Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1193-1205), Month: May - August 2019, Available at: www.noveltyjournals.com

Effect of Earplugs and Eye Masks on Improving Patients' Quality of Sleep in Intensive Care Unit

Zeinab Hussein Bakr[1], Howyda Ahmed[2]

Lecturer of medical surgical nursing[1] and Assistant Professor of Medical Surgical Nursing[2], Faculty of Nursing- Ain Shams University

Abstract: **Sleep disruption is common in patients admitted to the ICU. Patients treated in the ICU are also exposed to high sound levels and cite noise as a substantial contributor to sleep disruption *Aim of the study:* The aim of this study was to assess effect of earplugs and eye mask on improving quality of sleep in ICU this aim was assessed through the following:1- Assess patient level of sleep disturbance. 2-Apply earplugs and eye masks to the patients in ICU. 3-Evaluate effect of earplugs and eye masks on improving patient's quality of sleep in ICU. *Study design:* a quasi-experimental study was utilized in this study. *Setting:* The study was conducted in the ICU unit at EL Demerdash hospital affiliated to Ain Shams University Hospital. *Subjects:* A purposive sample of 35 adult patients from the previous mentioned setting. *Data collection*: data were collected by two tools as follows: Patients Interview questionnaire and Richards-Campbell sleep questionnaire. *Results:* there were statistically significant differences regarding improving patients' quality of sleep post implementation of earplugs and eye masks in ICU. The study *concluded* that: There was a statistical significant difference for the study group in relation to factors disrupts sleep, quality of sleep post implementation of earplugs and eye masks in ICU. The study *recommended* that: Educational program for nurses to improve their knowledge regarding importance of introducing earplugs and eye masks for ICU patients to prevent onset of delirium and improve quality of sleep.**

Keywords: **Earplugs and eye masks, Quality of sleep, and Intensive care unit.**

I. INTRODUCTION

Sleep is one of the basic physiological needs. In the last decade, an unprecedented number of studies have been carried out focusing on sleep deprivation in intensive care unit (ICU) patients. There is increasing evidence that connects sleep deprivation associated with general alterations in a patient's condition with negative biological impacts **(Locihová, Axmann & Padyšáková, 2018).**

Epidemiological data indicate that sleep deprivation has a mutually conditional relationship, e.g. pain leads to insomnia and sleep deficiency decreases the pain threshold and contributes to the extended periods of wound healing, to the reduction of growth hormone and to affecting metabolic, endocrine and immunological responses. Studies confirm that an increased incidence of hypertension, increased heart rate, and the presence of delirium and confusion a decreased performance in daily activities and reduced quality of life (**Litton, Elliott, Ferrier &, Webb, 2017).**

Critically ill patients have an increased risk of developing insomnia during their hospital stay. This often results from sepsis and disturbances in inflammation and coagulation pathways leading to microvascular thrombosis. In addition, critical illness disrupts circadian rhythm and sleep patterns and along with sedatives such as benzodiazepines that are commonly used to treat insomnia in septic patients, can impair immunity and contribute to sleep disturbance (**Delaney, Haren, & Lopez, 2015)**.

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1193-1205), Month: May - August 2019, Available at: www.noveltyjournals.com

Intensive care unit (ICU) is a potentially hostile environment to the vulnerable ill patients. In addition to physical stress of illness, pain, sedation, intervention, and mechanical ventilation, there are psychological and psychosocial stressors perceived by these patients. Frequent reported stressful environmental factors are noise, ambient light, restriction of mobility and social isolation (**Fan, Abbott, Reid, Zee &, Maas, 2017**).

The most cited element causing sleep disorders of ICU patients is noise) indicating that environmental factors: noise and nursing interventions are overestimated in relation to sleep disorders. The Environmental Protection Agency (EPA) has issued a recommendation that the noise level in health-care facilities should not exceed 45 decibels (dB) by day and 35 dB at night (**Litton, Carnegie, Elliott, Webb (2016)**.

Previous studies have shown that the level of noise in intensive care is exceeded consistently within the range of 60–80 dB. Some major sources of noise include equipment alarms, loud personnel conversations, screams of other patients, telephones and television, etc. In order to achieve and maintain quality of sleep, it is necessary to implement organizational measures reducing noise. The principles of so-called sleep promotion strategy are non-pharmacological nursing interventions. Four major domains of the described strategy can be identified: reduction of noise, reduction of light, clustering nursing activities and increasing the patient's comfort (**Elbaz , Leger & Sauvet , 2017).**

Noisy ICUs and bright lights are undesirable because evidence shows that such stimuli can cause both psychological and physiologic harm in an environment otherwise focused on recovery and healing (**Boyko, et al, 2016**). A continuously noisy atmosphere can cause physiologic harm with cardiovascular stimulation and suppression of immune response to infection. ICU patients already in septic shock or recovering from massive or acute myocardial infarction do not need increased demands on cardiovascular or immune systems. Undesirable consequences follow sensory overload, especially in critically ill adults (**Tainter, Levine, & Quraishi, 2016)**.

