various reasons, the detrimental consequences associated with shift work cannot be overlooked. Workers on early morning or night shifts face a significantly higher risk of developing Shift Work Sleep Disorders (SWSD) and other serious health issues [1].

Shift work schedules can be categorized into three primary types according to the Bureau of Labor Statistics: evening, night, and early morning shifts. The evening shift typically spans from 6 PM to 10 PM and includes occupations such as food service employees, personal care workers, sales personnel, and professionals in the arts, sports, healthcare, and media sectors. Night shifts occur between 11 PM and 3 AM, encompassing roles such as healthcare practitioners, protective service workers, manufacturing and production employees, and transportation and material moving personnel [2]. Early morning shifts, on the other hand, include jobs from 4 AM to 8 AM, typically involving construction and extraction workers, engineers, forestry workers, and installation and repair professionals.

From a physiological perspective, individuals engaged in shift work experience sleep/wake schedules that conflict with their natural circadian rhythms, leading to a misalignment between their sleep and wakefulness processes. This desynchronization can result in various sleep disorders among shift workers [2]. The dynamics of sleep and wakefulness can be understood through the two-process model, which posits that wakefulness is regulated by a circadian alerting signal while sleep is governed by homeostatic pressure. The interaction between these two signals regulates the overall sleep process.

Homeostatic pressure builds up during wakefulness and decreases during sleep, while the circadian alerting signal is primarily regulated by the suprachiasmatic nucleus (SCN). During daylight hours, both the homeostatic

pressure and the circadian alerting signal rise, subsequently decreasing after sleep. The synchronization of circadian rhythms is maintained by external environmental cues, including the natural light/dark cycle.

Light entering the eyes triggers the transmission of photic stimuli to the central nervous system (CNS), which suppresses melatonin secretion. Melatonin levels remain low during the day and rise in the evening, signaling the body to prepare for sleep. As daylight returns, melatonin secretion is inhibited, informing the internal clock that it is time to awaken [2].

However, for shift workers, these physiological processes become disrupted, adversely affecting both sleep quality and wakefulness. For example, night shift workers who sleep during the day, when circadian alerting signals are high, often experience short and fragmented sleep. Conversely, their work during nighttime occurs when circadian alerting signals are low, resulting in heightened sleepiness.

Understanding the implications of shift work on sleep physiology is crucial for addressing the health challenges faced by shift workers and developing effective interventions to mitigate the impact of SWSD.

Adequate sleep is essential for maintaining both physical and mental health. During sleep, the body undergoes vital processes that restore and organize itself, ensuring optimal brain function and overall well-being. Sleep comprises two main types: Rapid Eye Movement (REM) sleep and Non-REM sleep, which typically cycle through three to five times per night [3]. While individual sleep needs can vary, adults are generally recommended to aim for approximately seven to nine hours of sleep each night.

Sleep plays a crucial role in the growth and development of children and adolescents. It significantly impacts various physiological systems, including the circulatory, respiratory, metabolic, and immune systems. During sleep, the parasympathetic nervous system activates, allowing the heart to rest and blood pressure to normalize. Insufficient sleep or frequent awakenings during the night can lead to serious health issues, including coronary heart disease, obesity, high blood pressure, and stroke. Sleep also regulates hormone secretion and the functioning of many organs.

Research indicates a strong link between insufficient sleep and the prevalence of overweight and obesity. Furthermore, sleep is vital for forming long-term memories, enhancing cognitive function, and improving focus on daily tasks, thereby promoting overall health and performance .

The National Sleep Foundation provides updated recommendations for sleep duration that take into account overall health, including physical, emotional, and mental well-being [4].

Sleep disorders are characterized by difficulties with the quality, timing, and duration of sleep, leading to daytime distress and a range of physical and emotional problems. These disorders can severely impact overall health, safety, and quality of life. Common symptoms of sleep deprivation include excessive daytime sleepiness, irregular sleep patterns, difficulty initiating sleep, irregular breathing during sleep, and various other complications [5].

The consequences of inadequate sleep are extensive, manifesting as fatigue, low energy, impaired concentration, and increased irritability [5]. There are several types of sleep disorders, with insomnia being the most prevalent. Other notable sleep disorders include obstructive sleep apnea, restless leg syndrome, parasomnias, and narcolepsy. Sleep disorders are often associated with mental health conditions such as anxiety and depression, which can further impair decision-making abilities.

