

## Sleep Quality among Saudi Nurses: Cross-Sectional Study

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### Abstract

**Background:** Sleep quality is one of the important aspects among nurses as it has a significant impact on nurses' work productivity, and work quality and is found to be associated with quality of life for nurses. **Purpose:** This study aims to assess the sleep quality among Saudi nurses. **Method:** This cross-sectional study included 323 Saudi nurses to measure their sleep quality using the Pittsburgh Sleep Quality Index (PSQI). **Results:** The study included 75% female and 25% male, with an advantage for age 25-34 (36.9%). The majority (61.61%) held a bachelor's degree in nursing, 49.11% were unmarried, 46.73% were married, 56.55% had fixed morning shifts, and 43.45% had shift days. 27.08% of participants had experienced 10 to 20 years of working experience. The study found that 67.86% had moderate sleep difficulty, followed by mild sleep difficulty, while only 2.08% had severe sleep difficulty. In addition, It was found that female (176.9) was significantly higher than male (143.3) in sleep difficulty ( $U=8467$ ,  $p<0.01=0.002$ ). It was found the distribution is significantly different in terms of age ( $X^2=10.52$ ,  $p<0.05=0.02$ ), and the post hoc (pairwise test) found that the 25-34 group (185.81) was higher than the 35.44 group (143.79). It was found that shift day (189.32) was significantly higher than Fixed morning shift (152.5) in sleep difficulty ( $U=1083.5$ ,  $p<0.01=0.006$ ). It was found that female (176.9) was higher than male (143.3) in sleep difficulty ( $U=8467$ ,  $p<0.01=0.006$ ). **Conclusion:** This study examined Saudi nurses' sleep difficulties and related factors in a specific healthcare setting. The findings highlight sleep difficulties and their causes in this population. The study findings emphasize the need to treat sleep difficulties among Saudi nurses to improve their well-being and job effectiveness. Healthcare organizations should promote sleep hygiene and provide sleep management resources. This may involve mental health education, scheduling changes, and support.

**Keywords:** Sleep quality, Saudi nurses, Sleep.

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## INTRODUCTION

Sleep is a biological necessity for human health and is defined as a physiological state that occurs in alternation with wakefulness divided into two phases, REM sleep is associated with vivid dreaming and a high level of brain activity, and NREM sleep is associated with reduced neuronal activity and non-visual ruminative thoughts (McCarley, 2007). Healthy People 2030 contains several sleep-related objectives that include healthy sleep demands good quality; suitable scheduling, regularity, and the absence of sleep disorders in addition

to enough sleep length which is important for sleep quality. (Ramar *et al.*, 2021)

The concept of "sleep quality" is broad and covers both more subjective aspects, such as "depth," "restfulness," and "waking up feeling refreshed," as well as more objective aspects, such as "sleep length," "sleep latency," and "arousal times" (Girschik *et al.*, 2012). Sleep disturbance is commonly reported by people all over the world and is the most common disturbance

reported after pain (Zamayan *et al.*, 2016; Al-Aradi *et al.*, 2022).

Sleep quality among nurses is an important issue because sleep deprivation impairs nurses' performance and efficiency leading to clinical mistakes and adverse events harming individual's health (Karagozlu *et al.*, 2008). It can lead to complications, such as irritability, bad moods, reduced communication skills, and a breakdown of emotional coping skills in the work environment (Killgore *et al.*, 2012).

A related or underlying issue may involve nurses working shifts; the relationship between work shifts and sleep quality has been evaluated in previous research and confirmed (Flo *et al.*, 2009).

