

## ORIGINAL ARTICLE

# Critical Care Nurses's Knowledge and Attitude Towards Sleep Promoting Interventions Among Critically Ill Patients in Intensive Care Unit

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## ABSTRACT

**Introduction:** Sleep promotion in the Intensive Care Unit (ICU) should be a priority because interruptions may prevent patients from getting enough sleep. Inadequate sleep might lead to delirium, anxiety, increased hospital stays, and higher mortalities. Critical care nurses with good knowledge and attitude towards sleep promotion interventions benefit critically ill patients' quality of care and life. Critical illness, pain, mechanical ventilation, surroundings, and nurses' activity at night contribute to sleep disturbances in ICU patients. The aim of this study was to determine critical care nurses' knowledge regarding the physiology of sleep, interventions to promote sleep, attitude towards sleep, and sleep promotion. **Methods:** A cross-sectional study with a self-administered questionnaire and purposive sampling method was conducted among 109 critical care nurses at the ICU of a teaching hospital. **Results:** The mean score knowledge of critical care nurses was 4.72 ( $\pm$  1.92), attitude towards sleep was 18.57 ( $\pm$  3.56), and intervention towards sleep promotion was 70.00 ( $\pm$  12.00). A significant correlation was observed between knowledge and attitude ( $p < 0.05$ ,  $r = 0.22$ ) and between attitude and intervention ( $p < 0.05$ ,  $r = 0.32$ ), indicating a modest correlation. Moreover, a significant association was noted between years of experience and attitude and intervention ( $p < 0.05$ ). **Conclusion:** Critical care nurses' knowledge, attitudes, and interventions were poor; hence, they need to improve their knowledge, attitude, and interventions. The significance of sleep promotion and factors leading to critical care nurses in Malaysia not promoting sleep among ICU patients needs to be rectified.

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## INTRODUCTION

Sleep is defined as a speedily reversible phase to reduce metabolism, activity, and awareness (1) controlled by the central nervous system (2). In a critical care setting, the quality of sleep among ill patients is influenced by many factors (3), such as critical illness, pain, mechanical ventilation, surroundings, and nurses' activity at night (4).

Due to the lack of sleep knowledge and awareness among critical care nurses, patient outcomes like health status in the ICU could be affected. Unfortunately, nurses' knowledge of sleep promotion in the ICU was poor (5). Nurses in ICU did not receive education on sleep promotion; hence the lack of knowledge, especially in

sleep components, and no protocol for sleep promotion in the ICU (6). Without adequate knowledge and knowledgeable nurses in sleep promotion, critically ill patients could suffer inadequate sleep due to disturbances and deprivation that were undiagnosed, untreated, undertreated, or mistreated (7).

Attitude in the documentation of sleep promotion is one of the main components of critical care professionals of nursing (8). The sleep documentation should consist of assessments, interventions, and evaluations to encourage patient-centred treatment in promoting sleep, especially in ICU patients (8). A large number of patients might pose a problem, e.g., the increasing number of ICU beds in the short-run (9), and impeding nurses from implementing the best attitude to promote sleep in the ICU. Moreover, the high number of patients admitted to the ICU and decreased attitude toward documentation would impact the nursing care of critically ill patients, especially in sleep promotion (10). Nurses need to provide a positive attitude in sleep promotion on critically ill patients to

attain good quality care (11).

A study reported that sleep promotion interventions in the ICU were not successfully developed and applied due to the lack of practice and guidelines (12). Likewise, another study reported that nurses had aimed and prepared a sleep-promoting intervention but thought it was unachievable due to a lack of time and non-functional schedules (13). Meanwhile, critical care nurses were unsure whether the pharmacological or non-pharmacological aspects are more effective in sleep intervention and should be used in promoting sleep (14). In Malaysia, no specific intervention in promoting sleep in the ICU has been documented. No specific non-pharmacological approaches, such as earplugs, eye masks, or both, were introduced towards interventions to promote sleep among critically ill patients in the ICU, with inadequate evidence (15). The multi-sleep interventions may improve the quality and quantity of sleep and prevent sleep loss and disturbance among critically ill patients in the ICU. Thus, critical care nurses must acquire appropriate knowledge, attitude, and interventions to promote sleep.

