Impact of reduce the sleep disruption causes at post-operative ICU among patients after open Heart.

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Abstract:

Back ground Patients in ICU are experienced poor sleep quality and consistently report poor perceived sleep quality in ICU compared to home. Sleep disruption was the second most stressful condition reported by patients after open-heart surgery in ICU. Causes of sleep disruption at ICU are admission to ICU, separation from patients family, isolation, and fear of death, noise, light, extreme temperature , and diagnostic procedures, the patient being connected with many tubes, connection with machines, alarm of machines and monitors, and health team conversation. Existing evidence supports that ICU sleep promotion via multi-faceted interventions focused on minimization of nighttime sleep disruptions and maintenance of the homeostatic sleep-wake cycle**.** Therefore, **the purpose** of this study is reducing the causes of sleep disruption in ICU to improve patients sleep quality, and reduce complications. **Patient and Method** Quiz Experimental research design was used to conduct this research .**This study was carried out at** post-operative ICU in Assiut University Hospitals **.The sample of this study was** consisted of 40 patients, admitted to ICU after open-heart surgery. **Tools** used in this study are, **First Tool:** Patient's profile assessment sheet. **Second Tool**:1- sleep quality assessment questionnaire.2- Sleep disruption scale after open-heart surgery as a non-physiological assessment**. Results:** patients after open-heart surgery in ICU report poor sleep quality (1.5 ± 0.6) compared to home (9.9 ± 0.3).There is a significance increase (P<0.001) regarding to the overall quality of sleep in ICU stay for both groups. Highly significant decrease in overall degree of daytime sleepiness during ICU stay (p=0.000). Highly significant decrease in pulse rate of the study group (83.3 ± 10.7) versus control group (109.1 ± 14.8) through ICU says. Highly significant decrease in respiratory rate in 2nd day in ICU and poor significant differences in last day. Regarding to Systolic blood pressure there is statistical significant differences (p=0.003) in the2nd day. Regarding to length of ICU stay, there were highly significant decreased in study group versus control group (3.1 ± 0.3& 4.8 ± 1.1) day. **Conclusion** applying standard interventions to reduce sleep disruption causes in ICU was more effective to reduce complications of sleep disruption after open-heart surgery in study group versus control group who received routine hospital care. **Recommendations:** Patient preparation and provision of information should start from time of the surgeon's decision that surgery is required.

Key Words: Sleep disruption, open heart surgery, post- operative intensive care unit.

Introduction:

Sleep defined as a reversible behavioral state of perceptual disengagement from and unresponsiveness to the environment. Sleep is a basic human need, just as food and water are. For patients to regain and maintain their optimal physical and emotional health, they must be able to get adequate amounts of quality sleep. **(Linda, Kathleen, and Lettieri 2010)**

Sleep disruption was the second most stressful condition reported by patients after open heart surgery in ICU. **(Weinhouse and Schwab 2006)**

Patient in ICUs have a sensory/perceptual alterations related to therapeutically or socially restricted environment that leads to psychological stress Nurses plays an important role for determine the sensory simulation needed, plan care accordingly. Control factors that contribute to environment overload. Avoid constant lighting to maintain day/night patterns, reduce noise by decrease alarm volumes, and avoid loud taking, display clocks, and large calendars. Provide meaningful sensory stimulation by Position patient toward window when possible, depending on patient's preferences: provide radio or music, encourage significant others to communicate with patient. **(Case Western 2009)**

In ICU, nurses are the only group of health care providers with bedside responsibility for patients throughout the 24 hours and with a regular opportunity to observe patients while they sleep. Monitoring devices provide a wealth of information about the sleep-related occurrence of myocardial ischemia, cardiac arrhythmias, systemic and pulmonary arterial pressure changes, drops in oxygen saturation, and other physiologic events. Periods of REM sleep predominate in the early morning hours and can be identified with reasonable certainty by the presence of easily observed REMs and muscle twitches in the face. Assessment during this time is particularly important for patients with

cardiovascular disease. **(Harrison, Imran, cathy 2009)**

The general nursing management plan focuses on promoting adequate, restful sleep for patients after open-heart surgery. Nurses have considerable control over the hospital patient's physical environment, particularly lighting and sound levels. The level of noise (or sound unwanted by the listener) tends to be particularly high in ICU—and a major source of that noise is the staff. Noise can be reduced by conscious effort to avoid unnecessary or loud conversation, use equipment quietly, turn off unnecessary equipment or alarms, consider sound level when deciding on equipment purchases, and give attention to level of noise acoustic when participating in care of patient in ICU. **(Case Western 2009)**

The nursing plan should reflect awareness of the typical 90-minute sleep cycle and should cluster nursing care to provide opportunities for full cycles to occur. **(Case Western 2009)**

Nurses must be assertive in alerting other health care providers to the patient's need for sleep and in identifying untimely disruptions. Skills of diplomacy, coordination, and priority setting are needed to get important procedures done without fragmenting either the patient's sleep or the health care provider's routine. Sophisticated monitoring equipment permits assessment of many physiologic parameters without disturbing the patient. Necessary interruptions should, when possible, be done at times when otherwise unavoidable activities occur**. (Case Western 2009)**

Patients and method

Research Design:

Quiz experimental research design was utilized for conducting this study.