Nursing, as a function compared to other professional groups, has a high level of psychological stress and huge work requirements while caring for patients. (Nadaoka, *et al.*, 1997; Dong *et al.*, 2017). A shift work schedule is one of the most significant factors that might influence sleep quality among nurses. Almhdawi *et al.*, 2021)

Shift work is common among nurses and is known to be a workplace hazard as it may cause poor sleep quality, which can negatively affect the health and safety of nurses and their patients (MvDowall *et al.*, 2017). Moreover, poor sleep quality may lead to lower nurse productivity. Nursing leaders and executives should consider longer intervals between shift-work cycles, clockwise scheduling order, a longer break time after night shift work, allowing nurses to nap before/during a night shift, and providing a worksite healthy sleep program (Park *et al.*, 2018)

### Significance of the Study

The risks associated with poor sleep quality include cognitive problems, mood alterations, depression, increased irritability, decreased work productivity, loss of motivation, high risk of injury, and altered physiological response (Khatony *et al.*, 2020; Hemmati-Maslakpak *et al.*, 2021).

Studying the sleep quality of nurses can provide more knowledge about the factors influencing it as well as, is considered as an important issue, which requires more extensive study, then, we can pinpoint strategies that can help improve their sleep quality.

### Research Hypothesis

The sleep quality among Saudi nurses will be low

### Research Question

1. What is the effect of sleep quality on nurses?

## PATIENTS AND METHOD

**Study Design:** This study is a cross sectional.

### Research Setting

The study conducted online through Google sheet survey which sent in form of link by email messages or via WhatsApp.

**Study Sample:** Study comprised 323 Saudi nurses using convenience sampling.

### Sample Size

Since the population size is unknown, the researchers used the following formula:

$$n = z^2 \cdot [P \cdot q] / d^2$$

n = sample size

P = estimated proportion of the study variable or construct based on previous studies or pilot studies (70%), q = 1-P (30%)

d = margin of error (5%)

z is the Z-score or a standard normal deviation corresponding to (100%,  $\alpha/2\%$ ), where  $\alpha$  refers to the significance level or the probability of making a type I error. The Z score for different significance levels is 1.96 for 5%,

After adding some hypothetical values, the sample size would be 323 (Charan & Biswas, 2013).

**Inclusion Criteria:** The study will include all Saudi nurses who work in the Kingdom of Saudi Arabia, whether in government or private institutions.

**Exclusion Criteria:** Non-Saudi nurses are excluded from Saudi Nurses who work out of the Kingdom of Saudi Arabia.

### Data Collection Procedure

After getting the ethical approval from the Ethical Committee at Qassim Health Cluster to conduct the study, the researchers started data collection, and the first participants (Saudi nurses) were informed about the purpose and the aim of this study. This is followed by getting permission from nurses and fills informed consent to their participation. Then, the link was sent to participants through email or WhatsApp to complete the questionnaire.

**Instruments:** This study included instruments as explained below:

#### Part A: Demographical Characteristics

Age range, gender, education, marital status, working shift, working year experiences, administrative position, and personal monthly income.

#### Part B: Pittsburgh Sleep Quality Index (PSQI)

It is self-rated questionnaire which assesses sleep quality over one month interval. Nineteen individual items generate seven "component" scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The sum of scores for these seven components yields one global

score. Clinical and clinimetric properties of the PSQI were assessed over an 18-month period with "good" sleepers (healthy subjects,  $n = 52$ ) and "poor" sleepers (depressed patients,  $n = 54$ ; sleep-disorder patients,  $n = 62$ ). Acceptable measures of internal homogeneity, consistency (test-retest reliability), and validity were obtained. A global PSQI score greater than 5 yielded a diagnostic sensitivity of 89.6% and specificity of 86.5% ( $\kappa = 0.75$ ,  $p$  less than 0.001) in distinguishing good and poor sleepers. The clinimetric and clinical properties of the PSQI suggest its utility both in psychiatric clinical practice and research activities.

### Data Analysis

Data was analysed using SPSS version 25.0. The frequencies, percentage, mean and standard deviation were conducted to describe the Pittsburgh Sleep Quality Index (PSQI). Based on One-Sample Kolmogorov-Smirnov the data was not normally distributed the non-parametric tests (The Mann Whitney and Kruskal Wallis).