## **MATERIALS AND METHODS**

### **Design and setting**

The cross-sectional design method was used, according to the population-based surveys. The study was conducted at the Intensive Care Unit (ICU) of a teaching hospital in Malaysia, Hospital USM, Kubang Kerian, Kelantan, from January to June 2021.

### **Participant and sampling**

A total of 109 nurses working in critical care settings (General ICU, Surgical ICU, Surgical High Dependency Unit, Neurosurgery ICU, Trauma ICU, Cardiothoracic ICU, Coronary Care Unit, and Burn Unit) were involved in this study through purposive sampling. The sample size was determined using the Krejcie and Morgan formula (16). The recommended sample size was 109 respondents. After adding a 10% dropout, the total number of respondents for this study was 120.

### **Eligibility criteria**

The inclusion criteria includes nurses with one year and above experience working night shifts in the ICU. The exclusion criteria were nurses who are on leave (including maternity and study leave) and those who hold a managerial position in nursing.

### **Study instruments**

This study used a self-administrated questionnaire adopted from the study by Zsarnay (17) comprising four parts: demographic characteristics, knowledge physiology of sleep, attitude survey, and intervention checklist.

### **Demographic characteristic**

The questionnaire comprised ten questions: age, nation, gender, religion, year of nursing experience, years of experience in critical care nursing, level of education, special certification, respondent notice regarding sleep promotion, and ward placement.

### **Knowledge of sleep physiology**

This part implements multiple choice questions (MCQs) comprising 11 items. The respondents must choose A, B, C, or D. One right answer is equal to 1 score, and one wrong is equal to 0. The total score is 11 marks. Respondents with the highest score, i.e., 11 marks, indicate a high level of sleep physiology knowledge.

### **Attitude survey**

This part was used to determine critical care nurses' attitudes towards sleep and sleep promotion and used a four-point Likert scale comprising six items. The ratings are as follows: 4 (strongly agree), 3 (agree), 2 (disagree), and 1 (strongly disagree). Item ratings were summed up to produce a total score from 6 to 24, with the higher scores 16–24 indicating a higher attitude, while 8–16 scores indicate a moderate attitude and 1-8 scores indicate a low attitude of sleep promotion.

### **Intervention checklist**

Consisted of 21 items to identify specific nursing interventions applied by critical care nurses to promote sleep in critically ill patients. The checklist used a four-point Likert scale, as follows: 4 (always), 3 (sometimes), 2 (not applicable), 1 (rarely), and 0 (never). Item ratings were summed up to produce a total score from 0 to 84, with the higher scores indicating common interventions in sleep promotions. The 0–21 scores signify low interventions, 21–42 scores (moderate intervention), and 63–84 (good intervention) in promoting sleep. The higher frequency indicates the most common intervention applied by critical care nurses.

### **Validity and reliability**

The questionnaire was validated by three experts: an Intensive Care Anaesthesiologist, Nurse manager for the ICU, and nurses with Advanced Diplomas using content validity checklist. The questionnaire was administered to another 5 senior nurses with more than 15 years of experience in the ICU. A pilot study was conducted among 10 critical care nurses in the ICU of Hospital USM to test the reliability of the questionnaire.

Due to it being an MCQ questionnaire, knowledge and reliability of the instrument were obtained via the formulation for content validity index (CVI), with a value of 0.9. The Cronbach's alpha for sleep promotion attitude was 0.746, and the intervention for sleep and sleep promotion of a nurse was 0.752. The Cronbach's alpha value of 0.7 is acceptable for internal consistency, ranging from 0.70 to 0.95 (18).

## Ethical consideration

Ethical approval has been obtained from the respective ethical bodies (university and study setting), the UiTM Ethics Committee on March 3, 2020 (Reference:600-TNCPI (5/1/6)) and the Human Research Ethics Committee of USM on April 30, 2020 (JEPeM no: USM/JEPeM/20010022). Respondents were involved voluntarily and were asked to sign the consent form after explanations regarding the procedure of this study were given. Anonymity and privacy have been assured.

## Data collection

After obtaining approval from the UiTM and USM Research Ethics Committee, the researcher addressed the respondents based on the inclusion and exclusion criteria and explained the purpose of the study.