This design allowed the researcher for controlling the time when subjects were observed and applied the nursing interventions.

Setting:

The study conducted in post-operative intensive care unit at Assiut university hospitals.

Sample:

A convenient sample of 40 adult patients was admitted at the post-operative intensive care unit after open-heart surgery.

The present research was contains one dependant variable (patients after open-heart surgery) and independent variables (ICU environmental stressors). The sampling size of the present study was 40 patients after open-heart surgery they divided equally into two groups control group (assessing the causes of sleep disruption) and the study group for applying the control measures of environmental factors and received nursing instructions and patient teaching program.

Effective implementation of ICU sleep guideline will involve a significant change in culture. Education and engagement of all involved ICU physicians, nurses, and staff will be paramount to achieve buy-in, and frequent performance measurement will be a vital tool for feedback and motivation. Monitored outcomes will vary based on available resources which may include validated sleep quality instruments. Success and sustainability of sleep interventions also will be dictated by secondary outcomes, such as ICU length of stay and post-ICU psychological and cognitive functioning. **(Pronovost , Berenholtz , and Needham 2008)**

Significance of the study

Sleep disruption among patients after open heart surgery is considered as a significant health problem and it is in need for effective medical and nursing care. The admitted patients at the Coronary Care Unit of Cleveland Ohio USA after open heart surgery during the period of May 2008 until February 2010 they were 987 patients,200 patients were complained from the physiological and non physiological symptoms of sleep disruptions. The health team was following the interventions for the prevention of sleep disruption.

Aims of the study

- Application of interventions to prevent causes of sleep disruption after open-heart surgery and developing a strategy to improve ICU sleep quality through pre-operative psychological preparation and ICU environment management.

Criteria of the sample selection:-

Inclusion criteria:

1. All patients were admitted at the ICU immediately after open-heart surgery and connected with mechanical ventilation.
2. The patients stayed at the ICU for at least 72 hours.

Exclusion criteria:

The study was excluding those patients who have a history of sleep disturbances and psychological disorders.

Tools of the study:

Three tools were designed and used for collecting data for this study, these tools were tested by the researcher, and the content of the tools was be established by extensive literature review and pilot study.

Tool I: Patient's assessment sheet

Patient's assessment sheet include three parts, **1st part** consists of socio-demographic data of the patient as name , age , sex, level of education , and type of occupation, **2nd part** consists of medical data as: date and time of admission , medical diagnosis ,type of surgery, time of connection and disconnection with mechanical ventilation, length of

ICU stay and mechanical ventilation setting, **3rd part** consists of the vital signs (temperature , pulse, respiration and blood pressure) , laboratory investigation (ABG, liver function test, prothrombin time and prothrombin concentration).

Second Tool: sleep quality questionnaire (Freedomman, and et al 2001)

1- A questionnaire were assessed the sleep quality of ICU patients and factors that contributed to sleep disruption among these patients. Patients evaluated their sleep quality on a scale of 1to 10 (1= poor, 10= excellent) at home and in the ICU. Sleep quality over the duration of the patients' ICU stay as assessed with the same scale. Participants were asked to determine their degree of daytime sleepiness over he duration of their ICU stay on a scale of 1to 10 (1= unable to stay awake, 10= fully alert and awake). The effect of environmental stimuli on sleep disruption was measured on a scale of 1 to 10 (1= no disruption, 10= significant disruption).The environmental stimuli that were evaluated included noise, light, nursing interventions (bathing, etc), diagnostic tests (i.e., chest radiographs), evaluation of vital signs, blood sampling, and the administration of medications. Patients were also asked to assess the effects of different ICU noises on sleep disruption, using a scale of 1(no disruption) to (significant disruption). The ICU noises that were evaluated included telemetry alarms, ventilator sounds and ventilator alarms (for applicable patients), sounds of pulse oximetry, communications between staff members, intravenous pump alarms, suctioning sounds, doctor's beepers, and television and telephone sounds.

2- Sleep disruption scale after open-heart surgery. **Psychiatric Prof.Dr.Samy Abd-Elkawy Ali 2010).**

The scale consists of 30 questions measures 30 Symptoms, Are the most common sleep disorders in post-operative open-heart surgery. Can be classified into categories :(Symptoms of concentration and memory disorder, Affective symptoms, Sensory symptoms, Symptoms of the autonomic nervous system, Symptoms of cognitive disorder, Symptoms of disorder of thinking and awareness).

Scoring system

Screened given a degree of four degrees (zero, 1,2,3) on the response chosen by the Never, rarely, sometimes, often), respectively, and reflect the degree to which obtained for the intensity of symptoms, as reflected in the total score (zero - 90) obtained by the power of the likelihood of disorder .The grade 45 and above a strong indication for it.

Ethical considerations:

- Permission to conduct the study was obtained from hospital responsible authorities in the postoperative ICU after explanation of the aim of the study.
-The researcher explained the aim of the study to the post-operative nurses to get their cooperation.
- For ethical considerations the nature and purpose of the study was explained to every patient.
- Informed consent was obtained from the patient to carry out these studies.