Shift Work Sleep Disorder (SWSD) is a severe form of sleep disorder commonly observed among shift workers, particularly those engaged in night or rotating shifts. Individuals in these roles are more likely to experience symptoms that qualify for a diagnosis of SWSD. The primary symptoms include sleep deprivation at night and insomnia [6].

Sleep deprivation manifests as excessive daytime sleepiness, characterized by insufficient sleep hours and an overwhelming urge to sleep during daily activities, which can pose dangerous risks. Insomnia refers to the difficulty in falling asleep or achieving sufficient continuous sleep. Shift workers suffering from insomnia often struggle to maintain a consistent sleep schedule, leading to increased daytime sleepiness and associated complications [7]. The prevalence of sleep deprivation and insomnia is notably higher among night shift and rotating shift workers compared to those with traditional work schedules.

Diagnosis of SWSD is based on criteria outlined in the International Classification of Sleep Disorders [6], which includes:

- Complaints of insomnia or excessive sleepiness temporally associated with a recurring work schedule that overlaps typical sleep times.
- Symptoms must persist in relation to the shift work schedule for at least one month, supported by documentation of circadian and sleep-time misalignment through sleep logs or actigraph monitoring for a minimum of seven days.
- Sleep disturbances that cannot be attributed to other sleep disorders, medical or neurological conditions, mental health disorders, medication use, or substance use disorders.

SWSD is not solely linked to sleep disturbances; it also encompasses various other medical issues such as fatigue, irritability, social difficulties, and deficits in daily performance, which can heighten the risk of accidents. Research has established that individuals with SWSD are at an increased risk for cardiovascular diseases and digestive problems (e.g., ulcers) compared to their daytime-working counterparts. Additionally, they are more susceptible to mood disorders, anxiety, and depression [8]. Studies have shown that shift workers are more likely to experience car accidents due to sleep deprivation compared to those working during the day. The daily lives of these workers are also adversely affected, often resulting in missed family gatherings or declined social invitations due to the impacts of sleep deprivation or insomnia [9].

2. Materials and Methods

This study employed a cross-sectional design to assess Shift Work Sleep Disorders among nurses in the Jazan Region of the Kingdom of Saudi Arabia. The research targeted nurses working in Ministry of Health hospitals that provide 24-hour healthcare services. The estimated sample size consisted of 424 nurses, determined through simple random sampling techniques.

A comprehensive data collection sheet was developed by the researchers, which comprised three main sections:

1. Personal Characteristics: This section recorded demographic and professional information, including age, gender, nationality, marital status, educational qualifications, specialty, job position, years of experience in medical practice, and smoking habits.

2. Shift Work Disorders Screening Questionnaire: This four-item screening tool (see annex) was designed to identify symptoms indicative of shift work disorders. It has demonstrated a positive predictive value of 89%, a negative predictive value of 62%, a sensitivity of 0.74, and a specificity of 0.82.

3. Pittsburgh Sleep Quality Index (PSQI): The PSQI is a widely recognized instrument used in both clinical and nonclinical research to assess sleep quality over the past month. It consists of 9 self-rated questions that generate 7 component scores, which are subsequently summed to produce a global score (see annex).

4. Depression, Anxiety, and Stress Scale (DASS): The DASS was developed by Miriam Taouk and Peter F. Lovibond and is available in an Arabic version. The scale includes 42 items that measure current symptoms of depression, anxiety, and stress experienced over the past week.

Data collection was conducted across five selected hospitals in the Jazan Region using a multi-stage stratified random sampling technique. Nurses who met the inclusion criteria were included in the study, ensuring proportional representation relative to the number of nurses in each hospital while maintaining an appropriate male-to-female ratio. Approval from the relevant official authorities was obtained prior to data collection.

Questionnaire sheets were distributed at the beginning of each morning shift, and participating nurses were asked to complete the questionnaires.

Data were entered into a personal computer and analyzed using the Statistical Package for the Social Sciences (SPSS, version 23). A p-value of less than 0.05 was considered statistically significant for all analyses.