The respondents in this study have to provide written consent. The researcher handled the questionnaire and distributed it to the ICU, Hospital USM, for one week. Respondents were chosen based on the purposive sampling method and the working schedule. The questionnaire took about 15 to 20 minutes to be filled up by the respondents after working hours, collected, and put in envelopes. Each respondent was given a numerical code for data analysis, and confidentiality was guaranteed.

## Data analysis

Data were analysed using SPSS software (version 25). Descriptive statistics analysis (mean, standard deviation, percentage, and frequency) was used to analyse knowledge physiology of sleep, critical care nurses' attitudes towards sleep and sleep promotion and specific nursing interventions applied by critical care nurses to promote sleep in critically ill patients.

Pearson correlation was used to determine the relationship between critical care nurses' knowledge of sleep physiology and sleep-promoting interventions and their attitude towards sleep and sleep promotion. Meanwhile, simple linear regression was used to determine the relationship between years of critical care nurses' experience and the level of knowledge regarding sleep physiology, sleep-promoting interventions, and attitude toward sleep and sleep promotion.

The parametric tests were used to determine the assumptions of normal values. Kolmogorov-Smirnov normality tests were carried out before inferential data analysis. The results of the normality test for the main variables of this study (knowledge) indicate that these variables are typically distributed with probabilities and normally distributed ( $p > 0.05$ ).

## RESULTS

### Demographic data

Table I shows that 51 respondents are between 31 and

Table I. Demographic characteristics of the respondents (N: 109)

Variable	Value	Frequency	Percent
<b>Ward placement</b>	Cardiothoracic ICU	14	12.8
	Coronary Care Unit	10	9.2
	Surgical High Dependency Unit	10	9.2
	Surgical ICU	15	13.8
	Neuro ICU	<b>20</b>	<b>18.3</b>
	Intensive Care Unit	<b>20</b>	<b>18.3</b>
	Unit Rawatan Kebakaran (URK)	11	10.1
	Trauma ICU	9	8.3
<b>Age</b>	21 – 30	43	39.4
	31 – 40	<b>51</b>	<b>46.8</b>
	41 – 50	13	11.9
	51 – 60	2	1.8
Mean age	33.59 (SD± 6.31)		
<b>Race</b>	Malay	<b>106</b>	<b>97.2</b>
	Chinese	3	2.8
<b>Gender</b>	Male	16	14.7
	Female	93	85.3
<b>Religion</b>	Islam	<b>106</b>	<b>97.2</b>
	Buddha	3	2.8
<b>Years of experience in nursing</b>	1 – 10	<b>59</b>	54.1
	11 – 20	44	40.4
	21 – 30	6	5.5
<b>Years of experience in critical care</b>	1 – 10	<b>62</b>	<b>56.9</b>
	11 – 20	41	37.6
	21 – 30	6	5.5
<b>Education level</b>	Diploma	<b>101</b>	<b>92.7</b>
	Degree	8	7.3
<b>Post basic certification</b>	Yes	24	22.0
	No	<b>85</b>	<b>78.0</b>
<b>Sleep promotion information</b>	Yes	33	30.3
	No	<b>76</b>	<b>69.7</b>

40 years old, with 46.8% ( $n = 51$ ), and the mean age is 33.59 ( $SD \pm 6.31$ ). Most of the respondents worked at the neuro ICU and ICU and showed similar results of 18.3% ( $n = 20$ ). Most respondents are Malay, with 97.6% ( $n = 106$ ), followed by Chinese 2.8% ( $n = 3$ ), and most of them are women (85%,  $n = 93$ ) and men (14%,  $n = 16$ ). Approximately 54.1% ( $n = 59$ ) of the respondents have 1 to 10 years of experience in nursing, and 56.9% ( $n = 62$ ) have 1 to 10 years of experience in critical care. Respondents with a diploma background are 92.7% ( $n = 101$ ), while those with a degree are 7.3% ( $n = 8$ ). Most respondents (78.0%,  $n = 85$ ) do not have post-basic certification in their career, while 22.0% ( $n = 24$ ) have post-basic certification. The sleep promotion information of the respondents is 33.0% ( $n = 33$ ), while 69.7% ( $n = 76$ ) of the respondents do not have sleep promotion information (Table I).