The introduction of non-pharmacological interventions supporting sleep with the emphasis on using earplugs and eye masks is perceived as an inexpensive tool to improve sleep quality of hospitalized patients. While the measures described are gradually becoming a common part of everyday nursing practice globally, this simple and inexpensive tool may potentially improve the quality of sleep (**Hu, Jiang, Hegadoren &, Zhang, 2015).**

Simple intervention such as earplugs and eye masks may be a valuable addition to patients attempting to sleep in intensive care units earplugs and eye masks could be used as an acceptable non-pharmacological. Earplugs are a simple, low-cost, noise-abatement intervention that may improve sleep disturbance of patients admitted to the ICU, and eye masks are one of the best tools that can be used to overcome sleep problems and obtain restful relaxing sleep. Eye masks are made with silky soft black taffeta inside, outside with cushioned filler and two elasticized straps with Nose Bridge **(Dave, Qureshi, Gopichandran & Kiran, 2015).**

Significance of the study

There is a high incidence of sleep disturbance in (30-40%) patients admitted to the intensive care unit. Its occurrence results in distress and is associated with substantial morbidity, mortality and cost. Sleep disruption is common in patients admitted to the ICU. Patients treated in the ICU are also exposed to high sound levels and cite noise as a substantial contributor to sleep disruption (**Ritmala-Castren, et al, 2016)**.

Adverse consequences of sleep disruption include impaired immune function, decreased inspiratory muscles endurance, and negatively affected weaning from mechanical ventilator and possible association with severe morbidity. So improving quality of sleep could be obtained through applying non pharmacological nursing measures such as earplugs and eye masks at night. This intervention will improved outcomes and shorten patients ICU length of stay and hospitalization as well as benefit of decreased hospital costs.

Aim of the study

The aim of this study was to assess effect of earplugs and eye mask on improving quality of sleep in ICU this aim was assessed through the following:

1- Assess patient level of sleep disturbance.

2- Apply earplugs and eye masks to the patients in ICU

3- Evaluate effect of earplugs and eye masks on Improving patients quality of sleep in ICU

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1193-1205), Month: May - August 2019, Available at: www.noveltyjournals.com

Research questions:

1- Does the use of earplugs and eye mask during the night improve patients' quality of sleep in ICU?

II. SUBJECTS AND METHODS

The present study was carried out through the four main designs:

I- Technical design.

II- Operational design

III- Administrative design.

IV- Statistical design.

1- Technical design

The technical design includes; research design, setting, subjects, and tools used in data collection of the study.

Research design:

A quasi-experimental design was utilized to meet the aim of the study.

Setting:

The study was conducted in the ICU unit at EL Demerdash hospital affiliated to Ain Shams University Hospital. ICU consisted of 40 bed divided into 4 sections each section consisted of 10 beds each bed connected with monitor and mechanical ventilator all monitors are connected with central monitor on nurses' station.

Subjects:

A purposive sample of 35 adult patients from the previous mentioned setting and accepted to participate in the study and meeting the following inclusion and exclusion criteria. The sample size was determined statistically by power analysis considering the total number of (600) patients admitted to ICU. Type I error with significant level alpha (α) = 0.05 (sig. 95%). Type II error B = 90%.

Inclusion criteria

- Full conscious patient
- Patients expected remaining ICU stay > 48 hrs.
- Newly admitted patients to ICU

Exclusion criteria:

- Sedated patient
- Patients having sleep problems before admission to ICU
- Hepatic patients and patients with chest disease as obstructive sleep apnea
- Patients with ear injuries, hearing impairment, eye disease or injuries, contagious skin disease in their face or skin lesions

Tools of Data Collection:

The following two tools were used in this study:

1- **Patients Interview questionnaire:** it was develop by the researcher it consisted of three parts

Part 1: Demographic characteristics: it was used to assess patients' age, sex, occupation and level of education

Part 2: patient clinical data it was used to assess patient diagnosis, day of admission, length of stay in ICU, sleep aids

Part 3: factors disrupt sleep in ICU as alarms, noise, safety measure, weather, light and nursing intervention.

Tool 2: Richards-Campbell sleep questionnaire (2000)

This questionnaire includes 5 items that was used to assess effectiveness and quality of sleep. These items are sleeping depth (2 questions), sleep latency (2 questions), awakening (2 questions), returning to sleep (2 questions) and sleep quality (2 questions). The score for each item from zero to (100). If the patients have zero it mean poor quality of sleep and if the patient have high score it mean good quality of sleep.

