

ORIGINAL PAPER**Sleep Quality of Patients Hospitalized in the Coronary Intensive Care Unit and the Affecting Factors****Hatice Sutcu Cicek, RN, PhD**

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Abstract

Backgrounds: Intensive care units have many factors that cause sleep disorders in patients. Most of the times, due to the environment and the conditions, patients have to remain with less sleep.

Objective: The aim of this descriptive study was the quality of sleep and the affecting factors in patients hospitalized in Coronary Intensive Care Unit (CICU).

Methods: Nine questions were included in the data collecting form about the socio-demographic and disease characteristics of the patients. To determine the sleep quality and the affecting factors of the patients a 1-10 point scale was used (Freedman et al 1999).

Results: The mean age of the 100 patients was 55.5 ± 16.59 (range:21-93) years old. The patients were hospitalized for myocardial infarction (35%), congestive heart failure (29%) and they were hospitalized with an mean of 4.7 ± 1.16 days. While the patient sleep quality mean score at home was in average 7.39 ± 1.87 it has been determined that the first night after the hospitalization the mean score reaching the lowest level was 5.42 ± 2.39 and that the mean of the CICU was 6.83 ± 2.15 and that after the transfer to the clinic the score was reaching (7.39 ± 2.18) the same score as the sleep quality at home. While the change in sleep quality related to the diagnostic of the patients was not considered as statistically significant ($p < 0.05$).

Conclusion: While the sleep quality of patients hospitalized in CICU was showing a slight decrease during the first night of hospitalization in CICU, after the transfer to the clinic it was reaching the same sleep quality existing at home. It has been in the opinion that this situation was generated by important factors which affect the sleep quality of patients such as light, noise existing in the CICU and as well as by the nursing activities.

Key words : Coronary care unit, sleep deprivation, inpatients

Introduction

Sleep, which comprises approximately one third of the human life, is a state of unconsciousness in which the individual can be awakened by sensorial and other stimuli, and sleep relaxes the individual by taking one away from stress and responsibilities, providing mental and physical restructuring of energy storage. Achievement and maintenance of normal sleep and rest are more important in unhealthy conditions. Since sleep is essential for physical and psychological recovery, insufficient sleep can cause life-threatening disorders. Determination of the factors that interfere with patients' comfortable sleep and ensuring the continuation of the normal sleep process by eliminating these factors is an important part of the treatment and care process (Fontana & Pittiglio, 2010; Erol & Enç, 2009; Kara, 1996).

Individuals hospitalized due to health problems have difficulties in meeting the need for sleep due to the changes in their sleeping and resting attitudes, behaviors and habits. Individuals who are hospitalized in the Intensive Care Units (ICU) are the patient group who are mostly in need of sleep and rest in order to recover, since the treatments and care-giving services of patients with severe health problems are maintained in the ICU and the environment is technically well equipped. However, most of the times, due to the environment and the conditions, these patients have to remain with less sleep. This is because intensive care units have many factors that cause sleep disorders in patients (Fontana & Pittiglio 2010; Erol & Enç, 2009).

In ICUs, factors originating from the ambience of ICU such as the general crowd of the health professionals and technological equipment, the lighting of the environment, the temperature, the environmental noise, unpleasant odors, foreign instruments, nursing interventions, invasive interventions, and many factors originating from the patient such as pain, loss of physical activity, medical treatment, severity of the disease, fear of death, sedation, factors that affect melatonin release (sepsis, light, mechanical ventilation, benzodiazepines, adrenergic agents, beta blockers, opioids, etc.), loss of privacy and staying away from the family, cause sleep

disorders (Little, 2012; Erol & Enç, 2009; Drouot, et al., 2008).

In studies that have evaluated the sleep of patients in the ICU, it has been demonstrated that sleep is negatively affected with regard to both the duration and the quality, and that the sleep structure is disrupted and sleep problems have often been experienced (Erol & Enç, 2009; Freedman, 2001). Freedman et al., (2001) tracked 22 mechanically ventilated patients in the ICU for 24-48 hours by polysomnography (sleep analysis equipment). Simultaneously, by measuring the noise, they evaluated the effect of noise on sleep disruption and determined abnormalities in the sleep-wake cycles in all the patients (Freedman 2001). In their study, Hardin et al. (2009) reported that ICU environmental factors, treatments, mechanical ventilators and acute disorders had led to a decrease in night sleep, and lack of deep sleep, and this affected the weaning from the mechanical ventilation and the duration of recovery (Hardin, 2009). In the study of Hweidi (2005) with 165 patients at the ICU, "inability to sleep, hearing the voices and the alarms of the equipments in the unit" were reported as to be the 3rd most important stressing factor.