### Knowledge among critical care nurses regarding the physiology of sleep and sleep promoting interventions

The highest score of knowledge regarding sleep

physiology is 58.7% (n = 64). The average length of sleep in a young adult is 7 to 8 hours, indicating that the respondents have an excellent understanding of sleep physiology. Moreover, 57.8% (n = 63) of respondents noted that age is the most powerful determinant of a person’s sleep pattern, and they have a good knowledge of the effects of sleep deprivation seen in ICU patients, with 56.0% (n = 61) respondents reported lethargy, irritability, and confusion. Meanwhile, the lowest knowledge of sleep physiology is 66.1% (n = 72), whereby the respondents answered incorrectly regarding the importance of non-REM in sleep, 68.8% (n = 75) of the respondents answered REM during sleep incorrectly, and 88.1% (n = 96) have a low knowledge regarding occasional loud noises. The mean score is 4.72 (SD = 1.92), the minimum score is 0, and the maximum score is 11 (Table II).

**Table II: Descriptive data for knowledge of critical care nurses regarding the physiology of sleep and sleep promoting interventions**

Items	Correct		Incorrect	
	n	%	n	%
The average length of sleep in a young adult was 90 minutes	64	68.7	45	41.3
The average adult sleeps hours per night	52	47.7	57	52.3
The stage of sleep as a “deepest” stage of sleep	56	51.4	53	48.6
Stage of sleep do people experience vivid dreams	41	37.6	68	62.4
Initial effect of drugs used to hasten sleep on REM	48	44.0	61	56.0
Seems to be the most powerful determinant of a person’s deep pattern	63	57.8	42	42.2
Sensitivity to noise is increased	45	41.3	64	58.7
Occasional loud noises	13	11.0	96	88.1
Effects of sleep deprivation seen in ICU patients	61	56.0	48	44.0
During REM sleep	34	31.2	75	68.8
Non-REM sleep is important	37	33.0	72	66.1

\*REM = rapid eye movement

**Common nursing interventions applied by critical care nurses to promote sleep in critically ill patients**

Most of the respondents in this study, 88.1% (n = 98), claimed that they turn off the light as an intervention to promote sleep, while 86.2% (n = 94) reported intervention result for medicate pain and turn on the radio is similar. All these were the most frequent interventions applied by critical care nurses in promoting sleep among critically ill patients in the ICU. The respondents showed poor intervention in delayed routine procedures such as lab draws, X-rays, or ECGs, with 28.4% (n = 31). Meanwhile, 34.9% (n = 38) of the respondents reported that changing patients’ positions helped promote sleep among ICU patients, and 39.4% (n = 43) scored a delay in administering oral medication as a sleep intervention. The total mean score is 70 (SD = 12.00). The maximum score regarding sleep promotion intervention is 84, and the minimum score is 31. Respondents with the highest score were 84, indicate that they applied well the nursing intervention in sleep promotion (Table III).

**Critical care nurse’s attitude towards sleep and sleep promotion**

About 33.9% (n = 37) of the respondents strongly agree that sleep promotion is an important part of the daily nursing care plan. Meanwhile, 33.0% (n = 36) of respondents strongly agree that nurses should be willing to adjust their nursing care activities to promote sleep to the patients, followed by 27.5% (n = 30) who strongly agree that physicians need more education on the importance of sleep in critically ill patients.

Subsequently, 26.6% (n = 29) of the respondents strongly agree that they need more education regarding the importance of sleep for critically ill patients. Furthermore, the level of attitude in routinely assessing the quality and quantity of patients’ sleep via written documentation is still low, at 23.9% (n = 26) and the attitude of nurses who would approach physicians regarding changes in the frequency of routine procedures is 22.0% (n = 24). The total mean score for critical care nurses towards sleep and sleep promotion is 18.57 (SD = 3.56). Meanwhile, the minimum score in attitudes towards sleep and sleep promotion among critical care nurses is 8, and the maximum score is 24 (Table IV).

