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Nurses' Performance Regarding Acquired Sleep Deprivation among Critically Ill Patients

Nora Gamal Mohamed El- Sayed (1) Badria Abd Elshahed Ahmed (2) Sheren Elsayed Elmetwally Shrief (3)

(*1) Demonstrator of Medical Surgical Nursing department, Faculty of Nursing, Beni Suef University*
(2) Assistant Professor of Medical Surgical Nursing department, Faculty of Nursing, Helwan University
(3) Assistant Professor of Medical Surgical Nursing department, Faculty of Nursing, Beni suef University

Abstract

Background: Critically ill patients commonly experience poor sleep quality and sleep deprivation. **Aim of study**: assess nurses' performance regarding acquired sleep deprivation among critically ill patients. **Design:** Descriptive exploratory research design. **Setting:** General Intensive Care Unit of Beni-Suef University Hospital. **Methods:** A convenient sample of all available nurses (40 nurses) who worked at General Intensive Care Unit at Beni-Suef University Hospital. **Tools: Tool (I)** Interview Self- administered Nurse's Questionnaire consisted of 2 parts; Part (I): Questionnaire to assess demographic characteristics of studied nurses. Part (II): Nurses' level of knowledge tool. **Tool (II):** observational checklist to assess nurses' level of practice. **Results:** The study results revealed that 57.5% of the studied nurses had an unsatisfactory total level of knowledge and 85% of the studied nurses had incompetent total level of practice regarding acquired sleep deprivation among critically ill patients. **Conclusion:** It can be concluded that there was a statistically significant positive correlation between total level of knowledge score and total level of practice score. **Recommendation:** Developing follow up courses and training programs to improve nurses' performance regarding acquired sleep deprivation among critically ill patients.

Key words: *Critically Ill Patients, Nurses' Performance, Sleep Deprivation*

Introduction

Sleep is a basic biological vital human need that is as essential in its way to survival as water, food, and air and required for good health, better quality of life, and human survival. It is a period of rest and recovery and one of the essential factors in promoting physical and mental health because of the numerous important physiological processes which take place during sleep. It is characterized by a rapidly reversible decreased response to environmental stimuli. **(Hsu, etal.,2019)**

Critically ill patients in ICUs commonly experience poor sleep quality, sleep fragmentation, sleep deprivation and insufficient sleep due to shortened sleep times, increased daytime sleep, disrupted circadian rhythms and frequent awakenings per hour. Poor sleep quality characterized by prolonged latency to sleep onset, increased frequency of awakenings, difficulty going back to sleep, earlier awakening bedtimes, increased percentage of N1 non rapid eye movement (NREM) sleep and decreased percentage of N2 NREM sleep; ICU patients rarely get to rapid eye movement (REM) sleep and have difficulty going back to sleep. **(Grimm,2020)**

The etiology of sleep disruptions in the ICU is multifactorial. Factors contributing to disrupted sleep may be divided into two categories, environmental and non-environmental. Non-environmental factors include the patient's usual sleep pattern, the type and severity of their underlying illness, ongoing or prior treatments and current physical health, pain or discomfort, psychosocial factors (stress and anxiety) and medications. Environmental factors consist of noise, light, mechanical ventilation, frequent monitoring and nursing interventions **(Adell, et al., 2021).**

Sleep deprivation is harmful to the body and has several side effects on human health. It can cause emotional distress and mood changes, increases the risk of delirium and confusion, an increase in heart rate and blood pressure, decrease neurocognitive function and immune system, gastrointestinal motility changes. It also may lead to delayed recovery, impaired wound healing, prolonged intensive care stay, adverse effect on the psychological and neurological status, disturbed function of the immune system, decreased quality of life and consecutively, increased mortality **(Locihová, et al., 2021).**

Management of sleep disturbance in the ICU might be done by pharmacologic and/ or nonpharmacologic methods. Using sleep drugs is the most common method to manage sleep disturbance, but they have several side effects. The use of nonpharmacologic methods is safe and might be achieved with the use of sleep drugs as a complementary intervention. There are several interventions used to improve sleep quality consist of relaxation training, such as progressive muscle relaxation (massages), decreasing environmental noise or light, acupressure, music therapy or a combination therapy **(Bellon, et al., 2023).**