There is a strong relationship between systemic disorders and mortality, and sleep disorders. In the ICU, particularly in organ insufficiencies, with advanced therapies, the highest level and complex nursing care are provided. Although the number of studies related to the issue is few in number, sleep deprivation is known to cause negative nitrogen balance, degradation of the cellular and humoral immunity, increase in oxygen consumption and carbon dioxide production, impairment of wound healing and thermoregulation, disorders of the respiratory system, emotional stress, cognitive impairment and delirium, and subsequently, these cause delays in patients' recoveries and discharges (Ganz, 2012; Little, 2012; Erol & Enç, 2009; Bijvadia & Ejaz, 2009; Tembo & Parker, 2009; Gabor, et al., 2001, Krachman, et al., 1995)

In Coronary Intensive Care Units (CICU) in which patients with severe cardiovascular disorders are treated and cared for, apart from the above-mentioned factors, various problems cause difficulties in falling asleep and frequent

awakenings, disrupting the sleep cycle. Sleeping and resting are very important for the recovery of patients with Myocardial Infarction (MI). They need to feel relaxed and calm mentally and physically (İncekara, 2004). In their studies conducted with 400 heart failure patients, Santos et al. (2011) reported that 68.50% of the patients had poor sleep quality and most of them (72.2%) had sleep disturbances because of nocturia (Santos 2011). Lanfranchi and Somers (2003) reported the rate of sleep disorders to be between 45-82% in different study groups of heart failure patients (Lanfranchi & Somers, 2003).

Nurses caring for patients with sleep problems have important roles and responsibilities with regard to the early diagnosis of sleeping disorders, decreasing the present stressors and providing the necessary environmental regulations so as to create a therapeutic ambience. This study was conducted to determine the quality of sleep and the affecting factors in patients in the ICU, which are special units.

Materials and Methods

This descriptive study was conducted in the CICU of a research and training hospital with 27 beds. The study was completed with 100 patients in the CICU who had no communicating problems and who had agreed to participate in the study between 1st January 2010 and 31st March 2010. To collect the data, the data collecting form, which was developed by the researchers following the literature review, was used. Nine questions were included in the form about the socio-demographic and disease characteristics of the patients. Furthermore, to determine the sleep quality and the affecting factors of the patients, a 1-10 point scale was used (Freedman et al., 1999). The scoring on the form was as follows: For sleep quality: 1=poor, 10=excellent; for staying awake: 1= unable to stay awake, 10= fully alert and awake; and for the effect of environmental stimuli on sleep disruption: 1= no disruption, 10=significant disruption. Approval for the study was obtained from the Local ethical committee.

The data collection form was completed by the researchers through consultation with patients face to face. Each interview lasted 10-15 minutes. In the first of the 3 interviews with the patient, the sleep quality and the state of being

sleepy at home and in the first day of the hospitalization in the ICU, in the second interview, the sleep quality and the state of being sleepy two days after the hospitalization, and in the third, the sleep quality and the state of being sleepy on the last day in the ICU and the entire period of stay in the ICU, were recorded.

The SPSS 15.0 program was used to evaluate the data obtained from the study. The descriptive statistics were presented as mean \pm standard deviation ($\bar{X} \pm ss$) and frequency tables. For comparisons between the groups, the Significance test for the difference between two means (student t test), and for the categorical comparisons, the Chi-square test were used. A "p" value of <0.05 was accepted as statistical significance.

Results

When the socio-demographic characteristics of the patients were evaluated, the mean age was 55.5 ± 16.59 (min=21, max=93); 65% of the patients were males, 92% were married, 41% were high school graduates and 95% had a health insurance and were not concerned about the health care costs. Of the patients, 35% had been referred to the CICU due to MI, 29% had been referred due to chronic heart failure (CHF) and 13% had been referred due to dysrhythmia; the mean duration of hospitalization was 4.7 ± 1.16 days (min=2, max=7), 32% had been hospitalized for 5 days, 24% for 4 days and 15% for 3 days. It was determined that 45% of the patients had been hospitalized for the first time in the ICU and 35% had previous experience in the ICU (table 1).