Scoring system

Good quality of sleep (≥ 75% = 375)

Poor quality of sleep (≤ 75% = 375)

II- Operational Design:

The operational design consists of the preparatory phase, pilot study, ethical considerations, and field work.

Preparatory phase:

It includes reviewing of the current and most recent national and international literatures concerning caring of patients admitted to ICU of the various aspects of this issue, it was done by the researcher, for the preparations of tools, equipment used, and evaluation tools.

- **Pilot Study:**

A pilot study was carried out on 10 % (8 patients) of the study subject in order to test applicability, clarity, relevance, feasibility of conduction of study tools and time needed to fill in each tool. Based on the findings of the pilot study certain modification was done and patients selected for the pilot study were excluded from the study subject.

- **Tools validity and reliability test :**

Testing validity of the proposed tools by using face and content validity. Face validity aimed at inspecting the items to determine whether the tools measure what supposed to measure, content validity was conducted to determine whether the tools cover the aim. Validity tested through a jury of 7 expertises from medical surgical nursing department, Ain Shams University (3 professors, 2 assistant professors and 2 lecturers). The expertise reviewed the tools for clarity, relevance, comprehensive, simplicity and applicability; minor modification done. Testing Reliability of the proposed tools was done statistically by alpha Cronbach test.

- **Field Work :**

Field work included three phases: assessment phase, implementation phase, and evaluation phase.

I- Assessment phase: this included:

This phase starting with Data collection which started from the beginning of August 2018 to the end of January 2019. The researcher was starting the interviewing process for study group by filling demographic characteristic and patient clinical data sheet which took about 10 minutes then the researcher was observe the patients during used earplugs and eye masks at night then falling **Richards-Campbell sleep questionnaire for** sleep assessment tool which took about 8 hours. The researcher reviewed each point in front of patients to be sure that no points are missed.

II- Implementation phase: this included:

The researcher were explain for each patient the importance of earplugs and eye masks during night, the use of earplugs and eye masks was completed at two day within (8hours at night). It started with filling the tools by the researchers for patients, with help of the researcher for any explanation after that a general identification for the importance of earplugs and eye masks during night for ICU patients. The earplugs and eye masks was applied each night from 10 pm to 6 am and

tested for night and patient should be psychologically stable, put in consideration barriers of applying earplugs and eye masks and it was replaced by another one when being spoiled or fallen

III-Evaluation phase:

This phase included evaluation of the effect of earplugs and eye masks on improve quality of sleep for patients in ICU by using the same data collection tools which was done twice. Pre and Immediate post implementation of earplugs and eye masks in ICU.

III- Administrative Design

To carry out the study, the necessary approvals were obtained from the hospital director and nursing director of Ain Shams University Hospitals. Official letters were issued to them from the Faculty of Nursing explaining the aim of the study to obtain permission for the collection of data.

- **Ethical considerations:**

The ethical research considerations in this study included the following: An official permission was obtained before conduction of the study. The aim of the study was explained to the patients to obtain their cooperation. Oral consent was obtained from the patients to ensure willingness to participate in the study. The researcher maintains an anonymity and confidentiality of subjects' data. Subjects were allowed to choose to participate or not and they were informed that they have the right to withdraw from the study at any time without giving any reason.

IV- Statistical Design

The collected data were organized, categorized, tabulated and statistically analyzed using the Statistical Package for Social Science (SPSS) version (12) to evaluate the studied patients' changes throughout the study phases (pre, post, & follow up) and to evaluate the differences between the groups under study as regards the various parameters. Data were presented in tables and chart. The statistical analysis includes; percentage (%), and Chi-Square (X^2), P value.

Significance of results was described as follow:

- Non-significant (NS) difference obtained at $p> 0.05$.
- Significant (S) difference obtained at $p< 0.0 5$.
- Highly significant (HS) difference obtained at $p<0.001$.
- Very highly significant (VHS) difference obtained at $p<0.0001$.

III. RESULTS

The results of the current study are presented in the following parts:

Part I:

This part is concerned with assessment of the demographic characteristics, medical diagnosis in admission, smoking habits, and factors disrupt sleep related to ICU (table 1-4).

Part 11:

This part is concerned with the representation of patients' quality of sleep post implementation of earplugs and eye masks for the study subject (tables 5-6).

Part I11:

This part displays the relations between patient's quality of sleep and their characteristics post implementation of earplugs and eye masks for the study patients (tables 7-8).

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1193-1205), Month: May - August 2019, Available at: www.noveltyjournals.com

Table (1): Demographic characteristics of patients in the study group.