3. Results

To evaluate the reliability of the instrument used in this study, the Cronbach alpha coefficient was calculated. A coefficient of 0.7 or above indicates good reliability. With a Cronbach alpha value of 0.72, the assessment of sleep disorders and symptoms shows a strong level of stability for the study instrument. Internal consistency for this study was assessed by examining the correlation between individual indicators and the overall score of the axis.

Table 1: Degree and Significance of Correlation for Sleep Disorder Symptoms

Axis Indicator	Pearson Coefficient	Sig	Correlation
Problem with waking up too early	0.708	0.000	Significant
Sense of well-being during awake time	0.715	0.000	Significant
Likelihood of dozing off at work	0.743	0.000	Significant
Likelihood of dozing off while driving after two days off work	0.695	0.000	Significant
Intolerance or nervousness towards children's behavior	0.600	0.000	Significant

The data reveal a strong positive correlation among the majority of indicators, with Pearson coefficients ranging from 0.600 to 0.743. The significance values ($p < 0.05$) further validate the high internal consistency of the assessment tool.

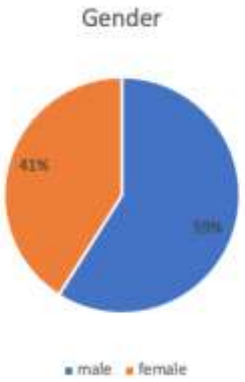


Figure 1 demonstrates that the majority of participants were male, comprising 59% of the sample, while females accounted for 41%.

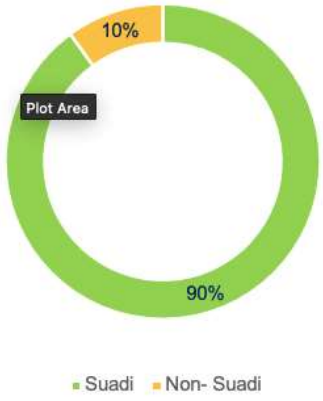


Figure 2 indicates that 90% of the participants were Saudi nationals, with 10% being non-Saudi.

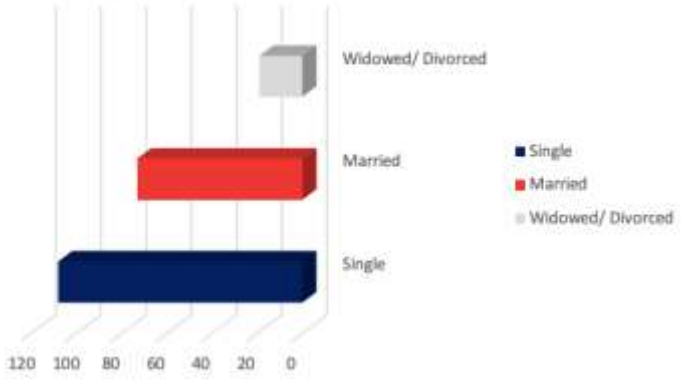
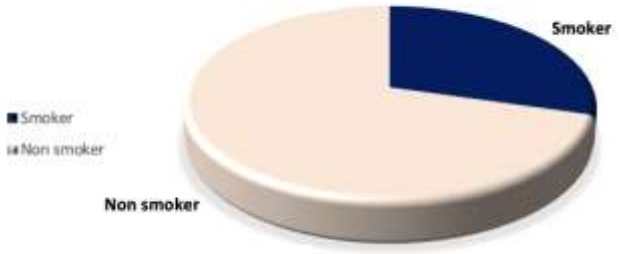


Figure 3 reveals that 54% of the participants were single, 37% were married, and 9% were either widowed or

divorced.



According to Figure 4, 70.5% of the participants identified as non-smokers, while 29.5% were smokers.