Statistical analysis

-Data were coded and transformed into specially designed form so as to be suitable for computer enter process.

-Statistical analysis was performed using the software program package SPSS, version 16.

-Data of obtained result were tabulated in the form of frequency using mean, standard deviation (M±S.D), number and percentage

-using Independent t-test to compare significance relation.

- Pearson correlation for factor analysis.

Results:

Table (1): Number and percentage distribution of study and control groups regards socio- demographic characteristics.

Variables	Study (n= 20)		Control (n= 20)	
	No.	%	No.	%
Age: (years)				
< 40	12	60.0	9	45.0
≥ 40	8	40.0	11	55.0
Mean ± SD	38.6 ± 10.1		39.2 ± 11.6	
Sex:				
Male	14	70.0	12	60.0
Female	6	30.0	8	40.0
Level of education:				
Illiterate	11	55.0	10	50.0
Read and write	0	0.0	1	5.0
Basic education	0	0.0	1	5.0
Secondary	6	30.0	6	30.0
University	3	15.0	2	10.0
Occupation:				
Employer	5	25.0	3	15.0
Worker	5	25.0	4	20.0
Farmer	3	15.0	4	20.0
Unemployed	1	5.0	1	5.0
Housewife	6	30.0	8	40.0

Statistically not significant at $P > 0.05$.

Table (2): Mean score of Vital signs pre-operative (as base line), immediately post-operation, after one hour and after patient disconnection from MV. (n=40)

Variable	Group		P-value
	Study (n=20)	Control (n=20)	
	Mean ± SD	Mean ± SD	
Body temperature: (C^o)			
Pre-operative	37.1 ± 0.2	37.2 ± 0.2	0.118
Immediately post-operative	36.3 ± 0.4	36.0 ± 0.4	0.127
After one hour	37.0 ± 0.2	36.9 ± 0.5	0.322
After disc. of MV.	37.0 ± 1.2	37.4 ± 0.4	0.021*
Pulse rate: (beat \ min)			
Pre-operative	80.5 ± 10.3	100.2 ± 8.3	0.001*
Immediately post-operative	96.7 ± 19.9	93.9 ± 17.7	0.641
After one hour	96.6 ± 12.8	101.2 ± 19.4	0.376
After disc. of MV.	88.5 ± 7.2	102.3 ± 16.6	0.004*
Respiratory rate: (c\min)			
Pre-operative	17.1 ±1.1	23.1 ± 1.8	0.001*
Immediately post-operative	15.1 ± 1.3	14.7 ± 1.3	0.355
After one hour	15.9 ± 1.7	12.3 ± 1.4	0.001*
After disc. of MV.	16.7 ± 2.5	19.2± 2.3	0.006*
Systolic BP: (mm.Hg)			
Pre-operative	122.5 ± 6.6	124.5 ± 8.7	0.005*
Immediately post-operative	106.1 ± 19.0	110.9 ± 22.3	1.000
After one hour	112.6 ± 12.3	109.1 ± 11.4	0.472
After disc. of MV.	117.2 ± 9.7	118.7 ± 10.7	0.041*
Diastolic BP: (mm.Hg)			
Pre-operative	70.5 ± 3.9	70.5 ± 5.1	0.044*
Immediately post-operative	61.8 ± 11.0	63.0 ± 12.3	0.589
After one hour	63.0 ± 5.7	61.8 ± 8.0	0.645
After disc. Mechanical Ventilation	64.8 ± 7.5	65.6 ± 9.9	0.761

* Statistical significant differences (P< 0.05) Independent samples t-test

Table (3): Comparison between both groups regarding to ICU causes of sleep disruption after applying the control measures for environmental stimuli. (n=40)

Activities	Study	Control	P-value
	Mean ± SD	Mean ± SD	
Noise	6.9 ± 1.8	10.0 ± 0.2	0.001*
Light	7.5 ± 3.1	8.3 ± 2.9	0.399
Nursing interventions	3.3 ± 3.3	7.1 ± 3.8	0.004*
Diagnostic testing (i.e. chest x-rays)	1.2 ± 0.4	3.0 ± 0.1	0.001*
Vital signs (BP, pulse, temperature)	5.0 ± 2.3	8.0 ± 3.2	0.009*
Blood samples	3.5 ± 3.4	4.9 ± 3.3	0.194
Administration of medications	4.4 ± 2.5	6.7 ± 2.4	0.009*

Table (4): Comparison between both groups as regards Specific ICU noises of sleep disruption for post – operative patients during ICU stay. (n=40)

Items	Study Mean ± SD	Control Mean ± SD	P-value
Heart monitor alarm	4.7 ± 3.9	9.9 ± 0.4	0.001*
Ventilator alarm	7.2 ± 3.4	9.9 ± 0.3	0.001*
Ventilator	6.5 ± 3.9	8.1 ± 3.2	0.179
Oxygen finger probe	2.4 ± 2.6	2.5 ± 3.0	0.955
Talking	7.8 ± 2.9	9.4 ± 1.5	0.035*
I.V. pump alarm	5.4 ± 3.7	7.2 ± 3.8	0.141
Suctioning	5.6 ± 3.2	8.4 ± 1.9	0.002*
Nebulizer	4.1 ± 3.8	4.8 ± 4.0	0.600
Doctor's beepers	1.5 ± 2.0	1.0 ± 0.0	0.324
Television	1.0 ± 0.0	1.2 ± 0.4	0.075
Telephone	4.6 ± 3.7	5.3 ± 4.1	0.573