Items	Study group (no=35)	
	No	%
Age (years)		
18< 30	8	22.9
30>40	8	22.9
40>50	8	22.9
≥50	11	31.4
Mean±SD	40.91±12.552	
Gender		
Female	25	71.4
Male	10	28.6
Education		
Read & write	11	31.4%
Basic	5	14.3%
Bachelor	19	54.3%
Job		
Working	19	54.3%
Not working	16	45.7%
Marital status		
Single	9	25.7%
Married	26	74.3%
Residence		
Rural	15	42.9%
Urban	20	57.1%

P>0.05 not significant *P<0.05 Significant ** P<0.001 highly significant

Table (1) showed that, the mean age of the patients in the study group was 40.91±12.552, while in relation to gender; the result showed that 71.4% were females in the study group. As regards educational level, the results showed that, 31.4% of the patients in the study group can only read and write, but more than half (54.3%) of the study group had bachelor degree. While, considering job, the results revealed that, (54.3%) of the patients in the study group were working. In relation to marital status, (74.3%) of patients in the study group were married. While, concerning residence, results revealed that, more than half of patients (57.1% in the study were from urban areas.

Table (2): Frequency distribution according to their admission medical diagnosis to ICU for patients in the study group.

Items	No	%
Postoperative care	29	82..9
Neurological disorders	27	77.1
Infectious disorders	10	28.6
Gastrointestinal disorders	25	71.4
Endocrine\metabolic disorders	15	42..9
Respiratory disorders	7	20
Renal disorders	11	31.4
Falling from height	24	68.6
Cardiovascular disorders	9	25.7

P>0.05 not significant *P<0.05 Significant ** P<0.001 highly significant

Table (2) illustrated that, Regarding patient diagnosis during admission, the results revealed that, (82%) in study group have post-operative care , Also (71.4%) in study group have gastrointestinal disorder and (20%) in the study group were have respiratory disorders.

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1193-1205), Month: May - August 2019, Available at: www.noveltyjournals.com

Table (3): Smoking history of the patients in the study group before admission to ICU.

Items	No	%
Active Smoking		
Yes **No**	23 12	65.7 34.3
Type - Cigarette - Shisah - Both of them	 16 4 3	 69.6 17.2 13
Duration of smoking (in years)		
Less than 10 years	16	69.6
≥10 years	7	30.4
Amount - Heavy (> 20 cigarettes /day) - Mild **(**< 20 cigarettes /day)	 12 11	 52.2 47.8

P>0.05 not significant *P<0.05 Significant ** P<0.001 highly significant

Table (3) showed that, (65.7%) of the patients in the study group were active smokers. As regard duration of smoking, results revealed that (69.6%) of the smokers in the study group smoked for less than 10 years. Regarding the amount of cigarette smoking, the results revealed that, (52.2%) of the smokers in the study group were heavy smokers. While, regarding type of smoking, (69.6 %,) of patients in study group are using cigarette.

Table (4): Frequency distribution of factors disrupts sleep for ICU patients.

Items	No	%
Alarms	22	62.9
Noise	21	60.0
Weather (hot-cold)	26	85.7
Light	27	77.1
Nursing intervention	21	60.0
Pain	16	45.7
Diagnostic testing	27	77.1
Vital signs measurements	11	31.4
O2 finger problem	12	34.3
Talking	35	100
Nurses and doctors phones	22	62.9

P>0.05 not significant *P<0.05 Significant ** P<0.001 highly significant

Table 4 showed that regarding to ICU environmental factors 85% of the study group complaining of weather (hot-cold), while regarding to light 77.1 of study group complaining from it. While, regarding to taking in ICU 100% of the study group compline from it.

Table (5): Relation between quality of sleep for the study group pre and post implementation of earplugs and eye masks in ICU.

Quality of sleep	Study Groups				X^2	P value
	Pre (n=35)		Post (n=35)			
	No.	%	No.	%		
1-**Sleep depth**						
a-light sleep	26	74.3%	5	14,3		
b- deep sleep	9	25.7%	30	85,7	**5.05**	**0.00000****
2-sleep latency						
a-Just never could fall asleep	27	77.1	3	8,6		
b-fell asleep almost immediately	8	22,9	32	91,4	**3.91**	**0.00009****
3-awakening						

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1193-1205), Month: May - August 2019, Available at: www.noveltyjournals.com

a-awake all night long	26	74,3	4	11,4		
b-awake very little	9	25.7	31	88,6	**2.73**	**0.00624****
4-returning to sleep						
a-couldn't get back to sleep	21	60.0	6	17,1	**2.46**	0.0239*
b-got back to sleep immediately	14	40	29	82,9		
5-sleep quality						
a-a bad night' sleep	24	68.6	2	5,7		
b-a good night's sleep	11	31.4	33	94,3	2.05	0.04042**

Table 5 Showed that, there were highly statistically significant relation between pre and post implementation of earplugs and eye masks in ICU regarding all items of quality of sleep for patients in ICU as sleep depth, sleep latency, awakening, returning to sleep and sleep quality .