**Relationship between knowledge of the physiology of sleep and critical care nurse’s attitudes toward sleep and sleep promotion intervention**

The level of knowledge and attitude (p < 0.05) are significantly correlated in this study. The correlation coefficient is 0.22, indicating that knowledge and attitudes are positive and poorly correlated. The correlation coefficient observed in the relationship between knowledge and intervention is similar, suggesting a positive and poor correlation between the variables. There is also a significant correlation (p<0.05) between attitude and intervention, showing that the correlation is fair (r = 0.32, Table V).

**Relationships between nurses’ years of experience in knowledge, attitude, and intervention of sleep and sleep promotion**

There is no significant association between the number of years of experience and the extent of knowledge (p > 0.05). Meanwhile, the years of experience are associated with the level of attitudes (p < 0.05). The mean attitude increases by 0.314 with another year of practice. The number of years of expertise and intervention among the nurses in the ICU is significantly associated (p < 0.05). An increase in one year of experience increases the mean of intervention by 0.112 (Table VI).

**DISCUSSION**

**Knowledge of critical care nurses toward the physiology of sleep and sleep promoting interventions**

The mean score of 4.57 in this study indicates that

**Table III: Descriptive data for common nursing interventions applied by critical care nurses to promote sleep in critically ill patients**

Items	Mean	SD	Frequency (%)			
			Never	Rarely	Sometimes	Always
Decrease frequency of line changes	3.49	0.688	0 (0%)	12 (11%)	31 (28.4%)	60 (60.6%)
Decrease frequency of dressing changes	3.17	0.951	7 (6.4%)	20 (18.3%)	29 (26.6%)	53 (48.6%)
Change height of transducers for hemodynamic monitoring to phlebostatic axis rather than change the height of the bed	3.13	1.13	19 (17.4%)	6 (5.5%)	26 (23.9%)	58 (53.2%)
Organize nursing care to coordinate care with other patients/ nurses/ health care workers in the room	3.74	0.583	1 (0.9%)	5 (4.6%)	15 (13.8%)	88 (80.7%)
Leave the patient alone without interruptions for 90 minutes or longer after he/she has fallen asleep	3.34	1.01	9 (8.3%)	16 (14.7%)	12 (11.0%)	72 (66.1%)
Give sedative or hypnotic	3.20	0.997	7 (6.4%)	24 (22.0%)	18 (16.5%)	60 (55.0%)
Turn off or decrease volumes of unnecessary/alarms	3.63	0.946	5 (4.6%)	11 (10.1%)	3 (2.8%)	90 (82.6%)
Decrease conversation with other nurses/ Health care workers	3.60	0.850	6 (5.5%)	9 (8.3%)	7 (6.4%)	87 (79.8%)
Close the patient's door	3.14	1.13	17 (15.6%)	12 (11.0%)	18 (16.5%)	62 (56.9%)
Put the patient in a quieter room	3.39	0.962	9 (8.3%)	10 (9.2%)	19 (17.4%)	71 (65.1%)
Use the ventilator alarm delay when suctioning patient	3.34	1.074	12 (11.0%)	14 (12.8%)	7 (6.4%)	76 (69.7%)
Adjust room temperature or patient's coverings	3.02	0.802	4 (3.7%)	10 (9.2%)	9 (8.3%)	86 (78.9%)
Give patient a back rub	3.07	1.086	14 (12.8%)	18 (16.5%)	23 (21.1%)	54 (49.5%)
Medicate for pain	3.75	0.651	2 (1.8%)	7 (6.4%)	6 (5.5%)	94 (86.2%)
Turn radio on	3.05	1.10	16 (14.7%)	15 (13.8%)	6 (5.5%)	94 (86.2%)
Change patient position	3.75	0.682	3 (2.8%)	6 (5.5%)	56 (51.4%)	38 (34.9%)
Arrange family visitation around patient sleep patterns	3.00	1.201	21 (19.3%)	15 (13.8%)	16 (14.7%)	57 (52.3%)
Delay the administration of oral medication	2.52	1.30	33 (30.3%)	26 (23.9%)	6 (5.5%)	43 (39.4%)
Shut off light in patient room	3.74	0.725	3 (2.8%)	9 (8.3%)	1 (0.9%)	98 (88.1%)
Delay routine procedures such as lab draws, x-ray or ECGs	2.33	1.284	46 (42.2%)	12 (11.0%)	20 (18.2%)	31 (28.4%)
Document quality and quantity of patient sleep via written documentation	3.10	1.13	17 (15.6%)	14 (12.8%)	19 (17.4%)	59 (54.1%)

