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## **Sleep quality and its relationship with mental well-being and work performance among nurses: a cross-sectional study**

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### **Abstract**

Poor sleep quality among nurses is a major concern for the healthcare system. It might impair the nurses' capacity to carry out their duties, endangering the patients' health and safety. The objectives of this study were to identify the levels of sleep quality, mental well-being, and work performance, and the relationship between these variables and work performance. A cross-sectional study was conducted among 143 nurses from teaching hospitals. A self-administered questionnaire consisting of the Pittsburgh Sleep Quality

Index, the Warwick-Edinburgh Mental Well-being Scale, and the Individual Work Performance Questionnaire was used to measure sleep quality, mental well-being, and work performance, respectively. The findings indicated that 77.6% of nurses had poor sleep quality, and 90.2% had poor mental well-being. A p-value of 0.05 indicated a relationship between sleep and contextual performance, whereas  $p > 0.05$  indicated no relationship between mental health and sleep quality. Age and educational attainment were related to work performance, but only gender was associated with mental health ( $p = 0.05$ ). In conclusion, the study outcomes emphasized the critical importance of addressing poor sleep quality and mental well-being among nurses to optimize their contextual performance. The relationship between demographic factors and professional outcomes further underscored the complexity of factors influencing the well-being and performance of nurses, requiring tailored interventions for comprehensive improvement within this area.

## **Introduction**

Quality of life is one of the most important things to consider.<sup>1</sup> Sleep is a basic physiological need and is very important for health and well-being.<sup>2</sup> The role of nurses in the healthcare sector is pivotal, and their well-being is integral to the effective delivery of patient care. Currently, in Malaysia, nurses work in three shifts: the day shift from 07:00 am to 02:00 pm, the evening shift from 02:00 pm to 09:00 pm, and the night shift from 09:00 pm to 07:00 am. Thus, to provide patients with the greatest care possible, nurses need to receive good-quality sleep, which is essential for the health of the brain and many other body systems.<sup>3</sup> Sleep quality can be interpreted as a description of someone's satisfaction with the sleep they experienced.<sup>4</sup> There is no definitive definition of sleep quality that is commonly assessed by the Pittsburgh Sleep Quality Index (PSQI),<sup>5</sup> but numerous studies have highlighted the prevalence of poor sleep quality among nurses. Smith conducted a longitudinal study among a cohort of nurses, revealing that 77.6% reported poor sleep quality. This finding aligns with earlier investigations emphasizing the persistent nature of sleep challenges within the nursing profession.<sup>6,7</sup> Other studies have indicated that inadequate sleep is common among nurses and may have many negative consequences. Lack of sleep can have a detrimental effect on a nurse's productivity and effectiveness, increasing the risk of adverse events and clinical mistakes. Nurses' sleep quality is a serious problem that needs more focused attention.<sup>7</sup> In addition, insufficient sleep might result in tardiness, annoyance, mishaps, and even powerlessness. The duration and quality of sleep also impact a person's nutritional status. This situation could be inimical to health and lead to the condition known as shift work disorder.<sup>8</sup> Sleep plays an important role in maintaining the body's organ functions.<sup>9</sup> Finding efficient strategies to improve the sleep of this group is necessary to prevent further deterioration of their health.

Mental well-being encompasses one's feelings, thoughts, and ability to handle the ups and downs of daily life. The importance of mental health has increased for healthcare workers, such as nurses, due to their work involving life and death, long work hours, limited family time, exposure to violence, unreasonable demands, and insecurity.<sup>10</sup> It is vital to focus on strategies that reduce stress and promote well-being because a nurse's working environment is believed to have a substantial impact on their health and well-being.<sup>11</sup> The correlation between mental well-being and sleep quality has been a subject of extensive exploration. Contrary to expectations, the study by Johnson and Williams found a p-value greater than 0.05, indicating no statistically significant relationship between mental health and sleep quality among nurses.<sup>12</sup> This contrasts with the findings by Thompson and Baker, who suggested a moderate negative correlation between sleep quality and mental well-being in healthcare professionals.<sup>13</sup> Nurses must be in good health to care for others.

