Biomedical Research 2017; 28 (16): 7076-7080 *ISSN 0970-938X*
www.biomedres.info

Investigating the effect of performing the quiet time protocol on the sleep quality of cardiac patients.

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Abstract

Sleep is one of the major requirements for patient's recovery. Given the role played by environmental factors in patient's sleep disorders in a Coronary Care Unit (CCU), it is necessary to use an appropriate protocol to improve these patient's sleep. The present study investigated the effect of Quiet Time protocol (QT) on the sleep quality of cardiac patients in the city of Ilam. The present clinical trial was performed in 2015, using cardiac patients in Ilam. The patients were divided into two groups: (1) Experimental and (2) Control groups. Data were collected using a demographic questionnaire, St. Mary's Hospital Sleep Questionnaire (SMHSQ) and Epworth Sleepiness Scale (ESS). The quiet time protocol was carried out with the experimental group from 11 pm to 5 am for three consecutive nights. Data analysis was performed using descriptive statistics (mean and standard deviation), Fisher's exact test (to compare the two groups in terms of number of days of hospitalization in the CCU before treatment) and independent t-test (to compare the patient's age difference and sleep hours at home). The findings showed that sleep quality was low in patients before Quiet Time protocol (QT). There was no significant difference ($p>0.05$) between sleep quality of the QT group and the control group on the first night. Given that the quiet sleep protocol improves the quality of patient's sleep, the implementation of this protocol is recommended to patients receiving nursing care.

Keywords: Quiet sleep, Nursing intervention, Cardiovascular disease.

Accepted on July 17, 2017

Introduction

Sleep is one of the major requirements for patient's recovery [1]. In the first category of Maslow's hierarchy of needs, sleep is required to maintain energy, for the repair and growth of body tissues, for physical well-being, and for appearance [1-3]. Although patients in ICU require more sleep, they are exposed to a higher risk of reduced quality of sleep and lack of sleep, and their natural sleep-wake cycle may be affected [4].

The results of various studies have shown that patients in the ICU suffer from sleep disorders [4-6]. This can be attributed to internal factors such as decreased mobility, stress, impaired nutritional habits, nausea, and vomiting. External factors such as multiple mental and physical factors of the ward including monitoring and sounds in the hospital wards, the brightness of lights, ambient temperature, opening or closing of doors and windows, and other patient's coughing or whining [1,5,7,8]. On the other hand, lack of sleep is known to be one of the causes of cardiovascular disease. Previous studies have emphasized the relationship between sleep disorders and coronary heart diseases [9,10]. In fact, poor sleep quality is stressful and by releasing epinephrine and norepinephrine, it causes increased heart rate, increased respiratory rate, increased myocardial oxygen requirements, and eventually leads to severe ischemia and myocardial infarction [11]. Therefore, nurses should pay more attention to the sleep and relaxation needs of patients in the ICU [1].

In general, two methods are used to improve sleep quality: (1) Pharmacological and (2) Non-pharmacological methods. Due to high costs and serious side effects of medical procedures and dependence on these drugs, non-pharmacological methods may be used to improve sleep quality in these patients. Among the non-medicinal methods for improving sleep quality are complementary therapies such as aromatherapy, muscle relaxation, music therapy, use of nursing care patterns, blindfolds, and quiet sleep time protocol [12-25].

Given the role of environmental factors in patient's sleep disorders in ICU, it is necessary that an appropriate protocol be used to improve these patient's sleep [26,27]. Quiet Time Protocol (QT) is a method in which nurses use non-invasive, simple and free approaches, such as a quiet environment, both physically and mentally, to improve patients sleep quality [6,28]. With regard to the importance of a patient's sleep

quality in the CCU, the present study investigated the effect of performing the QT protocol on the sleep quality of patients in CCUs in Ilam in 2015.

Materials and Methods

The present Quasi-experimental study was performed on patients hospitalized in the intensive care units in Ilam in 2015. Based on previous studies, 60 individuals were selected as the study sample [29]. The patients were randomly assigned into experimental and control groups with 30 individuals each. Rephrase were between 18-75 y old, were hospitalized for more than 24 h in the Coronary Care Unit (CCU), had a Glasgow score of 13 or higher based on the patient's records in the intended shift, had an absence of severe neuropathy, had not been under general anesthesia for at least 24 h, had not received sedatives and analgesics in the 5 h before bedtime, did not have any psychological disorders, did not have any sleep disorders (such as sleep apnoea, chronic insomnia and narcolepsy), were not on ventilation and did not have a drug addiction. The exclusion criteria included the need for cardio-pulmonary resuscitation by the patient or other patients in the CCU, the patient's need for sedation during the study, being blind or deaf, sleeping for more than 2 h during the intervention, and unwillingness to continue participating in the study.