### Ethical Consideration

Ethical approval obtained from ethical committee of Research Department in Qassim Health Cluster after sending all official requirements. The study guaranteed informed consent, voluntary participation, anonymity, privacy, and confidentiality of personal information.

## RESULTS

Data was analysed using SPSS version 25.0. The frequencies, percentage, mean and standard deviation were conducted to describe the Pittsburgh Sleep Quality Index (PSQI). Based on One-Sample Kolmogorov-Smirnov the data was not normally distributed the non-parametric tests (The Mann Whitney and Kruskal Wallis) were used to assess the distribution of the mean rank score of PSQI in term of sociodemographic information, A  $p$  value less than 0.05 was considered statistically significant.

### Table 1: The Socio-Demographic Information

As shown in Table (1) (Appendix I) 336 nurses participated in the study including 75% female and 25% male, the age was classified into 4 groups with advantage for 25-34 group (36.9%). The majority (61.61%) held bachelor degree in nursing, followed by diploma (26.19%), while high educated was 12.20%. 49.11% were unmarried, while 46.73% were married, 56.55% had fixed morning shift, while 43.45% had shift day. 25.89% were nursing intern, followed by 27.08% had experienced 10 up to 20 years of working experiences, then 23.81% had experienced less than 5 years. 19.94%

had administrative position, 47.92% had more than 10 thousand Saudi riyals, followed by less than 3000 SAR, then 8000-10000 SAR (19.35%).

### Table 2: The Prevalence of the Pittsburgh Sleep Quality Index (PSQI)

As shown in Table (2) (Appendix II) The prevalence of the Pittsburgh Sleep Quality Index (PSQI) was presented.

During the past month; 53.57% went to during the morning time, followed by 23.51% night and 22.92% afternoon. It was reported the 91.51% took  $\leq 15$  minutes to fall asleep each night, 46.43% usually get up between 5 and 6 am, 43.15% spent 6-7 hours of actual sleeping at night. The table shows participants who could not sleep, took medicine for sleeping, and registered loud snoring.

### Table 3: The Descriptive Information of the PSQI and Its Dimensions

As shown in Table (3) (Appendix III) the Pittsburgh Sleep Quality Index (PSQI) consists of seven dimensions, the score of each dimeson ranged between 0 and 3, thus the total score ranged between 0 and 21. The total PSQI score was  $9.13 \pm 2.77$ , which indicated a moderate level. Sleep efficiency had the highest mean difficulty score ( $2.25 \pm 1.24$ ), while Sleep latency had the lowest mean score ( $0.24 \pm 0.89$ ).

### Figure 1: The Distribution of Sleep Difficulty Level

As shown in Figure (1) (Appendix IV) 67.86% had moderate sleep difficulty, followed by mild sleep difficulty, while only 2.08% had sever sleep difficulty.

It was found that female (176.9) was higher than male (143.3) in sleep difficulty ( $U=8467$ ,  $p<0.01=0.006$ ).

### Table 4: The Distribution of Sleep Difficulty in Term of Socio-Demographic Information

As shown in Table (4) (Appendix V) The non-parametric tests (Mann Whitney and Kruskal Wallis) were applied to test the distribution the Pittsburgh Sleep Quality Index (PSQI) in term of Sociodemographic factors.

It was found that female (176.9) was significantly higher than male (143.3) in sleep difficulty ( $U=8467$ ,  $p<0.01=0.002$ ). It was found the distribution is significant differ in term of age ( $X^2=10.52$ ,  $p<0.05=0.02$ ), the post hoc (pairwise test) found that 25-34 group (185.81) higher than 35.44 group (143.79). It was found that shift day (189.32) was significantly higher than Fixed morning shift (152.5) in sleep difficulty ( $U=1083.5$ ,  $p<0.01=0.006$ ).