Table (5): Comparison between both groups as regards patient's quality of sleep at home, in the ICU days (1st night, middle, at the last night), **and degree of daytime sleepiness for post – operative patient.**

Variables	Study	Control	P-value
	Mean ± SD	Mean ± SD	
Overall quality of sleep at home	10.0 ± 0.2	9.9 ± 0.3	0.560
Quality of sleep in the ICU :			
– the first night in the ICU	2.0 ± 1.5	1.9 ± 1.6	0.840
– During the middle of ICU stay	5.0 ± 2.1	2.5 ± 0.9	0.001*
– At the end of ICU stay	5.7 ± 2.4	2.8 ± 1.5	0.001*
Overall quality of sleep in the ICU	4.7 ± 3.0	1.5 ± 0.6	0.001*
Overall degree of daytime sleepiness during ICU stay:			
– On the first night in the ICU	4.3 ± 2.3	2.5 ± 2.5	0.033*
– During the middle of ICU stay	6.6 ± 2.0	4.6 ± 2.6	0.016*
– At the end of ICU stay	6.1 ± 2.3	4.4 ± 2.4	0.039*
Overall degree of daytime sleepiness during ICU stay	5.7 ± 2.2	4.7 ± 2.8	0.001*

Table (6): Comparison between both groups regards Psychiatric symptoms after one month of the operation. (n=40)

Psychiatric symptoms	Study Mean ± SD	Control Mean ± SD	P-value
1- Symptoms of disorder concentration and memory	6.4 ± 2.1	9.1 ± 1.5	0.001*
2- Affective symptoms	8.7 ± 2.6	11.0 ± 1.4	0.001*
3- Sensory symptoms	5.4 ± 2.4	9.0 ± 1.8	0.001*
4- Symptoms of the autonomic nervous system	6.9 ± 2.0	9.6 ± 2.0	0.001*
5- Symptoms of cognitive disorder	4.3 ±1.2	5.7 ± 1.1	0.001*
6- Symptoms of disorder of thinking and awareness	2.8 ± 3.0	4.8 ± 1.9	0.044*
Total	30.6 ± 12.8	48.3 ± 8.2	0.001*

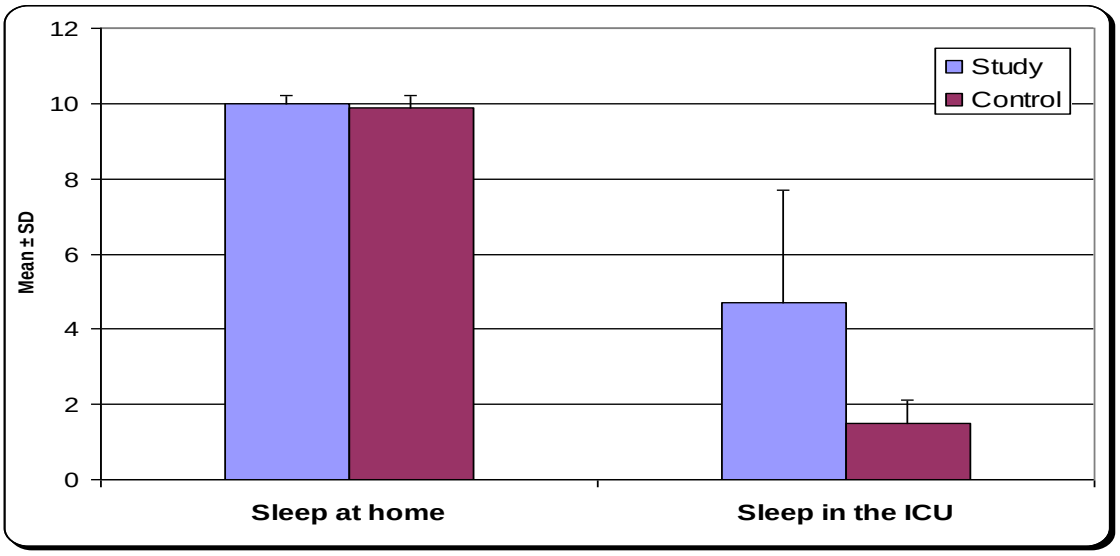

Figure (1): Comparison between both groups in relation to patient's quality of sleep at home and quality of sleep in the ICU days.