**Table IV: Descriptive data for critical care nurse's attitude towards sleep and sleep promotion interventions items**

Items	Mean	SD	Frequency (%)			
			Strongly disagree	Disagree	Agree	Strongly agree
Sleep promotion is an important part of my daily nursing care plan	3.22	0.658	1 (0.9%)	12 (11%)	60 (55.0%)	37 (33.9%)
Nurses should be willing to adjust their nursing care activities to promote patient sleep	3.13	0.759	3 (2.8%)	16 (14.7%)	54 (49.5%)	36 (33.0%)
Nurses should be willing to approach physicians regarding changes in frequency of routine procedures	2.88	0.847	9 (8.3%)	19 (17.4%)	57 (52.3%)	24 (22.0%)
Nurses need more education regarding the important of sleep for the critically ill	3.15	0.664	4 (3.7%)	5 (4.6%)	71 (65.1%)	29 (26.6%)
Physicians need more education regarding the importance of sleep for the critically ill	3.14	0.713	6 (5.5%)	3 (2.8%)	70 (64.2%)	30 (27.5%)
It is important to routinely assess the quality and quantity of patients' sleep via written document	3.06	0.692	3 (2.8%)	14 (12.8%)	66 (60.6%)	26 (23.9%)

**Table V: Correlation between the knowledge of the physiology of sleep and critical care nurse's attitudes toward sleep and sleep promotion intervention**

Variable	1	2	3
1. Knowledge	1	0.22*	0.23*
2. Attitude	0.23*	1	0.32*
3. Intervention	0.22*	0.32	1

\*p-value<0.05; Pearson correlation applied as normality assumption was fulfilled

**Table VI. The relationship between nurse's years' experience in knowledge, attitude and intervention of sleep and sleep promotion**

Items	(95% CI)	t statistics	p value*	r2
Knowledge	.021	0.71(-.038,.080)	0.477	0.006
Attitude	.112	2.05(.004, .219)	0.043	0.038
Intervention	.314	2.06(.010, .618)	0.042	0.022

\*Simple linear regression

critical care nurses lack knowledge regarding sleep promotion, similar to the previous study (17). This is likely due to the low level of awareness among nurses in the physiology of sleep. Inadequate care preparation for critically ill patients may occur due to the lack of knowledge and understanding among critical care nurses regarding the importance of sleep for critically ill patients in the ICU (7). The use of knowledge in daily nursing practice is essential in improving the quality of care towards the patient besides as an educational preparation (19). Furthermore, nurses' lack of knowledge in sleep promotion, especially in the critical care unit, could impact patients' safety and quality of care (20).

This study used a different set of questionnaires to approach respondents' knowledge, and the research reported a mean score of 9.93 on the critical care nurses' level of knowledge, which differs from a previous study (21). It could be due to factors like educational background and years of experience that influenced nurses' knowledge to promote sleep in the ICU. The use of health information technology in this advanced era may encourage nurses to use evidence-based practice (22, 23), including devices and technologies proven to improve the efficiency of treatment for critically ill patients (24). The findings in this study indicate that knowledge among critical care nurses was poor due to the lack of knowledge application in nursing practices. Hence, the application of knowledge towards promoting sleep significantly impacts the well-being of critically ill patients (1). Therefore, it is recommended to provide a continuous educational program for ICU nursing staff through coordinated in-service training to enhance their knowledge and skills regarding enhancing patients' health goals.

#### **Nursing intervention applied by critical care nurses to promote sleep in critically ill patients**

The respondents used dim lighting for sleep promotion interventions to promote sleep in critically ill patients, similar to the previous study (25). In this study, the respondents noticed that patients' sleep could be disrupted by bright lights from the nurses' station, lights that are not dimmed, and lights that are turned on brightly at night. These conditions are not conducive for patients to sleep, and they will be awake at night. The reduced light in the ward environment showed improved sleep and a significant decrease in delirium (26).