The Significance of the Study

Sleep deprivation among intensive care unit (ICU) patients is the second problematic issue that could happen during ICU stay. It is widely documented that patients in the intensive care unit (ICU) suffer from poor sleep, with up to 61% of patients reporting sleeping problems. Also, when asked to report on their ICU experience, patients rank poor sleep second on the list of most bothersome experiences just behind having experienced pain (**Schinkelshoek, etal., 2020).**

In 2022, Bolin reported that the incidence of sleep deprivation among critically ill patients is approximately 80% during their hospital stay. In Egypt, A study was conducted at Mansoura University Hospitals reported that incidence of sleep deprivation in ICU patients was about 74%. Another study was conducted at Minia University Hospital reported that the majority of control and study groups had a sever sleep problem with percentage of (52.6% and 44.7%) respectively **(Kandeel, 2019 & Abd El Khalik, 2020).**

In Egypt the Research has shown that, prevalence of sleep disturbance among critical ill and hospitalized patients has been shown that the majority of the study sample (98%) complaining from moderated sleep disturbance, so that the aim of the study is to assess nurses' performance regarding acquired sleep deprivation among critically ill patients (**Tolba, 2021).**

Aim of the Study

The aim of this study is to assess nurses' performance regarding acquired sleep deprivation among critically ill patients through the following objectives:

- Assess nurses' level of knowledge regarding acquired sleep deprivation among critically ill patients.
- Assess nurses' level of practice regarding acquired sleep deprivation among critically ill patients.

Research Questions

1. What is the nurses' level of knowledge regarding acquired sleep deprivation among critically ill patients?
2. What is the nurses' level of practice regarding acquired sleep deprivation among critically ill patients?

Subject and Method

Research Design:

A descriptive exploratory design will be used to achieve the aim of the study.

Setting

This study was conducted at General Intensive Care Unit at Beni Suef University Hospital, which is located at third floor in the hospital, covers 19 beds. They are distributed in 4 rooms, of which two rooms have 8 beds, another has 5 beds and the last one has 6 beds.

Subjects:

A convenient sample of all available nurses (40 nurses) from both gender at general intensive care unit of Beni-Suef University Hospital and agreed to participate in this study.

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Tools for data collection

The data were collected through the following tools:

Tool I. Interview Self-administered Nurse's Questionnaire: Appendix (I): It was used to assess nurses' level of knowledge regarding acquired sleep deprivation among critically ill patients. It was developed by the investigator after reviewing related literature and written in simple Arabic language to gather data regarding the following parts:

Part I: It was concerned with demographic characteristics of the nurses at intensive care unit which include: age, gender, marital status, educational level, years of experience in ICU, working hours in ICU.

Part II: Nurses' Knowledge Assessment Tool: It was developed by an investigator based on literature review (**Schieman & Bautista, 2021).**

It was concerned with the assessment of nurses' level of knowledge related to definition, stages, importance of sleep, organs involved into sleep, definition, incidence, causes, effects of sleep deprivation, intervention to promote sleep in the ICU.

Scoring system for knowledge

According to the answers obtained from studied nurses, a scoring system was followed. The total score was 30 and converted to 100%. The studied nurses' answers were compared with a model key answer,

where (1) score for correct answer, and (zero) for incorrect answer. Their total level of knowledge was categorized as the follows: **(Ahmed, 2023).**

- ≥75% (≥23 grade) was considered satisfactory level of knowledge.
- <75% (<23 grade) was considered unsatisfactory level of knowledge.

Tool II. observational checklist to assess regulation nursing activities, noise reduction, light reduction: Appendix (II): adapted from **(Edvardsen, etal., 2020)** to observe nurses' level of practice. It was adapted and modified by the investigator. It includes 19 items with done/not done answer format.

Observational checklist to assess nursing care of back massage and footbath: Appendix (II): It was adapted and modified by the investigator after reviewing the related literature (**Lynn, 2018 & Perry, etal.,2018)** to observe nurses' level of practice. It includes 20 items with done/not done answer format.

Scoring system for observational checklist

The total scores of nurses' level of practice was 39 scores and converted to one hundred percentages (100%), Nurses' level of practice was evaluated by giving (1) score for done steps and (0) score for not done steps, then the scores are converted to percentage and total score categorized as the follows: **(Ahmed, 2023).**

-≥ 80% (≥32 grade) was considered competent level of practice.
-< 80% (<32 grade) was considered incompetent level of practice

Validity

The tools were revised by a jury of 5 experts: 3 Assistant professors and 2 lecturers of medical surgical nursing from Faculty of Nursing Helwan University, who revised the content of the tools for comprehensiveness, accuracy, clarity, relevance and applicability, minor modifications were done.