The distribution of the data related to the patients' sleep state in the CICU has been presented in Table 2. The mean score of sleep quality of patients at home was determined as 7.39 ± 1.87 (median 8), 6.83 ± 2.15 in the CICU (median 8), 5.42 ± 2.39 on the first day of hospitalization (median 6), and the mean score of sleep quality just before the transfer to the clinic was found to be the same as the score at home.

Although not demonstrated in the table, the difference between the diagnoses of the patients (MI: 7.42 ± 1.85 , CHF: 6.86 ± 1.99) and the sleep qualities was not found to be statistically significant ($p=0.784$) (Table 2). The night sleep quality scores of the MI-diagnosed patients (MI: 6.20 ± 2.28) on the first night in the CICU

were found higher than that of CHF patients statistically significant ($p=0.588$). (CHF 5.37 ± 2.38), the difference was not

Table 1. Socio-Demographics Characteristics of the Patients

	N	%
Mean age: 55.5 ± 16.59 (min=21, max=93)		
Length of stay in the coronary intensive care unit: 4.7 ± 1.16 gün (min=2, max=7 day)		
Gender		
Female	35	35
Male	65	65
Education		
Elementary school	33	33
High school	41	41
University and higher	26	26
Marital status		
Married	92	92
Not married	8	8
Concerned about health care costs		
Yes	5	5
No	95	95
Reasons for hospitalisation		
Myocardial Infarction	35	35
Chronic Heart Failure	29	29
Arrhythmia	13	13
Other diseases*	23	23
Comorbidity		
Yes	27	27
No	73	73
Previous experience of intensive care unit		
No	45	45
Yes	55	55

*Monitoring of implantable cardiac defibrillator, coronary artery disease, embolism, etc.

Table 2. Patient' Sleep State in the Coronary Intensive Care Unit

	\bar{X} ss	min	max	Median
Overall sleep quality at home	7.39±1.87	3	10	8
Overall sleep quality in the CICU	6.83±2.15	2	10	8
Overall sleep quality in the coronary intensive care unit on the following days				
* On the first night in the CICU	5.42±2.39	1	9	8
* During the middle of CICU stay	7.12±1.98	2	10	9
* At the end of CICU stay	7.39±2.18	1	10	9
Overall degree of daytime sleepiness during CICU stay	6.31±2.23	1	10	8
Overall degree of daytime sleepiness during coronary intensive care unit stay on the following days				
* On the first night in the coronary intensive care unit	6.55±2.04	1	10	8
* During the middle of coronary intensive care unit stay	7.09±1.92	1	10	8
* At the end of coronary intensive care unit stay	7.27±2.04	1	10	9
Sleep- disruptive activities in the coronary intensive care unit				
Lighting	2.68±3.10	1	10	1
Nursing interventions	2.47±2.67	1	10	1
Collecting blood samples	2.11±2.36	1	10	1
Administration of medications	2.08±2.08	1	10	1
Taking vital signs	2.05±2.18	1	10	1
Diagnostic testing	2.03±2.20	1	10	1
Sleep- disruptive noises in the coronary intensive care unit				
Monitor alarms	2.82±2.99	1	10	1
Ventilator alarms	2.54±2.87	1	10	1
Telephone sounds	2.39±2.55	1	10	1
Television/Music	2.02±2.14	1	10	1
Talking	1.81±1.97	1	10	1
Oxygen finger probe	1.50±1.43	1	10	1
Nebulizer	1.47±1.32	1	10	1
Suctioning	1.44±1.35	1	10	1
IV pump alarms	1.43±1.43	1	10	1

During the hospitalization in the CICU, while the patients' state of being sleepy was found to be low on the first day (6.55 ± 2.04), at the end of the stay in the CICU, the state was determined to be high at the level of being completely awake (7.27 ± 2.04) (Table 2).

The most sleep-destructive activities in the CICU were respectively, the lighting (2.68 ± 3.10), the nursing interventions (2.47 ± 2.67) and the collecting of blood samples (2.11 ± 2.36); the noises disrupting sleep at maximum were found to be respectively, the monitor alarms (2.82 ± 2.99), the ventilator alarms (2.54 ± 2.87) and the phone sounds (2.39 ± 2.02) (Table 2)

Discussion

The sleep qualities of the CICU patients included in our study were mildly decreased on the first day of hospitalization at the intensive care unit and the qualities had reached the level at home just before the transfer from the ICU to the general ward. In the study conducted by Freedman et al. (1999) with a similar evaluation method, they demonstrated that the quality of sleep of ICU patients were decreased compared to that at home, and this was statistically significant ($p=0.0001$). In this study, which was conducted in medical and surgical ICUs, as the patients' duration of stay prolonged in the ICU, the difference between the sleep qualities in the ICU and that at home was decreased ($p>0.05$) (Freedman et al. 1999). In other studies, it was reported that most of the patients experienced an important change in the sleeping habits in the hospital environment (Atar et al., 2012; Lei et al., 2009; Uğraş & Öztekin 2007)