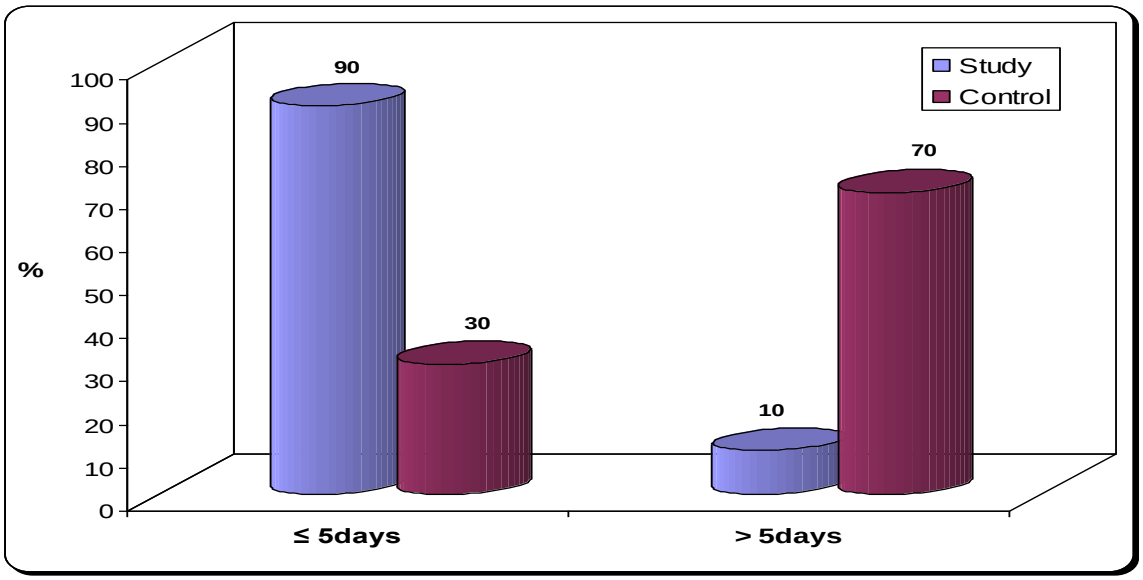

Figure (2): Distribution percent of both groups in relation to patient's Length of ICU stay.