Reliability

The reliability of the tool was tested to determine the extent to which the questionnaire items are related to each other. The Cronbach 's Alpha model which is a model of internal consistency was used in the analysis respectively. The statistical equation of Cronbach 's Alpha reliability coefficient normally ranges between 0 and 1, higher value (more than 0.7) denotes acceptable reliability. Testing reliability of the study tool was done by Cronbach 's Alpha, it was (0.978) for knowledge questionnaire and (0.971) for practice checklists (p-value <0.001**).

Ethical considerations

An official permission to conduct the proposed study was obtained from the Scientific Research Ethics Committee, Faculty of Nursing, Helwan University. Participation in the study is voluntary and subjects were given complete full information about the study and their role before signing the informed consent. The ethical considerations

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included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it was not accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs were respected.

Pilot study

The pilot study was done on 10% (4 nurses) of the sample to examine the clarity of the questions and time needed to complete the study tools.

Field work

- Data collection was started and completed within 4 months from the beginning of March (2023) until the end of June (2023).
- Data were collected by the investigator over three days per week during morning & evening shift at General Intensive Care Unit in Beni Suef University Hospital.
- For data collection, each nurse was assessed individually using the study tools. The investigator was available at the study setting three days weekly from 9am to 2pm & from 2pm to 11pm and started by introducing herself to the nurses then informing them about the aim of the study to assess nurses' level of knowledge and practice regarding acquired sleep deprivation among critically ill patients.
- The investigator gave each nurse the knowledge questionnaire tool to answer it and observed each nurse individually during their work in morning & evening shift to assess their level of practice.
- The time consumed for completion of the knowledge questionnaire format was 20-30 minutes. The time consumed for answering the checklist was 15-20 minutes.

Statistical Item

The collected data were organized and analyzed using appropriate statistical significance tests. The data were collected and coded using the Computer Statistical Package for Social Science (SPSS), version 25, and was also used to do the statistical analysis of data. Data were presented using descriptive statistics in the form of frequencies and percentages. Appropriate inferential statistics such as chi square, Pearson correlation "r" test and Fisher's Exact test were used as well.
The observed associated differences were considered as:

- Highly Significant (HS) if p-value ≤ 0.01
- Significant (S) if p-value ≤ 0.05
- Not significant (NS) if p-value > 0.05.

Results

Table (1): Percentage distribution of the studied nurses according to their demographic characteristics (n=40).

Variables	N	%
Age		
20<30	31	**77.5**
30<40	9	22.5
40 years & more	0	0
Mean±SD	**29.90±2.97**	
Gender		
Male	12	30
Female	28	**70**
Marital status		
Single	23	**57.5**
Married	15	37.5
Widow	2	5

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Educational level		
Diploma	0	0
Technical institute	12	30
Bachelor's degree of nursing	28	**70**
Postgraduate	0	0
Years of experience in ICU		
1<5	11	27.5
5<10	29	**72.5**
Mean±SD	**6.13±2.26**	
Working hours at ICU		
6 hours	26	**65**
12 hours	2	5
24 hours	12	30
Mean±SD	**7.98±7.12**	

Table (1): As observed from this table, regarding age, 77.5% of the studied nurses were in the age group of 20<30 years and the mean age for them were (29.90±2.97). Additionally, this table showed that 70 % of the studied nurses were female, 57.5% were single and 70% of the studied nurses had Bachelor degree of Nursing, the mean years of experience in ICU were (6.13±2.26) and 65% of studied nurses working 6 hours in ICU.

Table (2): Percentage distribution of the studied nurses' total level of knowledge regarding acquired sleep deprivation among critically ill patients (n=40).

Item	Satisfactory ≥ 75%		Unsatisfactory < 75%	
	N	%	N	%
Sleep	18	**45**	22	**55**
Sleep deprivation	20	**50**	20	**50**
Nursing Interventions to promote sleep at ICU	9	**22.5**	31	**77.5**
Total	17	**42.5**	23	**57.5**

Table (2): Explain that 77.5% of the studied nurses had unsatisfactory total level of knowledge regarding nursing interventions to promote sleep at ICU sleep, 55% of the studied nurses had unsatisfactory total level of knowledge regarding sleep and 50% of the studied nurses had unsatisfactory total level of knowledge regarding sleep deprivation.