Table (6): Relation between total patients quality of sleep in study group pre- post of implementation of earplugs and eye masks in ICU (no=35)

Total quality of sleep	**Pre**		**Post**		**Z test**
	No	**%**	**No**	**%**	**Pre- post**
Good quality of sleep	**0**	**0.0**	**33**	**94.3**	**7.91**
poor quality of sleep	**0**	**0.0**	**2**	**5.7**	0.001**

P>0.05 not significant *P<0.05 Significant ** P<0.001 highly significant

This table revealed that, there was highly statistically significant difference between total quality of sleep in study group pre- post of implementation of earplugs and eye masks in ICU (Z= 7.91 at P=0.001)

Table (7): Correlation between factors disrupt sleep and total quality of sleep for patients in the study and control groups' pre and post of implementation of earplugs and eye masks in ICU.

Total quality of sleep	**Factors disrupt sleep**			
	Pre		Post	
	R	**p-value**	**r**	**p-value**
Study group	-.011	.951	.78	.001**

P>0.05 not significant *P<0.05 Significant ** P<0.001 highly significant

This table revealed that, in the study group, there was no statistically significant correlation between total quality of sleep and factors disrupt sleep pre implementation of earplugs and eye masks in ICU, but, there was highly statistically significant correlation post implementation of earplugs and eye masks in ICU.

Table (8): Relation between total quality of sleep and socio-demographic of patients in the study and control groups' post implementation of earplugs and eye masks in ICU.

Items	**Total quality of sleep**	
	Study Group	
Sex	**Mean**	**SD**
Female	46.80	2.48
Male	45.90	2.77
	t= 0.94	
	p= 0.354	
Educational level		
Basic	46.27	2.90
High school	45.60	3.05
University	46.95	2.27
	t = 0.62	
	p = 0. 05*	

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1193-1205), Month: May - August 2019, Available at: www.noveltyjournals.com

Residence		
Rural	47.07	2.09
Urban	46.15	2.85
	t = 1.05	
	p = 0.001 **	
AGE	r = 0.026	
	p = 0.882	

P>0.05 not significant *P<0.05 Significant ** P<0.001 highly significant

This table revealed that, in the study group, there was no statistically significant correlation between total quality of sleep and demographic regarding sex and age post implementation of earplugs and eye masks in ICU, but, there was highly statistically significant correlation regarding residence and a significant correlation regarding educational level.

IV. DISCUSSION

Sleep deprivation is a major concern in critically ill patients in intensive care units (ICU). Several studies have shown that poor sleep quality and the inability to sleep are the second largest stressors and rank among the top three major sources of anxiety during ICU stays .Sleep for ICU patients is characterized by frequent disruptions, loss of circadian rhythms and decrease time spent in restorative sleep stages **(Huang et al, 2015).**

As regarding to the result of current study less than three quarter of the study group was female and the mean age of the study group was two fifth this result was in agreement with **Costa, & Ceolim, (2013)** the study title was **(**Factors that affect in patients quality of sleep in ICU**)** found that men had better sleep quality than women because women are always more concerned about their home duties and their families during their stay in the hospital.

While **Stewart, Green, Stewart (2016)**. the study title was (Factors influencing quality of sleep among non-mechanically ventilated patients in the intensive care unit.) added that insomnia is particularly common during middle adulthood; they thought that insomnia among this age group may be related to the changes and stresses of the middle age like stresses of job, family relationships or experiencing menopausal symptoms among women.

According to occupational status revealed that more than half of the study was worked and less than quarter of the study were married and this findings in consistent with **Demoule, etal (2017)** the study title was (Impact of earplugs and eye mask on sleep in critically ill patients: a prospective randomized study) who revealed that the lowest frequent job among the studied sample was working and married. Also in our study sample the waking group was in private sectors while may affect their income by hospitalization.

Regarding level of education, the current study revealed that more than half of the study group have bacloria degree this finding is contradicted by **Zhang et al, (2013)** who studied Factors that affect sleep quality y: perceptions made by patients in the intensive care unit after thoracic surgery where they found that most patients in the experiment group had bacloria education.

Regarding patient diagnosis during admission, the result reveled that, majority of the study group have post-operative care this result was not in agreement with **Ali, ELsenousy & Mohamed (2017)** the study title was 'Factors Affecting Sleep Disturbances among Patients in Critical Care' Units who found that more than half of patients were admitted for non-operative reasons, more than two thirds of patients complained of more than one disease, like diabetes mellitus, hypertension, chronic kidney disease liver insufficiency and respiratory failure.