## Appendices

Appendix I: Table 1: Sociodemographic characteristics

Factor		N (%)
Gender	Female	252(75%)
	Male	84(25%)
Age	18-24	106(31.55%)
	25-34	124(36.9%)
	35-44	90(26.79%)
	>44	16(4.76%)
Education	Diploma	88(26.19%)
	Bachelor	207(61.61%)
	Master	37(11.01%)
	Ph.D.	4(1.19%)
Marital statuses	Unmarried	165(49.11%)
	Married	157(46.73%)
	Divorced	12(3.57%)
	Widowed	2(0.6%)
Working shift	Fixed morning shift	190(56.55%)
	Shift duty	146(43.45%)
Working year experiences	Nursing intern	87(25.89%)
	< 5 years	80(23.81%)
	5 up to 10	59(17.56%)
	10 up to 20	91(27.08%)
	20 up to 30	17(5.06%)
	More than 30	2(0.6%)
Administrative position	Yes	67(19.94%)
	No	269(80.06%)
Monthly income	<3000 SAR	74(22.02%)
	3000-5000 SAR	26(7.74%)
	5000-8000 SAR	10(2.98%)
	8000-10,000 SAR	65(19.35%)
	>10,000 SAR	161(47.92%)

Appendix II: Table 2: The prevalence of the Pittsburgh Sleep Quality Index (PSQI)

Factor		N (%)
1. During the past month, what time have you usually gone to bed?	Morning	180(53.57%)
	Afternoon	77(22.92%)
	Night	79(23.51%)
2. During the past month, how long (in minutes) has it usually takes you to fall asleep each night?	≤ 15 minutes	309(91.96%)
	16-30 minutes	1(0.3)
	31-60 minutes	17(5.06%)
	<60 minutes	9(2.68%)
3. During the past month, what time have you usually gotten up in the morning?	>7 am	57(16.96%)
	6-7 am	106(31.55%)
	5-6 am	156(46.43%)
	< 5 am	17(5.06%)
4. During the past month, how many hours of actual sleep did you get at night?	>7 hours	45(13.39%)
	6-7 hours	145(43.15%)
	5-6 hours	88(26.19%)
	< 5 hours	58(17.26%)
5. During the past month, how often have you has trouble sleeping because you	Not during the past month	56(16.67%)
	Less than once a week	55(16.37%)
	Once or twice a week	98(29.17%)
	Three or more times a week	127(37.8%)
5.a. Cannot get to sleep within 30 minutes	Not during the past month	56(16.67%)
	Less than once a week	60(17.86%)
	Once or twice a week	90(26.79%)
	Three or more times a week	130(38.69%)
5.b. Wake up in the middle of the night or early morning	Not during the past month	88(27.19%)
	Less than once a week	79(23.51%)
5.c. Have to get up to use the bathroom	Not during the past month	88(27.19%)
	Less than once a week	79(23.51%)