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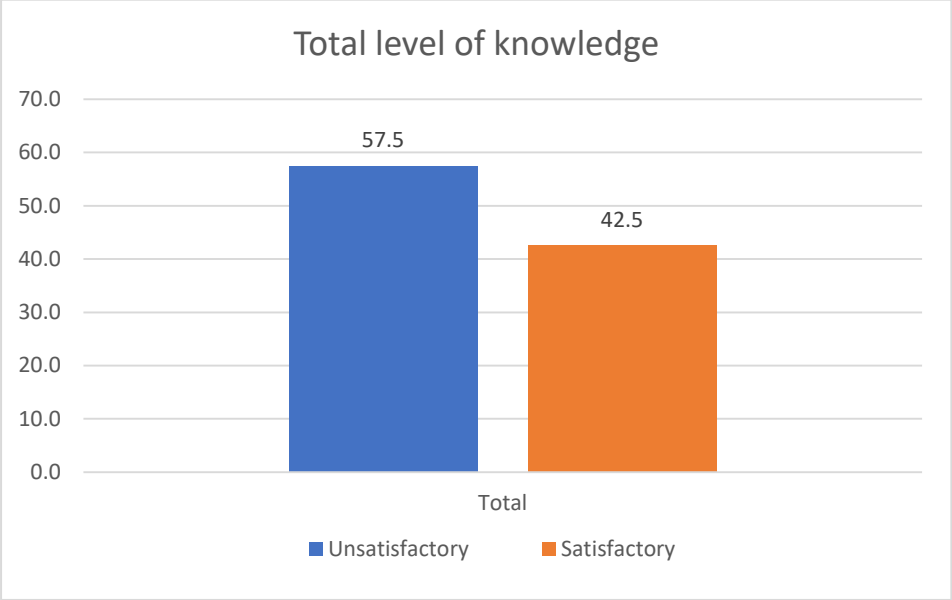

Figure (1): Percentage distribution of the studied nurses regarding to total level of knowledge regarding acquired sleep deprivation among critically ill patients (n=40).

Fig (1): Explains that (42.5%) of the studied nurses had satisfactory total level of knowledge and above half (57.5%) of the studied nurses had unsatisfactory total level of knowledge regarding acquired sleep deprivation among critically ill patients.

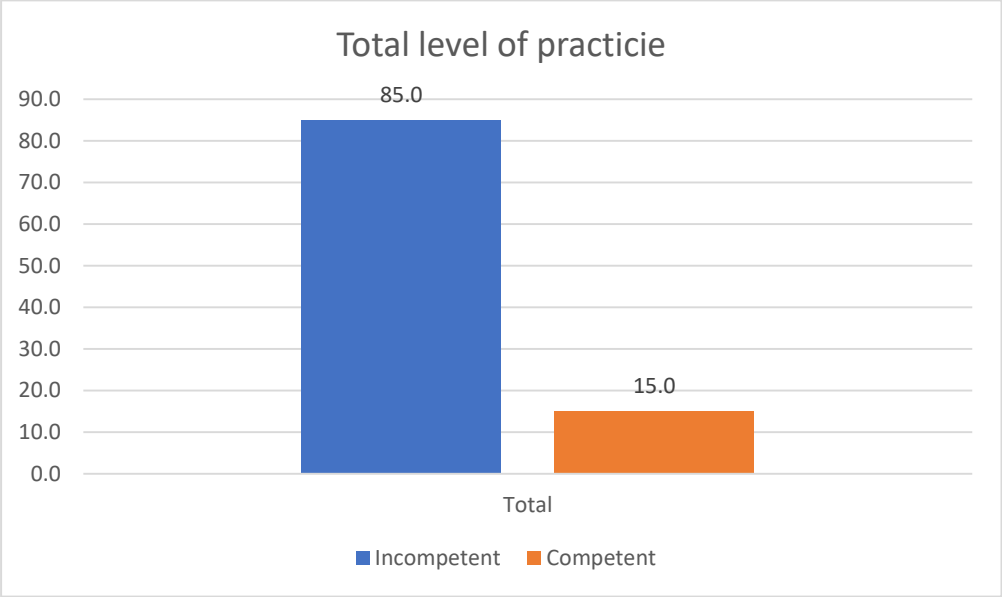

Figure (2): Percentage distribution of the studied nurses' total level of practice regarding acquired sleep deprivation among critically ill patients (n=40).