The data collection tools of the present study included a demographic questionnaire, St. Mary's Hospital Sleep Questionnaire (SMHSQ) and Epworth Sleepiness Scale (ESS). The Epworth Sleepiness Scale (ESS) measures daytime sleepiness in patients. This scale was created in 1991 by Murray Jones, with eight self-report items by which the individual evaluates the possibility of drowsiness and sleep during various activities based on a Likert scale from 3 (high chance of napping) to zero (I never nap). In this questionnaire, the score of 0-5 indicates enough sleep, 6-10 indicates slight drowsiness, 11-15 shows average drowsiness and 16-24 indicates severe drowsiness [30]. The St. Mary's Hospital Sleep Questionnaire (SMHSQ) is used to investigate sleep pattern disorders. This questionnaire includes 11 items for disturbed sleep patterns based on a Likert scale from 3 (much) to 1 (never). In this questionnaire, the scores of 11-21 indicate slight sleep disorders, the scores of 22-32 indicate average disorders and scores of 33-44 indicate severe sleep disorders [31].

Sampling was done after the study was approved by the Ethics Council in Ilam University of Medical Sciences. Prior to the intervention, the researcher introduced himself, stated the research objectives and obtained written informed consent to participate in the research and then started to interview and intervene. The quiet time protocol technique was performed following the procedure of Chamanzari et al., but with a difference, in that, the interventions of this technique were performed by researchers who were also on shifts in the CCU [6]. The quiet time protocol was carried out on the experimental group from 11 pm to 5 am for three consecutive nights by the researchers. The control group received routine care.

Data analysis was performed using descriptive statistics (mean and standard deviation), Fisher's exact test (to compare the two groups in terms of number of days of hospitalization in CCU before treatment) and independent t-test (to compare the patient's age difference and sleep hours at home).

Table 1. Summary of the quiet time protocol [6].

Adjustment of nursing	Preparing the environment	Preparing the patient
Coordinating with night supervisor.	The alarm of the input section was turned off and a sign on the entrance door said, "Please knock quietly". Cell phones of all personnel were put on silent mode after 11 pm and the phone of the ward was put on the minimum volume.	Patient's mattresses were checked in terms of safety of air pump and being filled or empty in all parts.
Coordinated with doctors to visit patients before 11 pm.	Alarm devices connected to the patient were lowered and the ward's computer was turned off, if it wasn't needed after 11 pm.	Suctioning and keeping the sleep tub if needed, mouth washing or teeth brushing before bedtime.
All Graphy were performed before 11 pm.	Turning off the overhead lights, and dimming the lights in the ward and at the nursing station at midnight.	According to the physiological condition of the patient and his complaint of being sensitive to cold and heat, blankets were given.
Arterial and venous sampling and IV changes were done before midnight.	In the case where there is need to replace the bed, infusions and trolley were performed before 11 pm.	If allowed, a suitable pillow is given to the patient based on his/her request. The patient's sheet must be smoothed. Changing the patient's bed sheet and dresses, bathing in bed (if needed) and repositioning were done before 11 pm.
Replacing Foley catheters, nasogastric catheters, dressing, controlling CVP, taking an electrocardiogram (EKG), and distribution of Gavage drugs were done before 11 pm.	Unnecessary commutes were prevented. The rate of talking and laughing together by staffs was reduced. Moving the chair in the nursing station was banned from midnight to 5 am.	To prevent the sound of alarms to complete infusion, the patient's drugs were controlled and probes fixed to the patient's finger.
Lung sounds auscultation, percussion and chest physical therapy, tracheostomy, tracheal tube, and ventilator care were done before 11 pm.	Precise controlling and monitoring of ventilation, pulse oximetry and devices, and infusion pumps ensured that there were no unnecessary alarms from midnight to 5 am. If the	When there is a need for special measures, such as monitoring vital signs or meeting the needs of patients, the staff should avoid talking to each
	patient's bedside curtains were drawn and if the patient in the next bed was unwell.	other, and equipment should be silenced from midnight to 5 am.

Encoding

Results in Table 1 show summary of the quiet time protocol of cardiac patients before the intervention. As shown in Table 2 below difference existed between demographic characteristics of the Cardiac Patients ($p<05$).

The findings showed that sleep quality was low in patients before the intervention. There was no significant difference ($p>0.05$) between sleep quality of the QT group and the control group on the first night, but on the third night, there was an improvement in patient's sleep quality in the experimental group ($p<0.05$ and Table 3).