Factor		N (%)
5.d. Cannot breathe comfortably	Once or twice a week	73(21.73%)
	Three or more times a week	96(28.57%)
	Not during the past month	183(54.46%)
	Less than once a week	71(21.13%)
	Once or twice a week	49(24.58%)
5.e. Cough or snore loudly	Three or more times a week	33(9.82%)
	Not during the past month	209(62.2%)
	Less than once a week	54(16.07%)
	Once or twice a week	41(12.2%)
5.f. Feel too cold	Three or more times a week	32(9.52%)
	Not during the past month	128(38.1%)
	Less than once a week	78(23.21%)
	Once or twice a week	72(21.43%)
5.g. Feel too hot	Three or more times a week	58(17.26%)
	Not during the past month	146(43.45%)
	Less than once a week	103(30.65%)
	Once or twice a week	58(17.26%)
5.h. Have bad dreams	Three or more times a week	29(8.63%)
	Not during the past month	129(38.39%)
	Less than once a week	88(26.19%)
	Once or twice a week	71(21.13%)
5.i. Have pain	Three or more times a week	48(14.29%)
	Not during the past month	142(42.26%)
	Less than once a week	66(19.64%)
	Once or twice a week	58(17.26%)
5.j. Other	Three or more times a week	70(20.83%)
	Not during the past month	195(58.04%)
	Less than once a week	50(14.88%)
	Once or twice a week	35(10.42%)
6. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?	Three or more times a week	56(16.67%)
	Not during the past month	58(17.26%)
	Less than once a week	168(50%)
	Once or twice a week	40(11.9%)
7. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?	Three or more times a week	70(20.83%)
	Not during the past month	246(73.21%)
	Less than once a week	43(12.8%)
	Once or twice a week	28(8.33%)
8. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?	Three or more times a week	19(5.65%)
	No problem at all	143(42.56%)
	Only a very slight problem	88(26.19%)
	Somewhat of a problem	59(17.56%)
9. During the past month, how would you rate your sleep quality overall?	A very big problem	46(13.69%)
	Very good	67(19.94%)
	Fairly good	120(35.71%)
	Fairly bad	122(36.31%)
10. Do you have a bed partner or roommate?	Very bad	27(8.04%)
	No bed partner or room mate	131(38.99%)
	Partner/roommate in other room	14(4.17%)
	Partner in same room but not same bed	54(16.07%)
11. If you have a roommate of bed partner, ask him/her how often in the past month you have had:	Partner in same bed	137(40.77%)
	Not during the past month	150(58.37%)
	Less than once a week	47(18.29%)
	Once or twice a week	29(11.28%)
11.a. Loud snoring	Three or more times a week	31(12.06%)
	Not during the past month	178(70.92%)
	Less than once a week	49(19.52%)
	Once or twice a week	16(6.37%)
b. long pauses between breaths while asleep	Three or more times a week	8(3.19%)

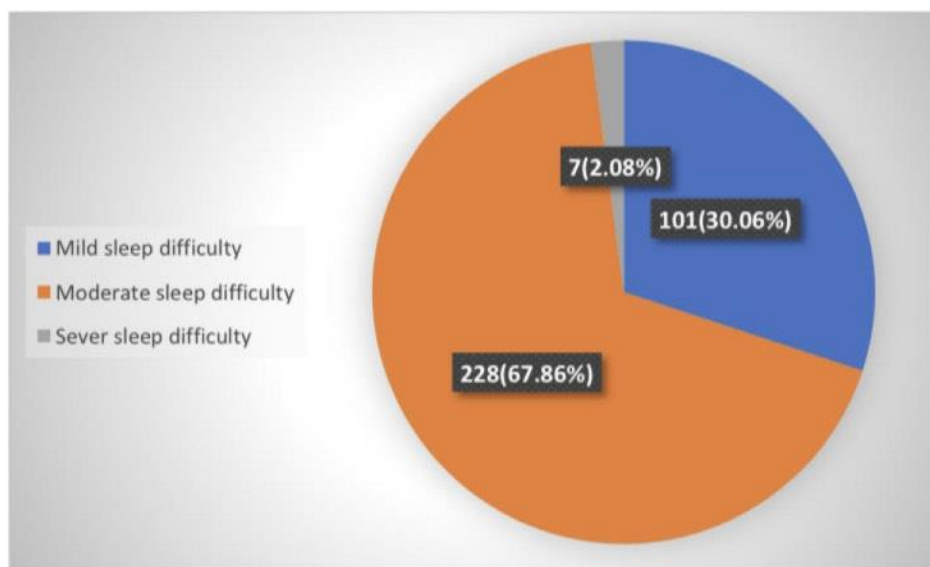


Factor		N (%)
11.c. Legs twitching or jerking while you sleep	Not during the past month	172(68.53%)
	Less than once a week	33(13.15%)
	Once or twice a week	28(11.16%)
	Three or more times a week	18(7.17%)
11.d. Episodes of disorientation or confusion during sleep	Not during the past month	157(62.3%)
	Less than once a week	50(19.84%)
	Once or twice a week	26(10.32%)
	Three or more times a week	19(7.54%)
11.e. Other restlessness while you sleep	Not during the past month	167(67.34%)
	Less than once a week	37(14.92%)
	Once or twice a week	24(9.68%)
	Three or more times a week	20(8.06%)