Fig (2): Demonstrates that (15%) of the studied nurses had competent total level of practice and more than four fifths (85%) of the studied nurses had incompetent total level of practice regarding regulation of nursing care activities, noise reduction, light reduction, back massage, footbath

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Table (3): Percentage distribution of the studied nurses' total level of practice regarding acquired sleep deprivation among critically ill patients (n=40).

Item	Competent ≥ 80%		Incompetent < 80%	
	N	%	N	%
Regulation of nursing care activities	17	**42.5**	23	**57.5**
Noise reduction	26	**65**	14	**35**
Light reduction	19	**47.5**	21	**52.5**
Back massage	5	**12.5**	35	**87.5**
Footbath	5	**12.5**	35	**87.5**
Total	**6**	**15**	**34**	**85**

Table (3): Show that 65% of the studied nurses had competent total level of practice regarding noise reduction, 87.5% of the studied nurses had incompetent total level of practice regarding back massage & footbath, 57.5% of the studied nurses had incompetent total level of practice regarding regulation of nursing care activities and 52.5% of the studied nurses had incompetent total level of practice regarding light reduction.

Table (4): Relation between demographic characteristics of nurses under study and their total level of knowledge regarding acquired sleep deprivation among critically ill patients (n=40).

Demographic characteristics	N	%	Total level of knowledge					
			Satisfactory ≥ 75%		Unsatisfactory <75%		Chi-square	
			N	%	N	%	X2	P-value
Age								
20<30	31	77.5	17	100	14	60.9	FE	0.005**
30<40	9	22.5	0	0	9	39.1		
Gender								
Male	12	30	0	0	12	52. 2	12.671	0.000**
Female	28	70	17	100	11	47.8		
Marital status								
Single	23	57.5	2	11.8	21	91.3	35.646 FE	0.000**
Married	15	37.5	15	88.2	0	0		
Widow	2	5	0	0	2	8.7		
Educational level								
Technical institute	12	30	0	0	12	52.2	12.671	0.000**
Bachelor	28	70	17	100	11	47.8		
Years of experience in ICU								

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1<5	11	27.5	0	0	11	47.8	FE	0.001**
5<10	29	72.5	17	100	12	52.2		
Working hours in ICU								
6 hours	**26**	**65**	15	88.2	11	47.8	FE	0.000**
12 hours	**2**	**5**	2	11.8	0	0		
24 hours	**12**	**30**	0	0	12	52.2		

FE Expected cell count less than 5, Fisher's Exact test was used.
** Highly statistically significant at p≤0.01

Table (4): There was a highly statistically significant relation between total level of knowledge and all of the items related to demographic characteristics related to acquired sleep deprivation (p-value ≤0.01).