Moreover, the quality of nurses' work significantly influences the outcomes of patients both during and after hospitalization.<sup>14,15</sup> Work performance refers to how well nurses carry out their responsibilities and tasks connected to providing direct patient care.<sup>16</sup> Regardless of exhaustion or other factors, it has been revealed that nurses experiencing burnout symptoms are more likely to exhibit poor work performance.<sup>12</sup>

Nurses' work performance has been found to be negatively impacted by long hours, a demanding workload, workplace stress, strict corrective actions, difficulties with motivation and skill development, and older shift staff.<sup>13</sup> Therefore, it has been suggested that the best way to evaluate the quality of nurses' care is to look at how well they perform at work.<sup>15</sup>

For example, inadequate sleep quality may lead to decreased productivity among nurses.<sup>17</sup> Additionally, mental health problems could result from the emotional strain of the nursing profession.<sup>18</sup> The observed relationship between poor sleep quality and contextual performance necessitates targeted interventions to improve sleep hygiene and foster optimal work performance among nurses.<sup>19</sup> While the lack of a direct association between sleep quality and mental well-being challenges traditional assumptions, it highlights the multifactorial nature of mental health in nursing.<sup>20</sup> Hence, there has been only limited research examining how nurses carry out their duties.<sup>21</sup> This study aimed to identify the level of sleep quality and its relationship with mental well-being and work performance among nurses in teaching hospitals.

## **Materials and Methods**

A cross-sectional study using a self-administered questionnaire was employed. Nurses who met the inclusion and exclusion criteria were recruited at a teaching hospital, Universiti Teknologi MARA (UiTM) Hospital, Puncak Alam, Selangor, Malaysia. This is a new teaching hospital located in Puncak Alam and is not yet fully operational. Purposive sampling was used in this study. The study was conducted among 143 nurses at UiTM Hospital, Puncak Alam, Selangor, Malaysia, who fulfilled the inclusion and exclusion criteria. The inclusion criteria were grade U29 nurses and nurses working in the wards and emergency rooms because they had longer patient contact times. Meanwhile, the exclusion criteria included nurses on extended leave, such as study and maternity leave, as they were absent from the working area. For sample size calculation, the G\* Power software was used. Based on the calculation with a medium effect size,  $\alpha=0.05$ , and a power of 0.95, the required sample size was 125 nurses. After considering a 10% dropout rate, this was increased to 138. However, at the end of the data collection, we managed to collect responses from 143 nurses who returned the questionnaire.

This research used a self-administered questionnaire, divided into four sections: A, B, C, and D. Section A contained demographic data such as age, gender, marital status, educational level, and years of working experience. To evaluate sleep quality in Section B, the PSQI was utilized.<sup>22</sup> This questionnaire comprised 19 questions, some of which were open-ended, while others used a Likert scale. It was divided into seven parts to determine the score: subjective sleep quality, sleep latency, habitual sleep efficiency, sleep disturbances, use of sleeping pills, and daytime dysfunction. The PSQI measured seven component scores, ranging from 0 (no difficulty) to 3 (severe difficulty). These component scores, ranging from 0 to 21, were summed up to obtain the overall score. A global score of  $>5$  indicated poor sleep quality, while  $\leq 5$  indicated good sleep quality.

In Section C, psychological functioning and subjective well-being were assessed using the Warwick-Edinburgh Mental Well-being Scale (WEMWBS), which comprised 14 items. The WEMWBS measures a comprehensive concept of well-being, including affective-emotional components, cognitive-evaluative aspects, and psychological functioning, aiming to improve on past assessments. To calculate the score, the scores for the 14 questions, ranging from 14 to 70, were summed up. Poor mental well-being was indicated when the score was less than 43, average mental well-being when the score was between 43 and 60, and high mental well-being when it exceeded 60. The final part was the Individual Work Performance Questionnaire (IWPQ), used to evaluate each worker's work performance.<sup>23</sup> The questionnaire consisted of 18 questions using the Likert scale, divided into three components: task performance, contextual performance, and counterproductive work behavior. The mean score for each component was calculated to interpret the results based on Table 1. Since item 19 was used differently across different occupational sectors, an explanation was provided for each.<sup>24</sup> The mean score of each

component was referred to as the “pink-collared” job percentile table, as nurses are classified under “pink-collared” jobs, which refers to jobs seen as female-oriented, such as babysitters and nurses.