Meanwhile, a previous study reported that 77% of the respondents used medication for pain as the most frequent intervention in promoting sleep among critically ill patients (17). The respondents believed that pharmacological intervention could promote sleep in patients besides ensuring they are comfortable. As a nurse, it is necessary to assess a patient's pain level using the pain score to recognise moderate to severe pain. Unrelieved pain could affect the physiology and psychology towards the patient and could cause anxiety

(27).

One of the effective intervention strategies for sleep promotion is to close the doors (28). In the current study, only 56.9% of the respondents, with a mean of 3.14, close the patient's door to promote sleep among critically ill patients in the ICU. This study's finding is consistent with a study that mentioned that closing the doors can reduce noise and improve patients' comfort in the ICU (29).

It was also found that almost half of the respondents (49.5%) in this study gave back rub to the patients to promote sleep. Hsu et al. (30) documented that ten minutes of back massage in sleep promotion intervention could improve sleep efficiency, sleep time, breathing and anxiety among patients in the ICU.

This study found that critical care nurses do not completely implement sleep interventions in the ICU, partly due to staff shortage. Recently, the shortage of nurses has been noticed in specialised areas, especially the ICU. It requires a high staff ratio, and newly qualified nurses were recruited (31). The nurse-to-patient ratio remains imbalanced due to the nursing staff shortage, besides the increasing number of patients daily, which can affect patient care in the ICU (32, 33). These findings showed that non-pharmacological interventions had become a priority for sleep promotion interventions in the ICU. Sleep promotion interventions could improve sleep quality in acute and semi-acute hospital patients (34). Therefore, nursing education regarding the importance of sleep promotion intervention should be emphasised and implemented as a daily nursing care activity.

#### **Critical care nurse's attitudes toward sleep and sleep promotion**

Contrary to the previous study (35), the result indicated that most critical care nurses had a good attitude toward sleep promotion. Approximately 96% of the respondents agreed to adjust their nursing activities to promote sleep and be ready to approach physicians regarding changes in the frequency of routine activities to promote sleep. For critically ill patients, nursing activities are essential in managing patients' problems and needs (36). Thus, to ensure that all nursing activities in the ICU run smoothly, time management among critical care nurses should be improved.

Meanwhile, only 23.9% of the respondents strongly agreed that the attitude in routinely assessing the quantity of patients' sleep should be shown via written documentation. Moreover, 53 nurses from 19 wards in acute care reported no informal documentation regarding sleep promotion (37). Documentation among nurses was poor due to insufficient sources of office supplies, the lack of time to document, staff shortage, and unfamiliarity with the hospital policy and

work settings (17). Additionally, lack of support and encouragement by the management and knowledge limitations among the nurses in the clinical area could become barriers to producing the documentation due to a lack of clear information among nurses (38). Thus, the lack of attitude in patient care knowledge, sleep promotion, and training among nurses can affect sleep promotion towards critically ill patients (39).

### **The relationship between knowledge of the physiology of sleep and critical care nurse's attitude towards sleep and sleep promotion intervention**

The present study showed a positive and poor correlation between knowledge and attitude. Meanwhile, a significant correlation is observed between the level of knowledge and attitude and between the attitude and intervention, indicating a modest correlation between attitude and intervention. Knowledge level, attitude, and intervention in this study's results are higher than in the previous study, with  $r = .199$  and  $p = 0.156$ , which the correlation between sleep physiology knowledge and attitudes toward sleep promotion was not statistically significant (17). This suggests that the knowledge physiology of sleep and positive attitudes toward sleep promotion have little or no correlation. Nurses in the current study could be considered to have adequate knowledge and a better attitude in promoting sleep. Nurses with a good attitude would apply the best interventions in promoting sleep, as stated by a study that the attitudes of healthcare workers impact behaviour, care quality, and patient outcomes (40).

Respondents in this study ( $n = 24$ ) had post-basic certification, and  $n = 62$  had experience in critical care compared to a previous study (17). The previous study had limited respondents with critical care registered nurse (CCRN) certification, i.e.,  $n = 6$  and  $n = 54$  had experience in critical care. Moreover, the sample size is not comparable, rendering the results not significant. Nurses are directly involved in the care of patients; hence, they should have adequate knowledge and expertise (41).