**Appendix III: Table 3: The descriptive information of the PSQI and its dimensions**

Dimension	Mean±SD
Subjective sleep quality	1.32±0.88
Sleep latency	0.24±0.89
Sleep duration	1.47±0.90
Sleep efficiency	2.25±1.24
Sleep disturbance	1.56±0.70
Use of sleep medication	1.36±1.00
Daytime dysfunction	0.92±0.89
Global PSQI Score	9.13±2.77

Key:0=None; 1-7=Mild;8-14=Moderate;15-21=Sever



**Figure 1 The distribution of sleep difficulty level**

**Appendix IV: Figure 1: The distribution of sleep difficulty level**

**Appendix V: Table 4: The distribution of sleep difficulty in term of socio-demographic information**

Factor		Mean rank	Statistic	p value
Gender	Female	176.9	U=8467	0.006**
	Male	143.3		
Age	18-24	166.37	X <sup>2</sup> =10.52	0.02*
	25-34	185.81		
	35-44	143.79		
	>44	187.47		
<i>Post hoc (pairwise test)</i>		<i>25-34&gt;35.44</i>		

Factor		Mean rank	Statistic	p value
Education	Diploma	172.74	$X^2=2.20$	0.53
	Bachelor	170.75		
	Master	149.45		
	Ph.D.	134.88		
Post hoc result				
Marital statue	Unmarried	173.88	$X^2=4.03$	0.26
	Married	159.47		
	Divorced	205.46		
	Widowed	211.75		
Working shift	Fixed morning shift	152.5	$U=1083.5^*$	0.002**
	Shift duty	189.32		
Working year experiences	Nursing intern	165.76	$X^2=8.10$	0.15
	< 5 years	186.45		
	5 up to 10	182.46		
	10 up to 20	150.95		
	20 up to 30	144.94		
	More than 30	156.75		
Administrative position	Yes	155.87	$U=8165$	0.23
	No	171.65		
Monthly income	<3000 SAR	170.03	$X^2=0.67$	0.95
	3000-5001	180.06		
	5000-8001	178.40		
	8000-10,000	163.98		
	>10,000	167.14		
* $\leq 0.05$ ; ** $\leq 0.01$ ; *** $\leq 0.001$				

## DISCUSSION

The study sheds light on nurses' sleep quality and the need for interventions. According to previous studies, Healthcare workers, especially nurses, suffer from poor sleep quality. Long hours, rotating shifts, and high stress can cause sleep problems in nurses (MvDowall *et al.*, 2017; Park *et al.*, 2018). Sleep disruptions can harm nurses' health, well-being, and job performance. Poor sleep quality can affect perception, mood, productivity, and safety (Ramar *et al.*, 2021). These consequences have significant implications for patient safety and the quality of care provided by nurses (Khatony *et al.*, 2020; Hemmati-Maslakpak *et al.*, 2021). Hence, it is imperative to implement interventions to improve the quality of sleep among nurses.

This study found that nurses' shift schedules affected sleep quality. Previous study found nurses struggle to get enough restful sleep due to irregular and altering shifts (Flo *et al.*, 2009). Providing longer intervals between shiftwork, improving scheduling order, allowing napping breaks during night shifts, and supporting worksite sleep programs may help nurses sleep better.