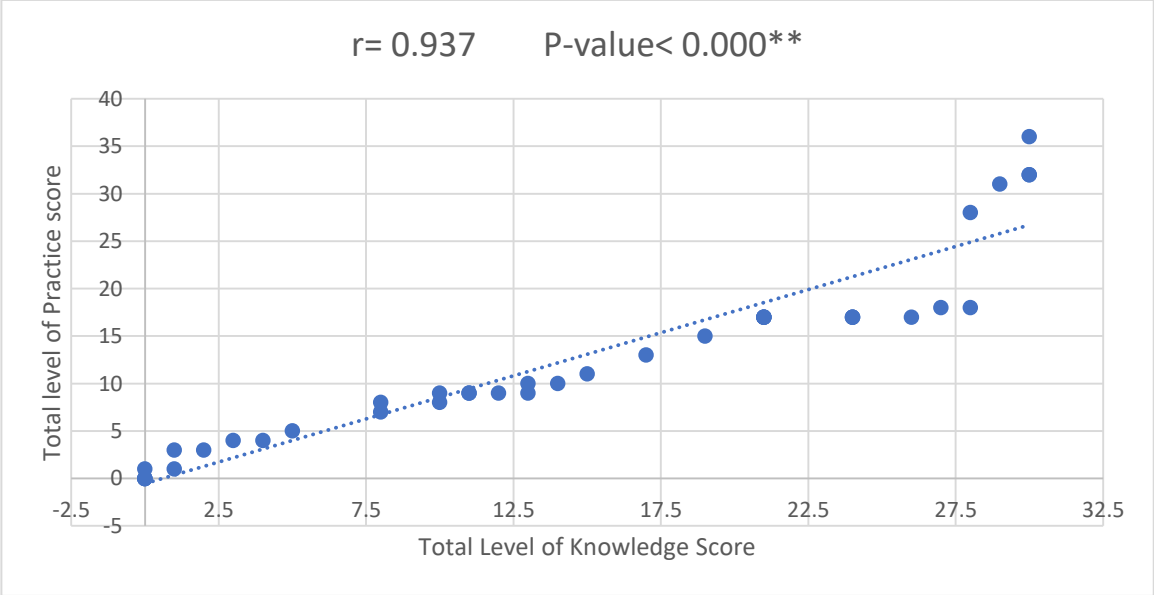

Figure (3): Correlation between total level of studied nurses' knowledge score and total level of practice score regarding acquired sleep deprivation among critically ill patients (n=40).

Fig (3): Illustrates that there was a statistically significant positive correlation between total level of knowledge score and total level of practice score with (R= 0.937) with p-value <0.000.

Discussion

Sleep disturbance is common among critically ill patients. Patients' sleep in the intensive care unit takes the form of sleep deprivation, sleep disruption and abnormal architecture of sleep. also show poor sleep quality, reduced sleep efficiency, slow-wave, sleep fragmentation, sleep–wake disorganization and circadian rhythm disruption that leading to increased frequent arousal, nighttime wakefulness and daytime sleep, which is commonly caused by pain, general discomfort, nursing interventions, noise caused by ICU staff and machines, and bright light. **(Grimm,2020).**

Critical care nurses are in a unique position to promote sleep because of their close relationship and frequent interactions with patients. nurses are the largest segment of the healthcare workforce with 24-hour access to patients. Due to their close contact with patients, nurses are in the best position to meet patients' basic needs for sleep by addressing and

minimizing the sleep disturbance factors. Nurses are in the front line to promote patients' sleep by implementing both pharmacological and non-pharmacological strategies to accelerate healing. Nurses have the ability to affect the patient's healing process by meeting patient's need for sleep and decreasing sleep disturbance factors. **(Kurban, 2019).**

The current study sample consists of 40 nurses working at general Intensive Care Unit (ICU) at Beni Sueif University Hospital. Regarding to the age of the studied nurses, the result of present study showed that slightly more than three quarter of the studied nurses were in the age group of 20<30 years and the mean age for them were (29.90±2.97) and less than three quarter of the studied nurses had Bachelor degree of Nursing.

From the investigator's point of view this result could be related to young nurses can tolerate with the nature of ICU workload, so the old age of ICU nurses was moved to another ward less in workload. As there became a faculty of nursing than only technical institute of nursing, many young nurses become graduate within four years, so the number of new graduates of the Bachelor of Nursing is larger than any educational level of nursing and as the newly graduated there isn't until yet who could complete graduate studies.

This finding agreed with **Goda, etal., (2022)** who carried out a study in Egypt which entitled "Enhancing Nurses' Knowledge and Practice through Implementing Sleep Care Protocol at Neonatal Intensive Care Unit" and revealed that less than two thirds of them were in age group between20-<30 years. Also agreed with **Ramirez (2017)** who carried out a study in U.S which entitled "Developing a Quality Improvement Project: Evaluating Nurses' Knowledge, Perceptions, Attitudes, and Beliefs Regarding Sleep Promotion in the ICU" and revealed that more than three quarter had bachelor's degree of nursing.

On the other hands, these findings were disagreement with **Razali, etal., (2023)** who carried out a study in Malaysia which entitled "Critical Care Nurses' Knowledge and Attitude Towards Sleep Promoting Interventions Among Critically Ill Patients in Intensive Care Unit" and revealed that less half of participant nurses' was between 31 and 40 years and revealed that the majority of studied nurses had technical institute of nursing.

As regard to gender and years of experience of the studied nurses, the current study reported that about less than three quarter of the studied nurses were females and less than three quarter of the studied nurses' years of experience at the ICU 5<10 years. From the investigator point of view this result could be related to because male nurses joined nursing lately in recent years and the studied nurses newly graduated.

This result agreed with **Buchan, etal., (2023)** who carried out a study in Australia which entitled "The sleeping giant - Nurses' professional principal practice in managing sleep health and sleep disorders" and illustrated that the majority of studied nurses were female and have years of experience in ICU about 7.