### **The relationship between the number of years of experience of nurses on knowledge, attitude, and intervention of sleep and sleep promotion**

The finding of the present study is contrary to a study that stated nurses with more years of experience in knowledge have a significant relationship in patient care (1). About 5.5% ( $n = 6$ ) of the respondents in this study had an experience of 20 to 30 years, and most of them (56.9%) had 1 to 10 years of experience ( $n = 62$ ), indicating a small portion of nurses with more than 20 years of experience. A nurse's experience is important to deliver the best care, especially to the patient's advantage. It is generally assumed that nurses with more years of experience have more knowledge regarding sleep and sleep promotion. This is because the severity of the patients requires highly specialised

skills, and working in critical care is generally reserved for experienced nurses (31).

In this study, the relationship of the number of years of experience is associated with the level of attitudes ( $p < 0.05$ ). This contradicts a study that indicated no relationship between the number of years of critical care nurse's practice and attitude towards sleep-promoting interventions ( $p = 0.468$ ) (2). The different ICU placement and management could be a source of this difference besides the nurse's workload, which affected patient care (42).

The number of years and experience of the nurses are significantly ( $p < 0.05$ ) associated with sleep promotion intervention in this study. Similarly, there is an association and positive reinforcements towards sleep promotion intervention (34). It showed that respondents with experience in critical care had applied the best interventions towards patients in the ICU at Hospital USM. The findings should be used to establish sleep-promoting guidelines for all patients in acute care settings (43). Nurses who work in critical areas should be aware of the importance of sleep among critically ill patients. Moreover, hospital management also plays an important role in creating a policy on sleep promotion.

### **Implication of study**

This study focuses on critical care nurses to raise awareness regarding the importance of sleep promotion towards patients in the ICU besides optimising patient comfort and improving sleep promotion interventions. It is recommended to create a routine sleep assessment by critical care nurses every shift to ensure patients get quality sleep.

A teaching hospital in Malaysia does not have the proper tool to measure sleep in critically ill patients. Non-proper intervention affects the patient's length of stay in the ICU. The use of sleep promotion intervention can reduce the patient's stay in the ICU using a sleep-enhancing tool, which significantly improves patient outcomes (44). The finding of this research suggests additional information on the current knowledge, attitude and intervention in promoting sleep and sleep promotion should be applied in the intensive care department to promote sleep among ill patients to minimise sleep disruption factors (35).

### **Study limitation**

Among the limitations of this study is the lack of recent articles regarding sleep promotion, especially on nurses' attitudes toward sleep and sleep promotion in Malaysia. Subsequently, the time constraint affects the respondents' rate of participation. It was quite difficult for the researcher to gather the data, which was conducted during the COVID-19 pandemic. The pandemic has affected people worldwide, particularly nurses, who were the front liners and had a heavy workload managing patients during the pandemic.

Next, the sample for this study only involved the critical care nurses in Hospital USM besides being limited to certain ethnicity of nurses. Comparing nurses' ethnicity could be a factor in knowledge, attitude, and intervention in sleep promotion. The study involved 97.2% Malay and 2.8% nurses of other ethnicities. Moreover, the questionnaire was prepared in English due to the lack of time to translate it into Malay.

### Strength of study

This is the first study to examine knowledge and attitudes toward sleep promotion interventions among critical care nurses in the ICU in a teaching hospital in Malaysia, Hospital USM. Furthermore, several sleep interventions were proposed in the questionnaire, and the researcher can evaluate the most prevalent intervention used by critical care nurses.

### CONCLUSION

This research has explored the level of knowledge and attitude of critical care nurses regarding sleep promotion intervention among critically ill patients in the ICU. The study objectives have been met, according to the analysis. The study reveals that critical care nurses' knowledge, attitude, and interventions were poor, whereby critical care nurses have no disclosure about sleep promotion. The study also shows the positive and poor correlation between knowledge and attitude. The mean score of knowledge and attitude towards sleep promotion intervention among critical care nurses in the ICU was low. Therefore, it is indispensable for critical care nurses to improve their knowledge, attitude, and interventions and explore the significance of sleep promotion in the ICU.

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