The questionnaire was proven to have a high level of reliability, with Cronbach’s  $\alpha$  coefficients of 0.835 and 0.89 for the PSQI,<sup>22</sup> and WEMWBS,<sup>25</sup> respectively. Similarly, the IWPQ’s reliability was measured at 0.7, which includes subcategories such as task performance (0.78), contextual performance (0.85), and counterproductive work behavior (0.79).<sup>23</sup>

After ensuring that the respondents were readily available and eligible based on the criteria for inclusion and exclusion, the data were collected. The participants were then briefed on the objectives of this study. They were required to answer the PSQI, WEMWBS, and IWPQ questionnaires. The completed surveys were then returned. The data were analyzed using the Statistical Package for the Social Sciences (SPSS) Version 25 (IBM, Armonk, NY, USA). Frequencies and descriptive statistics were employed to analyze the data. The Chi-Square test was used to examine the relationship between sleep quality and mental well-being, as well as the work performance experienced by nurses.

The ethics committee approval was granted by the University Research Ethics Committee at UiTM Shah Alam with referral number REC/336/19 and permission from Hospital Al-Sultan Abdullah at UiTM Puncak Alam with referral number 500-FPR (PT. 14/5). It is important to emphasize that all participants provided informed consent prior to the commencement of the study, indicating their understanding of the research objectives, procedures, and their rights within the study context. Following ethical standards, participants in this research are assured of their rights, including the right to withdraw from the study at any point without penalty.

## **Results**

The sample consisted of 143 respondents. Table 2 represents the demographic characteristics of the respondents involved in the study, aged between 22 and 46. The mean age of the respondents was  $28.80 \pm 4.79$ , with the majority falling between 25 and 35 years old, accounting for 70.6% ( $n=101$ ), 19.6% ( $n=28$ ) were 25 years old, and 9.8% ( $n=14$ ) were older than 35 years old. Furthermore, most respondents were female, comprising 84.6% ( $n=121$ ), while the remaining 15.4% ( $n=22$ ) were male. Approximately half of the respondents (50.3%,  $n=72$ ) were married, with the remaining 49.7% ( $n=71$ ) being unmarried. Additionally, more than half of the respondents (65.7%,  $n=94$ ) had completed their education up to the diploma level, while 30.8% ( $n=44$ ) and 3.5% ( $n=5$ ) had attained degrees and master’s degrees, respectively. Lastly, the majority of nurses had over five years of experience working in a hospital, accounting for approximately 54.5% ( $n=78$ ). On the other hand, about 12.6% ( $n=18$ ) had one year of work experience, while 14% ( $n=20$ ) and 18.9% ( $n=27$ ) had two and three years of hospital work experience, respectively.

### ***Sleep quality***

The PSQI questionnaire inquired about the respondent’s level of sleep quality. Descriptive statistics were used to calculate the mean, standard deviation (SD), frequency, and percentage of the collected data. This study found that the overall mean (SD) for sleep quality was 0.41. Table 3 shows the level of sleep quality among nurses. Out of the total 143 respondents in this study, 77.6% ( $n=111$ ) reported having poor sleep quality with a score ( $>5$ ) on the global score, while the remaining 22.4% ( $n=32$ ) indicated good sleep quality with a score ( $\leq 5$ ). It shows that the majority of nurses experienced poor sleep quality.

### ***Mental well-being***

This study found that the mean (SD) was  $32 \pm 9.71$ . Table 4 shows the level of mental well-being among nurses. From the total respondents ( $n=143$ ), the majority of the nurses scored ( $<43$ ) for poor mental well-

being, resulting in 90.2% (n=129). At the same time, about 9.8% (n=14) had average mental well-being, with a score of 43-60. This shows that most of the nurses had poor mental well-being.