Regarding to smoking the result showed that, more than two third of the patients in the study group were active smokers and there was highly statistically significant difference between them this result was in agreement e with **Wetter &Young, (2015).** Who study the relation between sleep and smoking found that males and females smokers were associated with difficulty initiating sleep, and difficulty waking up. Excessive daytime sleepiness was related to smoking only for females while nightmares and disturbing dreams were related to smoking only among males. Sleep disturbance may be more prevalent among smokers due to the stimulant effects of nicotine, nightly withdrawal, an increased prevalence of sleep disordered breathing relative to nonsmokers.

Regarding to factors affecting sleep in ICU environmental factors majority of the study group complaining of weather (hot-cold), while regarding to light more than three quarter of study group complaining from it. While, regarding to taking in ICU all of the study group compline from it.

This was in Agreement with **Ding**, **Redeker, Pisani,** and **Yaggi**, **(2017)** the study title was Factors influencing patients' sleep in the intensive care unit: perception of patients and clinical staff. Who found that among the participants in our study, one fifth of the patient/surrogate group and all of clinical staff members identified noise as the major environmental stressor that affected patients' nighttime sleep. All respondents noted that in-room disruptions were frequent at night. Alarms were found to be the most significant source of noise

In consistent with **Ehlers, et al 2013** more than two thirds identified monitor leads as restricting movement and becoming entangled with intravenous lines, other tubes and their arms. Alarms went off when monitor lines disconnected and their finger oxygen saturation probes lost signals, restricting patients' movements, and disturbing their sleep. Patients feared from the ventilators and their sounds, and were worried about accidentally touching these machines, which may disrupt their functions.

This result goes in the same line with **Hata, Han**,**Slade**, **Miyahira, & Passion, (2014)** who were found that, environmental factors had a negative effect on sleep pattern. Furthermore, were found that, physical illness, emotional stress, environmental change, non-optimal lighting, and high environmental noise are factors that can cause sleep deprivation in hospitalized patients. Creating a quiet hospital environment is one component to promote and improve the quality of sleep among patients at ICU.

In addition, **Wang and Greenberg (2013)** who were studied sleep and the ICU and were found that, environmental factors in critical care units that might negatively affect sleep include high noise and light at times when sleep is desired, and stated that Critical illness, various treatment modalities and the ICU environment itself can markedly impair sleep quality. Poor sleep and chronic sleep deprivation may, in turn, impair recovery with adverse effects on cognition, mental status and immune function.

Regarding quality of sleep before using of earplugs and eye masks the result of the present study revealed that regarding sleep depth less than three quarter of the study group have light sleep, while, regarding awakening period less than three quarter of the study group have awake all night long and regarding quality of sleep more than two third of the study group have bad night's sleep

Costa and Ceolim (2013) reported that patients' sleep was frequently interrupted during their hospital stay. This finding is consistent with the results obtained in the present study, in which all the studied patients reported that their sleep was frequently interrupted during their ICU stay.

The majority of patients often had difficulty in falling asleep at night and took an hour or more to fall asleep, and this is shown by their complaints about waking up during the night and not having a restorative sleep related to the ICU which environment is not favorable for sleep. This was a frequent complaint in the present study, where the participants stated that they slept less than they wished too. It is important to note that many patients find it is hard to fall asleep again once woken up at night supported by (**Costa, & Ceolim, 2013)**.

The present study is consistent with **Delaney et al. (2015)** study which explain the impact of sleep disturbance on intensive care patients, the majority of patient felt sleepy and tired during the day, about two thirds of studied patients took nap for less than one hour during the day, more than half noticed changes in their behavior and became irritable, worried, anxious or decrease of their attention. In my opinion these were early impacts resulted from sleepiness due to changing the surrounding environment , changing their life style and others fears associated with their disease.

In relation to quality of sleep post implementation of study group pre and post implementation of earplugs and eye masks in ICU the result showed that, there were highly statistically significant relation between pre and post implementation of earplugs and eye masks in ICU regarding all items of quality of sleep for patients in ICU as sleep depth, sleep latency, awakening, returning to sleep and sleep quality. This result was in agreement with **Demoule et al , (2017)** the study title was' Impact of earplugs and eye mask on sleep in critically ill patients: a prospective randomized study' who found the duration of N3 sleep was higher among the patients in the intervention group who wore earplugs all night long

In relation to difference between total quality of sleep in study group pre- post of implementation of earplugs and eye masks in ICU the result revealed that, there was highly statistically significant difference between total quality of sleep in study group pre- post of implementation of earplugs and eye masks in ICU this result was in agreement with **Yazdannik , Zareie, Hasanpour ,& Kashefi (2014)** who found that Effect of the interventions on sleep disturbance was positive, and there was a significant difference at treatment night compared to the control night between groups and within each group

Regarding to the relation between factors disrupt sleep and total quality of sleep, the result revealed that, in the study group, there was no statistically significant correlation between total quality of sleep and factors disrupt sleep pre implementation of earplugs and eye masks in ICU, but, there was highly statistically significant correlation post implementation of earplugs and eye masks in ICU.