Nurses' mental stress and task demands may affect sleep quality. Emotional labor, decision-making, and critical thinking in nursing can increase anxiety (Nadaoka, *et al.*, 1997; Dong *et al.*, 2017). Relaxation, mindfulness, and psychological support can help nurses manage stress and sleep better. Organizational policies and procedures should prioritize nurse well-being and

address the root causes of poor sleep quality (Girschik *et al.*, 2012). This may entail assessing shift duration and frequency, providing adequate rest periods, maintaining manageable workloads, and promoting a work environment that values work-life balance (Almhdawi *et al.*, 2021). Nurse leaders, administrators, and politicians must work together to promote nurse sleep health.

This distribution shows the diversity of nursing marital statuses and illustrates the possible impact of marital status on sleep quality and related consequences (August 2022). 56.55% worked a fixed morning shift, whereas 43.45% worked shifts. Shift employment disrupts sleep and the circadian rhythm, so this distribution is significant. Shift nurses may have trouble sleeping and be more prone to sleep problems. 25.89% of participants were nursing interns, suggesting a percentage of new nurses. 27.08% of experienced nurses had 10–20 years of experience, followed by 23.81% with less than five years. This distribution shows that nurses' work demands, stress levels, and coping mechanisms vary, which may affect their sleep quality (Bernburg *et al.*, 2022). 19.94% of participants were administrative. This shows that administrative nurses may have different work schedules or more work-related stress than non-administrative nurses. Future studies should examine how administrative duties and workload affect nurse sleep quality.

Participants were grouped by monthly income. 47.92% earned above 10,000 Saudi riyals, followed by 22.02% earning less than 3000 SAR. Nurses' salary

unpredictability may affect their living conditions, lifestyle choices, and access to sleep-enhancing tools. Understanding the study participants' socio-demographic features can affect sleep quality and outcomes. The sample's diversity in gender, age, education, marital status, working shift, years of experience, administrative position, and income can help identify potential sleep quality factors. These data can inform nurse sleep quality research and interventions (Di Muzio *et al.*, 2020).

The study emphasizes the need of meeting the sleep needs of healthcare workers working non-traditional hours to guarantee their well-being and effectiveness. The study also examined nurses' bedtimes. 91.96% had a sleep initiate latency less than 15 minutes. This suggests that most nurses can initiate sleep promptly, indicating effective sleep initiation and favorable sleep hygiene habits. A small percentage reported longer sleep start latencies, which may indicate sleep disorders or other factors impacting sleep quality. Nurses (46.43%) woke up between 5 and 6 am. Early morning job shifts or inclinations may explain this finding. Nurses who work late shifts or have difficulty changing their sleep and wake schedules on days off may be affected by early wake times. It emphasizes the need for sleeping and circadian alignment strategies for nurses with different schedules.

Nighttime sleep duration was also evaluated and found substantial sleep disorders. Many reported having problems falling asleep, waking up at night, wanting to use the bathroom, breathing discomfort, and other sleep interruptions multiple times a week. These data show that nurses have sleep problems and require interventions and support. Sleep disruptions can harm nurses' health, work, and patients (Di Muzio *et al.*, 2020). Sleep education, optimizing sleep settings, and encouraging good sleep behaviors can enhance sleep quality. Nurse sleep medication use was also examined.

Table 3 describes the Pittsburgh Sleep Quality Index (PSQI) dimensions among nurses. The total score range is 0–21, with each dimension scored 0–3. Each dimension's mean score reveals nurses' sleep quality experiences. Sleep efficiency had the highest mean difficulty score,  $2.25 \pm 1.24$ . This suggests that nurses had trouble maintaining a high sleep efficiency—the percentage of time spent asleep out of total bedtime (Epstein *et al.*, 2020). Frequent awakenings, restlessness, and trouble falling back asleep might cause sleep efficiency issues.

Sleep latency had the lowest mean difficulty score,  $0.24 \pm 0.89$ . The low mean score suggests that nurses fell asleep easily. To understand nurses' sleep experiences, this data must be considered alongside other sleep quality factors. The global PSQI score combines scores from all aspects to assess sleep quality. Nurses' mean global PSQI score was  $9.13 \pm 2.77$ , indicating

moderate sleep problems. This shows the need for sleep-related therapies and assistance.