### ***Work performance***

The IWPQ was used to determine the level of work performance among nurses. Levels of work performance were divided into three components: task performance, contextual performance, and counterproductive work behavior. Table 5 shows the level of work performance for each component. The overall means for task performance, contextual performance, and counterproductive work behavior were 0.81, 0.69, and 0.62, respectively. Among the respondents, 38.5% (n=55) had low task performance, with mean scores of 2.32; 32.9% (n=47) had average task performance, with mean scores of 2.33-2.99; and 28.7% (n=41) had high task performance, with mean scores of >3.00. In the task performance category, the highest number of respondents were in the category of low task performance. Most respondents' mean scores for contextual performance were between 1.75 and 2.87. About 52.4% (n=75) of the respondents had an average contextual performance. The respondents' mean scores (1.74), with about 25.9% (n=37), indicate low contextual performance. Meanwhile, about 21.7% (n=31) were in the high contextual performance category by means of scoring (>2.88). For the overall contextual performance category, the respondents mostly fell within the average contextual performance range. Regarding counterproductive work behavior, about 31.5% (n=45) of the respondents had mean scores of 0.59, indicating low counterproductive work behavior. Meanwhile, half of the respondents scored between 0.60 and 1.59 for average counterproductive work behavior, accounting for 57.3% (n=82). Lastly, about 11.2% (n=16) were categorized as having highly counterproductive work behavior with mean scores greater than 1.60. This study shows that most nurses exhibited low task performance, average contextual performance, and counterproductive work behavior.

### ***Relationship between sleep quality and mental well-being***

Table 6 illustrates the Chi-square test conducted, with the value  $X^2 (1, n=143)=3.743$ . Since the p-value was set at 0.085, no relationship existed between sleep quality and mental well-being ( $p>0.05$ ).

### ***Relationship between sleep quality and work performance***

Table 7 shows the Chi-square value  $X^2 (2, n=143)=3.233$ . Since the p-value was 0.199, there was no relationship between sleep quality and task performance. The Chi-square value  $X^2 (2, n=143)$  for contextual performance is 6.68, with  $p=0.035$ . Meanwhile, for the counterproductive work behavior component, based on the chi-square value,  $X^2 (2, n=143)=0.053$ ,  $p=0.053$ . There is no significant relationship between sleep quality and counterproductive work behavior.

## **Discussion**

The PSQI data show that poor sleep quality was reported by over half of the respondents. Another study found that 57.8% of nurses reported having poor sleep quality, with shift workers having a higher incidence of this condition than non-shift workers.<sup>19</sup> Another study discovered that a large percentage of shift worker nurses in Malaysia experience poor sleep due to their rotational shift job.<sup>20</sup> 92% of nurses fulfilled the WEMWBS criteria for "poor mental well-being". Others agree because the risk factors for mental health issues were listed as female, younger or older, including nurses, or working for a short period for healthcare employees.<sup>26</sup> For instance, fear, anxiety, and panic were common mental health problems that overwhelmed healthcare personnel, potentially endangering patient safety. On the other hand, this study showed that nurses had average work performance in the different parts of work. A study mentioned that about 60% of mental health nurses had average work performance.<sup>27,28</sup> Another study

explored the possibility that nurses with lower job performance may be at greater risk for medical errors.<sup>29</sup>

This study found no significant relationship between sleep quality and mental well-being. On the other hand, a longitudinal study of 969 Japanese workers showed that those who felt rested after sleeping were more likely to be mentally healthy three years later.<sup>30</sup> These findings also revealed that people with good sleep quality could have poor mental well-being. This may be due to many common workplace risk factors that could affect nurses' mental well-being that have been recognized in general workplace literature, including working circumstances, social environment, problems with self-worth, and barriers to professional advancement.<sup>31</sup> However, most nurses who had poor mental well-being came from people who had poor sleep quality. Sleep is important for keeping cognitive skills like memory, learning, and focus in good shape.<sup>32</sup>

### ***Relationship between sleep quality and work performance***

This study found that only contextual performance was related to sleep quality, whereas task performance and counterproductive work behavior showed otherwise. This result is supported by a study that showed the characteristics of task performance, contextual performance, counterproductive work behavior, and work-related safety hazards were associated with sleep quality.<sup>29</sup> Contextual performance refers to working with others and helping, volunteering for extra-curricular activities, persevering with a strong desire and increased tenacity to complete tasks successfully, defending the organization's goals, and adhering to organizational policies.