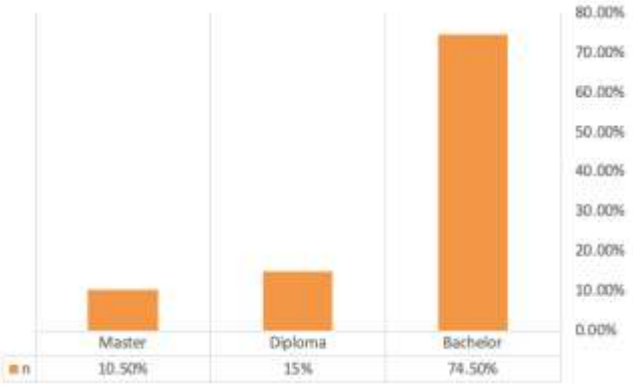
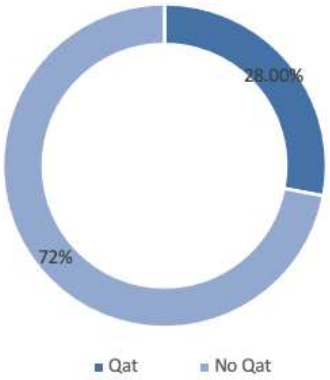


Figure 5 shows that 74.5% of the sample held a bachelor's degree, 15% had a diploma, and 10.5% possessed a master's degree.



Finally, Figure 6 indicates that 72% of the participants did not chew qat, whereas 28% reported that they did.

The Likert scale was used to evaluate participants' perspectives on sleep disorders and their associated symptoms. The results for individual questions are summarized in the table below:

Table 2: Responses of Likert Scale

Responses to Intolerance Towards Children's Behavior				
Response	Big Change	Moderate Change	Small Change	No Change
Likert Scale	1	2	3	4
Likelihood of Dozing Off While Driving				
Response	High Possibility	Moderate Possibility	Small Possibility	No Possibility
Likert Scale	1	2	3	4
Sense of Well-Being While Awake				
Response	Declined	Declined Slightly	Declined Somewhat	Normal
Likert Scale	1	2	3	4

Problems Waking Up Too Early				
Response	Dangerous Problem	Big Problem	Simple Problem	No Problem
Likert Scale	1	2	3	4

Table 3: Orientation of Sample Responses

Orientation	Average Range
Agree	1.00 - 1.74
Approve Somewhat	1.75 - 2.49
Disapprove Somewhat	2.50 - 3.24
Disapprove	3.25 - 4.00

Table 4: Averages and Standard Deviations of Sample Responses

Statement	Orientation	Deviation	Average	Sentence Number
Problem with waking up too early	Disapprove Somewhat	0.81	3.08	4
Sense of well-being during awake time	Disapprove Somewhat	0.91	3.23	1
Likelihood of dozing off at work	Disapprove Somewhat	0.92	3.06	5
Likelihood of dozing off while driving	Disapprove Somewhat	1.06	3.12	3
Intolerance towards children's behavior	Disapprove Somewhat	0.92	3.22	2

The overall average response was 3.12, with a standard deviation of 0.64, suggesting a somewhat disapproving attitude toward the symptoms of sleep disorders among the participants.

A t-test for two independent samples was performed to examine the impact of the following parameters. This statistical test is designed to compare the means of two distinct groups to determine if there is a significant difference between them. By analyzing these parameters, we aim to gain insights into how they may influence the outcomes related to the study.

Table 5: Effect of various parameters on sleep Disorder Assessment.

Effect of Gender on Sleep Disorder Assessment				
Gender	Average	Deviation	T Value	Significance Value
Male	3.18	0.65	1.411	0.16
Female	3.04	0.63		
Effect of Smoking on Sleep Disorder Assessment				
Status	Average	Deviation	T Value	Significance Value
Smoking	2.98	0.72	1.95	0.052
Non-Smoking	3.019	0.60		
Effect of Qat Chewing on Sleep Disorder Assessment				
Status	Average	Deviation	T Value	Significance Value
Qat	2.97	0.71	2.04	0.043
No Qat	3.19	0.61		
Effect of Nationality on Sleep Disorder Assessment				
Nationality	Average	Deviation	T Value	Significance Value
Saudi	3.18	0.61	3.375	0.001
Non-Saudi	2.68	0.74		
Effect of Educational Qualification on Sleep Disorder Assessment				
Qualification	Average	Deviation	T Value	Significance Value
Bachelor	15.34	0.61	4.83	0.009
Diploma	17.31			
Master	15.09	0.74		
Effect of Social Status on Sleep Disorder Assessment				
Social Status		Average	F Value	Significance Value
Single		16.36	5.12	0.007
Married		15.20		
Widow or Divorced		14.10		

The results reveal a minor difference in average scores related to gender; however, the significance value of 0.16 indicates that this difference is not statistically significant. Therefore, gender does not appear to influence the assessment of sleep disorder symptoms within this sample.