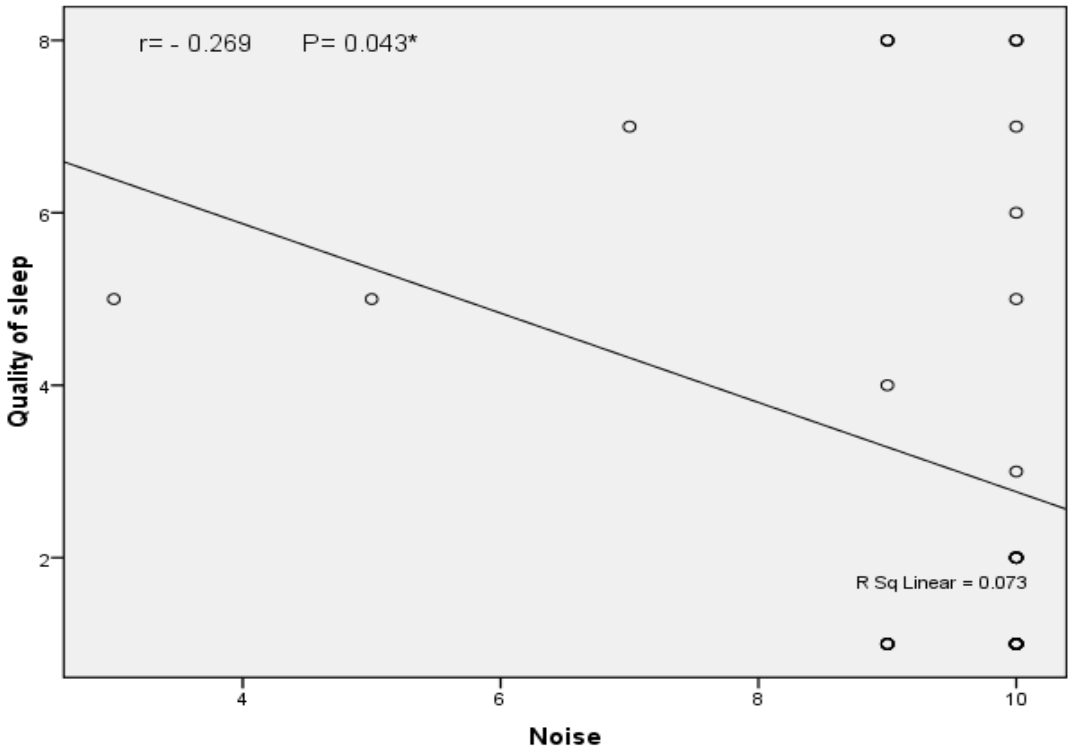

Figure (3): Correlation between the patient's quality of sleep and noise

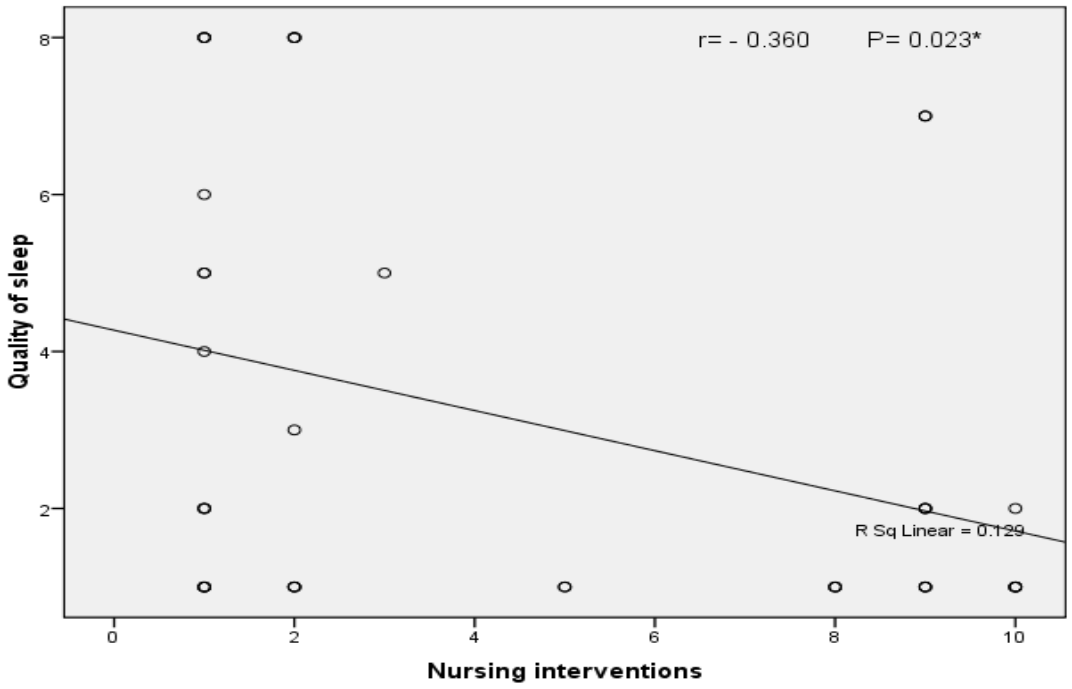

Figure (4): Correlation between the patient's quality of sleep and nursing interventions

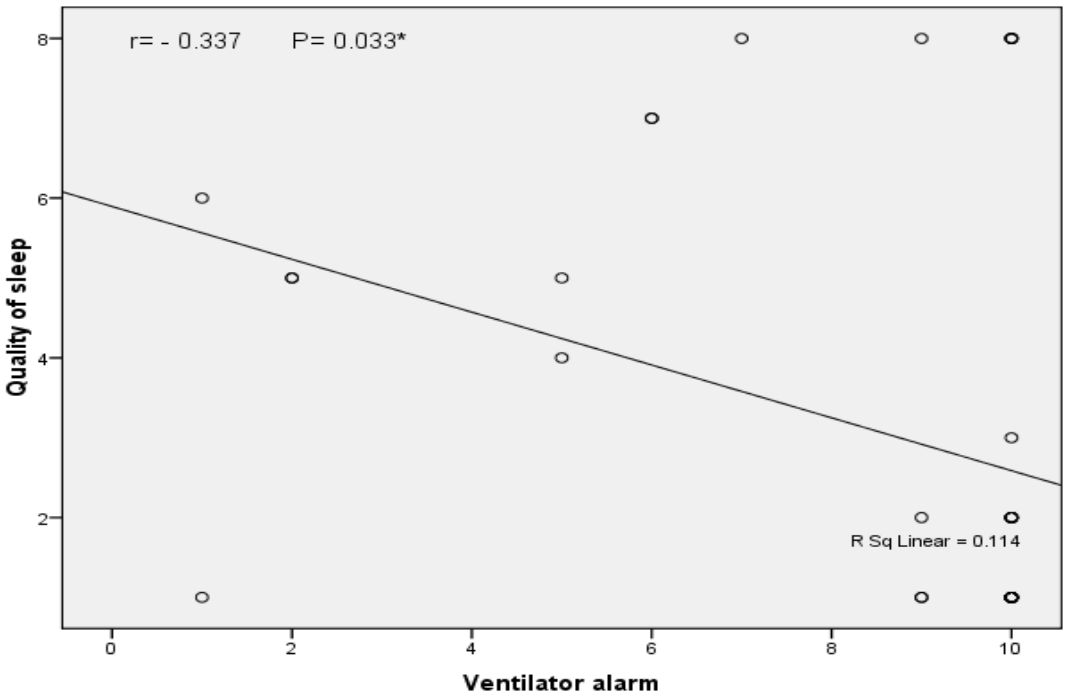

Figure (5): Correlation between the patient's quality of sleep and ventilator alarm

Table(1):

Represent the comparison between study and control groups as regard to sociodemographic data (age, sex, level of education, Occupation). The mean age ± SD of study group was (38.6 ± 10.1) compared to control group (39.2 ± 11.6). Regarding to sex it was noticed that the highest percentage of the study group were males (70 %), compared to study group (60 %). As regard the level of education it was found that the majorities of the study group was illiterate (55%), compared to control group (50%), This table shows that there is no statistical significant difference between study and control groups as regards sociodemographic status variables.

Table (2):

It Shows comparison between the control group and study group in relation to vital signs. Regarding to the body temperature after patient disconnection from MV it was found that there were a significance decrease (P<0.05) in study group (37.0 ± 1.2) versus control group, Regarding to the pulse rate at pre-operative it was found that there was a highly significant (P<0.001) in study group (80.5 ± 10.3) versus control (100.2 ± 8.3), Regarding to the respiratory rate at pre-operative and after one hour it was found that there were highly significance (P<0.001) in control group (23.1 ± 1.8) versus study group, and there was found a significance decrease in study group (19.2± 2.3) versus control group.