The current result is contrasting to **Ramirez (2017)** who carried out a study in U.S which entitled "Developing a Quality Improvement Project: Evaluating Nurses' Knowledge, Perceptions, Attitudes, and Beliefs Regarding Sleep Promotion in the ICU" and revealed that two fifths of the studied nurses had experiences in intensive care unit from 1<5 years.

Related to nurses' total level of knowledge regarding sleep, the current study reported that more than half of the studied nurses had incorrect answer of knowledge regarding to definition & importance of sleep, organs involved into sleep, factors affect sleep, stages of sleep. From the investigator's point of view this result could be related to nurses' work overload and shortage of staff that limit their participation in educational sessions about sleep which also maybe not given because there isn't appreciation about how much the sleep is importance to the patient specially in ICU.

This result in the same line with **Gellerstedt, (2019)** who carried out a study in Sweden which entitled "Nursing perspectives on patients' sleep during hospital care" and revealed that less than three quarter of studies nurses had insufficient knowledge regarding sleep.

The findings data answered the first research question. It states what is nurses' level of knowledge regarding acquired sleep deprivation among critically ill patients and clarifies more than half of the studied nurses had unsatisfactory total level of knowledge regarding acquired sleep deprivation among critically ill patients.

The present study reported that more than three fifths of the studied nurses have not done total practice regarding interventions to promote sleep "regulation of nursing care activities, noise reduction, light reduction, back massage, footbath". From the investigator's point of view this result could be related to absent awareness of nurses about sleep deprivation among patients and the potentially serious consequences of sleep deprivation that could happen.

This study agreed with **Mohedat & Somayaji, (2023)** who carried out a study in USA which entitled "Promoting sleep in hospitals: An integrative review of nurses' attitudes, knowledge and practices" and mentioned that there was insufficiency in sleep-promoting interventions.

The findings data answered the first research question. It states what is nurses' level of practice regarding acquired sleep deprivation among critically ill patients and clarifies more than four fifth of the studied nurses had incompetent total level of practice regarding acquired sleep deprivation among critically ill patients.

The current study reported that there was a highly statistically significant relation between total level of knowledge and demographic characteristics regarding age, gender, marital status, educational level, years of experiences and working hours in ICU related to acquired sleep deprivation.

This finding in the same line with **Jayanthi & Umadevi, (2022)** who carried out a study in in Bangalore, Karnataka which entitled "Impact of Structured Teaching Programme on Knowledge of Staff Nurses Regarding Sleep Hygiene among the Patients Admitted in a Hospital" and mentioned that there was a significant association was found between experience and the total level of knowledge.

This finding disagreed with **Razali, et al., (2023)** who carried out a study in Malaysia mentioned that there is no significant association between the years of experience and the total level of knowledge.

The current study reported that there was a highly statistically significant relation between total level of practice and demographic characteristics regarding marital status and working hours in ICU related to acquired sleep deprivation.

This finding disagreed with **Jayanthi & Umadevi, (2022)** who carried out a study in Bangalore, Karnataka mentioned that there is no significant association between marital status and the total level of practice. Also, this finding disagreed with **Lis, et al., (2022)** who carried out a study in Poland mentioned that there is no significant association were found between system of work hours and the total level of practice.

The current study reported that there was a statistically significant positive correlation between total level of knowledge score and total level of practice score. From the investigator point of view this result could be related to, if the nurse had unsatisfactory level of knowledge, it would lead to incompetence level of practice, because practice is based on knowledge and a high level of knowledge leads to a high level of practice.

This result on the same line with **Razali, et al., (2023)** who conducted a study in Malaysia mentioned that there is a positive correlation relationship between total level of knowledge and total level of practice of the studied nurses.

Conclusion

In the light of the present study findings, it can be concluded that, above half of the studied nurses had unsatisfactory total level of knowledge regarding acquired sleep deprivation among critically ill patients, and also more than three fifths of the studied nurses had incompetent total level of practice regarding Regulation of nursing care activities, Noise reduction, Light reduction, Back massage, Footbath.

Recommendations

In the light of the study findings, the following recommendations are suggested:

- Encouraging the nurses and newly employed nurses to attend conferences and workshops about sleep and acquired sleep deprivation.
- Courses and training programs should be offered and organized to maintain effective performance for care of patients with disturbed sleep.
- Periodical evaluation for nurses to determine the progression of their knowledge and practice regarding acquired sleep deprivation among critically ill patients.
- Develop policies in the intensive care unit to take care of patients with disturbed of sleep.

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