Similarly, while a difference in averages is noted for smoking status, the significance value of 0.052 suggests

that these differences are not statistically significant. Thus, smoking does not have a meaningful impact on the assessment of sleep disorder symptoms in this sample.

In contrast, the results demonstrate a significant difference in average scores for qat users, who reported lower scores. The significance value of 0.043 confirms that qat chewing significantly affects the assessment of sleep disorder symptoms.

Furthermore, the findings indicate a significant difference in scores based on nationality, with non-Saudi participants scoring lower. The significance value of 0.001 confirms that nationality influences the assessment of sleep disorder symptoms.

ANOVA was employed to evaluate the effect of educational qualifications. The results indicate significant differences, particularly highlighting that diploma holders scored higher. This suggests that educational qualification significantly impacts the assessment of sleep disorders and their symptoms.

Additionally, ANOVA was conducted to investigate the effect of social status. The results reveal significant differences, especially among widowed or divorced participants, who had lower scores. The significance value of 0.007 confirms that social status affects the assessment of sleep disorders and their symptoms.

4. Discussion:

The overall average score for the assessment of sleep disorders and their symptoms was found to be 3.28, with a standard deviation of 0.64. This indicates a relatively low degree of susceptibility to the symptoms associated with sleep disorders among the study participants. Contrary to the findings of Beker et al 2019 that shows challenges of shift work, the findings suggest that the nurses in this sample may be managing their sleep health adequately, although the average score still highlights the importance of continued monitoring and intervention [10].

The analysis revealed a significant effect of academic qualification on the assessment of sleep disorders and their symptoms which is in line with the study conducted by Wheaton et al in 2015 [11]. This suggests that educational background may influence nurses' understanding and perception of sleep-related issues, potentially impacting their ability to recognize and address these symptoms effectively. Higher educational levels may be associated with greater awareness of health implications and improved coping strategies related to sleep disorders [12].

The study found no significant effect of gender on the assessment of sleep disorders and symptoms [13]. This indicates that both male and female nurses experience similar levels of sleep-related issues, suggesting that factors influencing sleep health may be consistent across genders within this specific occupational group. As such, interventions aimed at addressing sleep disorders should consider a unified approach rather than gender-specific strategies [14].

The results indicate that smoking status did not significantly affect the assessment of sleep disorders and symptoms among participants. This finding suggests that, within this sample, smoking may not be a critical determinant of sleep health. However, it is essential to recognize that the relationship between smoking and sleep disorders can be complex and may require further investigation in larger, more diverse populations.

The study identified a significant effect of qat chewing on the assessment of sleep disorders and symptoms. Participants who reported chewing qat exhibited a higher prevalence of sleep-related issues compared to non-chewers. This finding underscores the potential impact of substance use on sleep health, indicating that qat may contribute to sleep disturbances among shift workers [15]. It highlights the need for targeted education and intervention strategies to address the implications of qat consumption on sleep quality and overall health among nurses.

5. Conclusion:

In conclusion, it is crucial for healthcare professionals, especially nurses, to prioritize adequate sleep as a key component of their well-being. Organizations should promote sleep hygiene through conducive environments, regular sleep schedules, and adequate rest periods. Training programs on the significance of sleep for cognitive performance and patient care could further enhance nurses' awareness of its impact on work quality.

Additionally, raising awareness about the negative effects of qat chewing on sleep disorders is essential. Educational campaigns and workshops can help healthcare professionals understand the physiological implications of qat and its connection to sleep disturbances, equipping them to guide patients on managing

substance use.

Further research is needed to explore how social status affects sleep disorders among healthcare workers, with a focus on factors like marital status and socioeconomic standing. This understanding can lead to tailored interventions and support systems for nurses from diverse backgrounds.

Finally, healthcare organizations should optimize work schedules to ensure nurses receive adequate rest. Strategies such as thoughtful shift rotations, extended breaks, and flexible scheduling can help mitigate the adverse effects of shift work on sleep quality. Monitoring staffing levels and workloads will also support nurses in prioritizing their health and well-being.

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