Table (3):

Shows the highest mean score for the control group as regard noise in ICU was (10.0 ± 0.2) compared with study group (6.9 ± 1.8) with increase statistical significant difference (0.001). The lowest mean score for study group regarding to diagnostic testing was (1.2 ± 0.4) and (3.0 ± 0.1) for control group with highly statistical significant difference (0.001). The result revealed that a statistical significant difference found between groups regarding to nursing interventions (0.004), taking vital signs and administration of medications (0.009).

Table (4):

Comparison between both groups as regards specific ICU environmental noises revealed that there was a statistical significant difference regarding to sound of heart monitor alarm (0.001) followed by sound of ventilator alarm (0.001) followed by suctioning (0.002) then talking at ICU (0.035).There was no statistical significant difference regarding to other factors [Ventilator, Oxygen finger probe, I.V. pump alarm, Nebulizer, Doctor's beepers, Television and Telephone].

Table (5):

The study revealed that there was a highly statistical significant difference (P<0.001) regarding to the overall quality of sleep in ICU stay for both groups (4.7 ± 3.0) of study group and control group was (1.5 ± 0.6). There was a highly significant difference between studded groups as regards to overall degree

of daytime sleepiness during ICU stay (5.7 ± 2.2) of study group and control group was (4.7 ± 2.8). Regarding to the overall quality of sleep at home for both groups there was no statistical significant difference as well as regards to quality of sleep on the first night in the ICU (P= 0.840).

Table (6):

The result revealed that there was highly a statistical significant difference between both groups regarding to symptoms of disorder concentration and memory, affective symptoms, sensory symptoms, and symptoms of the autonomic nervous system. There was significant difference as regards to symptoms of cognitive disorder and significant as regards to symptoms of thinking and awareness.

Discussion:

Sleep plays a critical role in maintaining health and well-being; however, patients who are hospitalized are frequently exposed to noise that can disrupt sleep**.(Buxton , Ellenbogen, Wang , and etal 2012)**

Sleep was markedly impaired in an ICU environment of elevated light and sound levels. Understanding the role of noise and light in the sleep efficiency of post-operative patient can help nurses identify sources of noise and light and initiate sleep improvement protocols**. (Missildine 2008)**

Since the late 1970s, research has confirmed that sleep is routinely disturbed in ICU patients. These findings have identified in studies using subjective measures (patient self- report and sleep in ICU Questionnaire) and objective measures (PSG). Subjective measures provide information regarding a patient's perceptions of both the quantity and the quality of sleep. Both types of studies provide data that illuminate our understanding of sleep in the ICU. Personal satisfaction with the amount of sleep and feeling refreshed after sleep are significant parts of the ICU experience. (**Roberta and Sonya 2007)**

Sleep in the intensive care unit (ICU) poses unique challenges for patients after one heart surgeries, Patients spend long periods in bed, remain in a supine position with minimal to no activity, and are typically not exposed to significant light variation over a 24-hour period. These conditions make sleep onset and continuity problematic. In addition, patients are subject to repeated environmental disruptions that further fragment sleep. **(Aaron , Christopher 2010)**

From this concept of the importance of sleep in post cardiac surgery recovery, this study was aiming to determine the contribution of the post-operative ICU environment to sleep disruption in patients after open-heart surgery and to estimate the effectiveness of nursing interventions application (pre-operative psychological preparation and environment management) to improve sleep quality and reduce complication of sleep disruption.

Regarding socio-demographic characteristics, two groups (study & control) were included in this study with no statistically significant differences shown between them regarding to age, sex, educational level, and occupation.

The current study confirmed that, Patients in the post- operative intensive care unit experience poor sleep quality and consistently report poor perceived sleep quality in the ICU compared to home. These results are supported by (**Borthwick , Bourne , Craig , and et al 2006)** who reported that patients in ICUs do not sleep well. Patients in critical care units may spend 30–40% of their sleep time awake; sleep is highly fragmented and distributed throughout the day and night.

(Freedman and et al 2001) Reported that Perceived quality of sleep was poorer than that at home. Poor quality of sleep and day- time sleepiness was common problems in all types of ICUs.

(Hardin 2009) Reported that patients in the ICU have severely disrupted sleep with disturbed circadian pattern. The etiology of sleep disruption in the ICU includes the nature of the ICU environment.

The results in the present study revealed that, intensive care unit environmental noise was perceived as more disruptive to sleep than other factors**.** This was supported by **(Freedman and et al 2001)** reported that Environmental stimuli, particularly noise, have been presumed to be the most disruptive factors in the ICU. **(Jonathan , Andrew, Shelley , and et al 2003**) Study reported that noise caused the majority of subjects' total arousals and awakenings in the open ICU.

The current study results revealed that, lighting comes in second place of the causes of sleep disruption and followed by taking vital signs, medications administration, taking blood samples and the less disruptive factor to sleep is making diagnostic testing. These results were supported by (**Walder, Bernhard , Francioli, and et al 2000)**, who examined the effects of guidelines implementation in a surgical intensive care unit to control nighttime light and noise levels, the study reported that environmental noise and light are major causes of sleep disturbances in the ICU, followed by interventions of the personnel for repeated clinical assessment and/or therapeutic procedures.