The distribution of sleep difficulty levels among the nurses is depicted in Figure 1. The majority of nurses (67.86%) experienced moderate sleep difficulty; followed by mild. 2.08 percent had serious sleep difficulty. These results show that most nurses had mild to moderate sleep issues. Identifying sleep difficulties and adapting interventions to severity levels can help solve them.

This study found that female nurses may have more sleep issues than male nurses. This disparity may be caused by gender-specific factors including hormone cycles, parenting obligations, or coping techniques (Epstein *et al.*, 2020). Understanding gender variations can help create sleep therapies for female nurses.

Table 3 and Figure 1 demonstrate the PSQI-assessed nurses' sleep issues. Interventions should address sleep efficiency and disruption. Nurses should address sleep issues because the global PSQI score showed moderate sleep difficulty. The nurses had more difficulty sleeping. Female nurses had more trouble sleeping.

Table 4 presents data on the prevalence of sleep difficulties among nurses, categorized by different socio-demographic variables. Data analysis used Mann-Whitney and Kruskal Wallis non-parametric testing. Gender significantly affects sleep difficulty. Female nurses had a mean rank of 176.9, indicating more sleep problems than male nurses, with a rank of 143.3. The Mann-Whitney U test showed that the two groups differed ( $U=8467$ ,  $p<0.01=0.002$ ). Nurses with sleep difficulties are more likely to be female.

Sleep difficulty also differed by age ( $X^2=10.52$ ,  $p<0.05=0.02$ ). The Kruskal Wallis test examined this link. The post hoc pairwise test showed that the 25–34 age groups had the highest mean rank of 185.81, substantially higher than the 35–44 age groups' 143.79. Younger nurses, especially those aged 25–34, had higher sleep problems than older nurses. Understanding age-related sleep difficulties can help customize therapies to different age groups.

Shift employment also caused sleep difficulties. Shift nurses had a mean score of 189.32, indicating more sleep trouble than fixed morning shift nurses, who scored a score of 152.5.  $U=1083.5$ ,  $p<0.01=0.006$ ). Shift employment might affect sleep quality due to irregular work hours and disrupted circadian rhythms (Epstein *et al.*, 2020). Nurses' well-being depends on reducing shift work's sleep-related impacts.

Education, marital status, administrative job, and monthly income did not significantly affect sleep problems ( $X^2=2.20$ ,  $p=0.53$ ). These results imply that



education, marital status, job position, and salary may not directly affect sleep problems in nurses. However, unmeasured causes or interactions may still cause sleep difficulties in these areas. To understand how these factors affect sleep quality, more research is needed.

Nurses' years of expertise were used to analyze sleep difficulties distribution. The Kruskal Wallis test showed no significant connection ( $X^2=8.10$ ,  $p=0.15$ ). However, nurses with 5–10 years of experience had a significantly high mean rank of 182.46. This shows that nurses in this experience range may have more sleep problems than those with less experience. Exploring the causes of this tendency could help target solutions and support.

## CONCLUSION

In conclusion, this study examined Saudi nurses' sleep difficulties and related factors in a specific healthcare setting. The findings highlight sleep difficulties and their causes in this population. Participants' PSQI scores showed moderate sleep issues. Sleep efficiency was the hardest, while sleep latency had the lowest mean score.

The study examined socio-demographic characteristics and sleep problems. Females had more sleep problems than male participants. Age was also a factor, with 25-34-year-olds having more trouble sleeping than 35-44-year-olds. Shift workers have higher sleep problems than morning shift workers. These findings emphasize the need to treat sleep difficulties among Saudi nurses to improve their well-being and job effectiveness. Healthcare organizations should promote sleep hygiene and provide sleep management resources through mental health education, scheduling changes, and support.

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