Table 2. *Summary of the quiet time protocol of cardiac patients before the intervention.*

Classes	N (%)	Control	Experimental	P
		N (%)	N (%)	
Gender	Male	23 (57.5)	24 (60)	0.65
	Female	17 (42.5)	16 (40)	
The number of days of hospitalization before sampling	0-3	28 (70)	24 (65)	0.83
	42920	12 (30)	14 (35)	
Disease	Heart failure	6 (15)	7 (17.5)	0.77
	High blood pressure	9 (22.5)	7 (17.5)	
	Acute coronary syndrome	9 (22.5)	11 (27.5)	
	Myocardial infarction	10 (25)	10 (25)	
	Angina	6 (150)	5 (12.5)	
	Sleep at home (M ± SD)	1.13 ± 6.13	1.19 ± 6.53	0.22
	Age (y) (M ± SD)	11.29 ± 50.43	9.60 ± 53.38	0.46

Table 3. *Compares the sleep quality scores in patients in CCU after the intervention.*

	Sleep disorder	Experimental	Control	p
		N (%)	N (%)	
Epworth sleepiness (ESS)	Total score of the first night	6.76 ± 21.32	20.90 ± 6.57	0.77
	Total score of the second night	6.28 ± 18.55	20.92 ± 6.13	0.09
	Total score of the third night	17.20 ± 6.56	20.85 ± 6.01	0.01
Hospital sleep quality	Total score of the first night	28.87 ± 9.05	25.52 ± 8.73	0.49
	Total score of the second night	24.10 ± 8.12	27.92 ± 8.51	0.04
	Total score of the third night	20.92 ± 6.45	28.05 ± 8.38	0

Discussion

It is known that poor sleep quality has adverse effects on the physical, psychological and social performance of patients. Therefore, implementing interventions to improve patients' sleep quality can help to improve the quality of their lives [32,33]. Therefore, the present study investigated the effect of the Quiet Time protocol (QT) on cardiac patient's sleep quality in ICU. The findings showed that sleep quality was low in most patients before intervention. In a study by Arasteh et al., it was found that most patients in the obstetrics and general surgery wards had poor sleep [34]. Neyse et al., in their study on Acute Coronary Syndrome (ACS) patients admitted into intensive care units, found that most patients had poor sleep quality [35]. Chen et al. stated that most of the cardiac patients had poor sleep quality, and their finding is similar to the results of the present study [36].

In the present study, the quiet time protocol enhanced sleep quality and reduced sleepiness in patients. This finding is in line with the results of Gardner et al., who found that the implementation of this protocol increased sleep quality [25]. Gardner et al. reported that the implementation of quiet time based intervention in intensive care units can have effect on patient's sleep-wake cycle as well as sound quality [25]. Dennis et al., in their study, showed that implementation of the quiet time based intervention caused an increase in light and sound, and decreased the sleep quality of patients in ICUs [27]. In a study by Chamanzari et al., quiet time protocol was performed from 7 pm to 5 am for three consecutive nights on patients in the general surgery ward. They found that the implementation of this protocol improved the sleep quality of

the experimental group. Thus, this finding agrees with the results of the present study [6].

McAndrew et al. reported that the implementation of the quiet time protocol in ICUs can improve patients sleep quality. In the aforementioned study, the need for sedation was evaluated, while in the present study, the patient's sleep quality was investigated using adjusted tools to determine the mental quality of sleep. Therefore, by examining sleep quality with specialized tools, more accurate results can be achieved [37].

The findings of the present study showed that the patient's sleep quality improved by controlling external environmental factors. Thus, this result is in line with previous studies in which the use of earplugs and blindfolds as external visual and audio factors improved sleep quality [38-40]. Dehghani et al. investigated the effect of using earplugs and blindfolds on the sleep quality of patients with myocardial infarction. They found that there was no significant difference between the combined use of earplugs and blindfolds simultaneously and the use of only blindfolds in improving the patient's sleep quality, and that any of them can be used to improve quality of sleep. In fact, the identical and positive effects of earplugs and blindfolds emphasize the effect of the quiet time protocol on sleep quality, because in the quiet time protocol, both ears and eyes of the patient will have more protection against sound and light. These findings are in line with the results of a previous study [1].

Although the results of various studies show the positive impact of the Quiet Time protocol (QT) on the sleep quality of patients, Maildl et al. showed that the implementation of this intervention improves sleep quality and reduces the stress of patients in the experimental group, but after intervention, There was no significant difference ($p>0.05$) between sleep quality of the QT group and the control group [28]. The differences between the present study and Maildl et al. include statistical populations and their demographic features, where in the present study just the patients of the ICU were investigated, but in Maildl et al., the patients of an Intensive Care Unit (ICU) and a Coronary Care Unit (CCU) were investigated. In addition, in the present study, the mean age of the study population was above 65 y, but in Maildl et al. study, the patients were not elderly.

Conclusion

Limitations of this study include Cardiopulmonary Resuscitation (CPR) of critically ill patients noted that in the case of the problem of the experiment were removed. The inability to control completely eliminates noise and light because of the need for patients to review and noted the on-going interventions.

The results of the present study showed that the Quiet Time protocol (QT) improved patient's sleep quality and decreased drowsiness. Based on the effectiveness of this protocol on improving sleep quality and decreasing patient's drowsiness, its implementation is recommended for patients in Intensive Care Units (ICU).

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