This result was in agreement with **Salmani , Mehrparvar , Torabi , Safaei , Mollasadeghi (2014)**.the study title was 'Training in using earplugs or using earplugs with a higher than necessary noise reduction rating?' The results of study found that using of earplugs minimizing noise and improve quality of sleep for these patients and there was statistically significant correlation between pre and post using of earplugs.

In relation to total quality of sleep and demographic characteristics, the result revealed that, in the study group, there was no statistically significant correlation between total quality of sleep and demographic regarding sex and age post implementation of earplugs and eye masks in ICU, but, there was highly statistically significant correlation regarding residence and a significant correlation regarding educational level.

This result was in constant with **Ali, ELsenousy & Mohamed (2017)** There was a statistically significance relation between total sleep and patient gender males as were scored higher than females. The reason for this difference could be due to sexual discrimination by society, heavier duties of females at home and in society, and males having more often rest periods than females during the day. In contrast with **Ünsal and Demir (2012)** whom evaluated sleep quality and fatigue in hospitalized patients and showed that sleep quality of female individuals were worse than male individuals. They found that sleep quality was associated with gender, females in both in patient and control groups had worse sleep quality than males.

V. CONCLUSION

Based on the findings of the present study, it can be concluded that:

The results of the current study answered the entire research question. There was a statistical significant difference for the study group in relation to factors disrupts sleep, quality of sleep post implementation of earplugs and eye masks in ICU. The using of earplugs and eye masks affect positively on patient quality of sleep ICU patients.

VI. RECOMMENDATIONS

Based on the results of the present study, the following recommendations are suggested:

- Provide earplugs and eye masks for patients admitted to ICU from the first day of admission to improve quality of sleep.
- Further studies have to be carried out in order to assess the effectiveness of earplugs and eye masks for ICU patients.
- Educational program for nurses to improve their knowledge regarding importance of introducing earplugs and eye masks for ICU patients to prevent onset of delirium and improve quality of sleep.
- Inform nurses about factors that disrupt sleep to prevent and minimize staff conversation, alarms during the quiet night time hours and they should keep their telephone silent.
- Create a suitable ICU environment that should decrease noises and lights and maintain suitable temperature during night time hours to promote sleep.
- Replication of the study on a large probability sample is recommended to obtain more generalized findings in relation to this problem.

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 2, pp: (1193-1205), Month: May - August 2019, Available at: www.noveltyjournals.com

REFERENCES

[1] **Ali S, ELSenousy T, & Mohamed H (2017):** Factors Affecting Sleep Disturbances among Patients in Critical Care Units. Master Thesis, Faculty of nursing, Ain Shams University.

[2] **Boyko Y, Jennum P, Nikolic M, Holst R, Oerding H, Toft P** (2016). Sleep in intensive care unit: The role of environment. *J Crit Care.* 37:99–105.

[3] **Costa, SV., Ceolim, MF.(2013):** Factors that affect in patients quality of sleep in ICU, *Revista da Escola de Enfermagem da USP*; 47 (1) Retrieved from (http://dx.doi.org/10.1590/S0080-62342013000100006).

[4] **Dave K, Qureshi A, Gopichandran L & Kiran U, (2015)**: Effect of earplugs and eye masks on perceived quality of sleep during night among patients in intensive care units, international journal of science and research vol 4 issue 6.

[5] **Delaney, LJ., Haren, FV. , & Lopez, V. (2015).** Sleeping on a problem: the impact of sleep disturbance on intensive care patients - a clinical review Annals of Intensive Care 5:3 Retrievedfrom(http://www.annalsofintensive care.com/content/5/1/3).

[6] **Delaney, LJ., Haren, FV. , & Lopez, V. (2015).** sleeping on a problem: the impact of sleep disturbance on intensive care patients - a clinical review Annals of Intensive Care 5:3 Retrievedfrom(http://www.annalsofintensive care.com/content/5/1/3).

[7] **Delaney, LJ., Haren, FV., Currie, M., Huang, HC., &Lopez,V.(2015).** Sleep Monitoring Techniques within Intensive Care International Journal of Nursing & Clinical Practices; 2(2): 114-120 Retrieved from (http://www. graphy online. com/archives/archivedownload.php?pid=IJNCP-114).

[8] **Demoule, A; Carreira, S; Lavault, S; Pallanca,O; Morawiec, E; Mayaux,J; Arnulf, I & Similowski,T (2017):** Impact of earplugs and eye mask on sleep in critically ill patients: a prospective randomized study. Critical Care 21:284. DOI 10.1186/s13054-017-1865-0

[9] **Ding**,Q, **Redeker,N, Pisani,M** and **Yaggi**,H (2017): Factors influencing patients' sleep in the intensive care unit: perception of patients and clinical staff. AMERICAN JOURNAL OF CRITICAL CARE, Volume 26, No. 4

[10] **Ehlers, V.J., Watson, H. & Moleki, MM., (2013).** 'Factors contributing to sleep deprivation in a multi-disciplinary intensive care unit in South Africa, *Curationis* 36(1), Art. #72, 8 pages. Retrieved from (http://dx.doi. org/10.4102/curationis. v36i1.72).