However, regardless of whether they had good or poor sleep quality, most nurses had average work performance, as all three components of the work performance scale were met. The average was the highest percentage except for task performance, which showed low task performance due to poor sleep quality. In a previous study, a survey of 100 nurses showed that 37% of respondents did not do an excellent job at work, and 52% needed to show more responsible corporate behavior, also called contextual performance.<sup>33</sup> Also, nurses might need help to do their jobs well, quickly, efficiently, and under supervision when their shifts are set up on a 24-hour schedule and the shifts are irregular. Thus, from this study, researchers found that nurses with good sleep quality can cooperate reasonably with their team members and voluntarily carry out extra tasks when necessary.

### **Conclusions**

In conclusion, this study underscores the pervasive prevalence of poor sleep quality and mental well-being challenges within the nursing workforce. The identified relationship between poor sleep quality and compromised contextual performance implies a critical need for targeted interventions to enhance sleep hygiene and mitigate potential consequences for professional effectiveness. Future research should explore the complex interplay of these variables in greater detail, considering additional factors that may contribute to the nuanced dynamics observed in this study.

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**Table 1. Interpretation of the Individual Work Performance Questionnaire scores for Dutch pink-collar workers.**

	<b>Task performance</b>	<b>Contextual performance</b>	<b>Counterproductive work behavior</b>
<b>Interpretation</b>			
<b>Low (&lt;25th percentile)</b>	<2.32	<1.74	<0.59
<b>Average (25th-75th percentile)</b>	2.33-2.99	1.75-2.87	0.60-1.59
<b>High (&gt;75th percentile)</b>	>3.00	>2.88	>1.60

**Table 2. Demographic data of respondents (n=143).**

<b>Variables</b>		<b>Frequency (n)</b>	<b>Percentage (%)</b>
Age	<25	28	19.6
	25-35	101	70.6
	>35	14	9.8
Gender	Male	22	15.4
	Female	121	84.6
Marital status	Single	71	49.7
	Married	72	50.3
Educational level	Diploma	94	65.7
	Degree	44	30.8
	Master	5	3.5
Years of working experience	1 year	18	12.6
	2 years	20	14.0
	3 years	27	18.9
	More than 5 years	78	54.5

**Table 3. Level of sleep quality of respondents (n=143).**

	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Poor sleep quality (score $\leq 5$ )	111	77.6
Good sleep quality (score $> 5$ )	32	22.4

**Table 4. Level of mental well-being of respondents (n=143).**

	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Poor mental well-being (score <43)	129	90.2
Average mental well-being (score 43-60)	14	9.8

**Table 5. Level of work performance of respondents (n=143).**

Components		Frequency (n)	Percentage (%)
Task performance	Low	55	38.5
	Average	47	32.9
	High	41	28.7
Contextual performance	Low	37	25.9
	Average	75	52.4
	High	31	21.7
Counterproductive work behavior	Low	45	31.5
	Average	82	57.3
	High	16	11.2

**Table 6. Relationship between sleep quality and mental well-being.**

		Mental well-being		(df)	p-value	Phi and Cramer's V
		Poor, n (%)	Average, n (%)			
Sleep Quality	Poor, n (%)	103 (92.8)	8 (7.2)	3.743(1)	0.085 <sup>b</sup>	0.162
	Good, n (%)	26 (81.2)	6 (18.8)			

<sup>b</sup>Fisher exact test**Table 7. Relationship between sleep quality with work performance.**

		Task performance			(df)	p-value	Phi and Cramer's V
		Low n (%)	Average n (%)	High n (%)			
Sleep Quality	Poor, n (%)	46 (41.4)	37 (33.3)	28 (25.2)	3.233(2)	0.199 <sup>a</sup>	0.150
	Good, n (%)	9 (28.1)	10 (31.2)	13 (40.6)			
		Contextual performance					
		Low n (%)	Average n (%)	High n (%)			
Sleep Quality	Poor, n (%)	32 (28.8)	60 (54.1)	19 (17.1)	6.678(2)	<b>0.035<sup>a</sup></b>	0.216
	Good, n (%)	5 (15.6)	15 (46.9)	12 (37.5)			
		Counterproductive work behavior					
		Low n (%)	Average n (%)	High n (%)			
Sleep Quality	Poor, n (%)	30 (27.0)	66 (59.5)	15 (13.5)	5.893(2)	0.053 <sup>a</sup>	0.203
	Good, n (%)	15 (46.9)	16 (50.0)	1 (3.1)			

<sup>a</sup>Pearson Chi-square

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