While disagreed with two studies by (**Freedman , Kotzer , and Schwab1999**) which evaluated the contribution of noise to sleep disruption in ICU patients. A detailed questionnaire administered to patients after discharge from the

ICU indicated that assessments of vital signs were considered more disruptive than noise.

In the present study, it was found that alarm noises (Heart monitor alarm& Ventilator alarm), noise resulting from staff taking and suctioning noises were more sleep disruptive causes than noise of oxygen finger probe, nebulizer, and telephone while there was no effect of doctor's beepers and television. These disagreed with **(Christenses, 2005)** who found that patient in the open ICU; no single noise source was predominantly responsible for sound-induced sleep disruption. Alarm noises were less disruptive than were conversation or staff activities.

The current study results revealed that, the vital signs parameters (body temperature, pulse rate, respiratory rate and blood pressure) affected by poor sleep quality. These results supported by **(Susan , Erika , and Sandra 2000)** who reported that Body temperature is regulated at a lower set point in NREM sleep than in wakefulness. In combination with reduced motor activity, this results in a decrease in temperature at sleep onset. The normal regulating mechanisms are markedly inhibited during REM sleep, however, and during this stage of sleep, body temperature is influenced more by the environment than the hypothalamus.

(Passchier-Vermeer, Steenbekkers, van der Ploeg, and et al 2003) studies has been found that the noise cause instantaneous effects such as extra motility, change in sleep state and EEG arousals, momentary changes in heart rate, and conscious awakening.

(Jones, Fujiki, Holder, and et al 2009) Rate studied the cardiovascular effects of noise around the time. The timing of the first noise boom was applied when a subject entered the deepest sleep stage. Pulse rate initially increased in frequency with a maximum in the fourth second, and then decreased below the level prior to the noise and then slowly increased to baseline level once more. No correlation was found between the intensity of the boom and the pulse reaction, or between the stage of sleep and the reaction. However, a highly significant correlation was found between the maximum post-boom increase of pulse rate and the prior to the boom, with the reaction becoming smaller as the pulse rate increased.

(Susan , Erika, and Sandra 2000) Reported that Sleep is accompanied by changes in blood pressure and heart rate, both major determinants of myocardial oxygen demand. NREM sleep appears to be a relatively protected state because blood pressure and heart rate decrease and become more stable as sleep progresses to deeper stages. During slow-wave sleep, blood pressure is approximately 10% to 20% lower than in quiet wakefulness, whereas the heart rate is decreased by approximately 5% to 10%.

(Michelle , Eveloff , Bauer ,and et al 2010) Reported that sleep disturbance has been linked to elevated blood pressure and risk for hypertension.

Sleep fragmentation can result in elevation of blood pressure, arrhythmias, and progression of heart failure **(Leung and Bradley, 2001).**

(Osamu , Akihiko , and etal 1996) Studies confirmed that Blood pressure (mean systolic/diastolic pressure ±SD) significantly increased the day after a sleep-insufficient night (129±8/79±6 mm Hg) compared with the day after a normal night (123±8/76±7 mm Hg, P<.05).

The present study revealed that, applying of nursing interventions (pre-operative psychological preparation and environment management) have appositive effect on reducing psychiatric complication of sleep disruption including disorder concentration and memory**,** Affective symptoms, Sensory symptoms, Symptoms of the autonomic nervous system, Symptoms of cognitive disorder, Symptoms of disorder of thinking and awareness. These results supported by several studies.

(Hopkins ,and Brett 2005) Numerous investigations describe a variety of short- and long-term neurocognitive deficits following critical illness, including impairment of memory, attention, concentration, language, and mental processing speed. **(Banks , Dinges 2007)** Studies clarified the potent effect of sleep quantity and quality on mood depressive symptoms and increased levels of fatigue, anxiety, and stress.

The result revealed that there was a negative correlation between the patient's quality of sleep and environmental factors (noise, nursing interventions, taking vital signs, blood samples, and administration of medications), and **a** negative Correlation between the patient's quality of sleep and specific noise at ICU environment.

(Freedman and et al 2001) Reported that sleep disruption by the ICU environmental light and noise showed a weak but significant negative correlation (r = - 0.19)

The previous data reflects that the patient's quality of sleep can be improved by nurses' awareness of the ICU environmental causes of sleep disruption and they must Create a Healing Environment in the ICU by, applying of nursing interventions which include proper pre-operative psychological preparation and environmental management protocol.

Conclusion:

Hospitalization in post-operative ICU is stressful to patients because of illness, medication, pain and ICU environment is an important factor of

sleep disruption. Psychological reasons superimpose as a result of the fear of the underlying diseases or death and the loss of personal self-control. Indeed, environmental noise and light are major causes of sleep disruption in the ICU.

Measures to reduce sleep alterations in ICU are easy to implement. Interventions that may treat the sources of sleep deprivation could be adequate pain therapy, optimal psychological support, and a low degree of environmental noise and light.

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