[11] **Elbaz M, Leger D, Sauvet F**,(2017). Sound level intensity severely disrupts sleeep in ventilated ICU patients throughout a 24-h period: a preliminary 24-h study of sleep stages and associated sound levels. *Ann Intensive Care.* 7(1):25. 26.

[12] **Fan EP, Abbott SM, Reid KJ, Zee PC, Maas MB.** (2017): Abnormal environmental light exposure in the intensive care environment. *J Crit Care.* 40:11–14.

[13] **Hata, R., Han, L., Slade, J., Miyahira, A., Passion, A., Ghows, M., Izumi, K., & Yu, M. (2014):** Promoting sleep in the adult surgical intensive care unit patients to prevent delirium. Nurs Clin N Am; 4: 383–397.

[14] **Hu RF, Jiang XY, Hegadoren KM, Zhang YH (2015).** Effects of earplugs and eye masks combined with relaxing music on sleep, melatonin and cortisol levels in ICU patients: a randomized controlled trial. *Crit Care.* 19:115.

[15] **Huang, HW., Zheng, BL., Jiang, L., Lin, ZT., Zhang, GB., Shen, L., & Xi, XM. (2015).** Effect of oral melatonin and wearing earplugs and eye masks on nocturnal sleep in healthy subjects in a simulated intensive care unit environment: which might be a more promising strategy for ICU sleep deprivation? Critical Care , ;**19** (19) **:**124-128

[16] **Litton E, Carnegie V, Elliott R, Webb SA (2016).** The efficacy of earplugs as a sleep hygiene strategy for reducing delirium in the ICU: a systematic review and meta-analysis. *Crit Care Med*; 44: 992-9.10

[17] **Litton E, Elliott R, Ferrier J, Webb S (2017).** Quality sleep using earplugs in the intensive care unit: the QUIET pilot randomised controlled trial. Crit Care Resusc. 19(2):128–33.

[18] **Locihová H, Axmann K, Padyšáková H, (2018).** Effect of the use of earplugs and eye mask on the quality of sleep in intensive care patients: a systematic review. *J Sleep Res* ; 27(3): e12607.

[19] **Richards KC, O'Sullivan PS, Phillips RL (2000).** Measurement of sleep in critically ill patients. *J Nurs Meas*; 8: 131-44.

[20] **Ritmala-Castren M, Virtanen I, Vahlberg T, Leivo S, Kaukonen KM, Leino-Kilpi H.(2016):** Evaluation of patients' sleep by nurses in an ICU. *J Clin Nurs.*25(11–12):1606–1613.

[21] **Salmani M, Mehrparvar AH, Torab i M, Safaei S, Mollasadeghi A (2014).** Training in using earplugs or using earplugs with a higher than necessary noise reduction rating? A randomized clinical trial. Int J Occup Environ Med. 5(4):187–93.

[22] **Stewart JA, Green C, Stewart J, (2016).** Factors influencing quality of sleep among non-mechanically ventilated patients in the intensive care unit. *Aust Crit Care* Mar 9 doi: 10.1016/j.aucc.2016.02.002.

[23] **Tainter CR, Levine AR, Quraishi SA, (2016).** Noise levels in surgical ICUs are consistently above recommended standards. *Crit Care Med.* 2016;44(1):147–152.

[24] **Ünsal, A., Demir, G. (2012).** Evaluatıon of Sleep Quality and Fatigue in Hospitalized Patients, International Journal of Caring Sciences 5 (3); 311-316

[25] **Wang , J .,& Greenberg , H. (2013).** Sleep and the ICU, The Open Critical Care Medicine Journal ;6 (1) 80-87

[26] **Wetter, DW., &Young, TB. (2015).** The relation between cigarette smoking and sleep disturbance.Austin J Sleep Disord. 2(3): 1016.

[27] **Yazdannik AR, Zareie A, Hasanpour M, Kashefi P. (2014):** The effect of earplugs and eye mask on patients' perceived sleep quality in intensive care unit. Iran J Nurs Midwifery Res.19(6):673-8.

[28] **Zhang, L., Sha, YS., Kong, QQ., Woo, JA., Miller, AR., Li, HW., Zhou, LX., Zhou, Y., &Wang, CL. (2013):** Factors that affect sleep quality: perceptions made by patients in the intensive care unit after thoracic surgery; 21(8): 2091-2096.