Hospitalized individuals encounter many internal and environmental problems. Patients may have regressive behaviors in the early days of admission to the hospital against the assessment, treatment, and other interventions. This state causes stress and anxiety in patients and affects their sleep negatively. According to Kara's (1996) reporting in the Babadağ and Altun's studies, approximately half of the patients had difficulty in sleeping on the first day; however, this rate decreased in the following days (Kara 1996). This result supports the finding in our study that the sleep qualities of the patients staying at the CICU decreased mildly on the first day, but that the qualities reached the sleep

quality at home just before the transfer from the intensive care unit.

In our study, the most sleep destructive activities were lighting, nursing interventions and collection of blood samples; the most sleep destructive noises were the monitor and the ventilator alarms and the phone sounds. In our study, the most influential factor in the patients' sleep was noise (Freedman, 2001).

With technological advances leading to an increase in the use of visual and/or auditory alarmed equipments, it has been reported that the alarms used to trace the circulatory and respiratory functions are responsible for 30% of the environmental noise (Erol & Enç, 2009). Among all the stimulants that affect sleep, environmental noise is known to have a share of 11.5-17%. Some of the conducted studies demonstrate that the factors leading to hospital noise cannot be taken under control and the patients' sleeps are affected negatively (Lei et al., 2009; Xie et al., 2009; Drouot et al., 2008; Freedman et al., 1999; Kara 1996). In the study of Uğraş and Öztekin (2007) which evaluated the environmental factors and the nursing interventions that affected the sleep of the patients in the neurosurgery ICU, it was reported that 78.6% of the patients had sleeping disturbances and the most important factors for sleep disturbances were "lying still and the noisy environment" (Uğraş & Öztekin, 2007). In the study of Taştan et al. (2010) conducted with 40 patients in the CICU, most of the patients (90%) reported that their sleep was disturbed mostly because of noise (Taştan et al., 2010).

Noise negatively affects the people's perception, can disrupt the physiological and psychological balance, decreases the productivity, decreases hearing, increases the gastric secretions, negatively affects the cardiovascular stimulation, stimulates the pituitary and the adrenal glands, suppresses the response to infection and destroys the serenity and the pleasant environment. The noise that can be tolerated by the patients is rather lower than the noise that the healthy individuals can tolerate (Xie, et al., 2009).

In a study evaluating the state of sleep of 470 patients hospitalized at the internal medicine and surgery clinics, the suggestions of the patients were asked for a better sleep in the hospital, and

it drew attention that they wanted the hospital noise to be controlled primarily (Kara 1996). In a study conducted by Atar et al. (2012) with 107 patients, it was reported that 55.1% of the patients had poor quality of sleep in the hospital and 23% had sleeping disturbances due to the environmental noise (Atar, et al., 2012).

In the article of Fontana and Pittiglio (2010) evaluating 10 experimental studies, they reported that with training the health personnel, they reduced the factors causing noise pollution in the ICU environment. In experimental studies, in order to reduce the noise at the intensive care units, headphones, ear plugs, sound masking, behavioral changes, and acoustic absorption methods have been used (Fontana & Pittiglio, 2010).

In our study, we determined that the second sleep disruptive factor was light. In a study, approximately half of the hospitalized patients reported that lights lit at night had a negative impact on their sleep (Kara, 1996). The necessity of lighting requirement in the hospital, and particularly in the ICU, is a known and an unavoidable fact. However, to control this factor as much as possible, it is necessary to maintain sleep and rest. In the study conducted by Dunn et al. (2010), it was demonstrated that patients in the ICUs were mostly exposed to light due to the blood sample collecting procedure, and that exposure to light peaked at the beginning and ending of the nurse shifts (Dunn et al., 2010).

In our study, it was reported that another important factor for sleep disruption was the nursing activities. Kara (1996) reported that the medical or nursing procedures at the time of sleep affected sleep by 27.6%, and that the entries and exits of the health professionals to and from the room at the time of the sleep had a negative effect by 27.5% (Kara, 1996). In the study carried out by Taştan et al. (2010) in the CICU, 95% of the patients reported the reason for sleep problems as medication procedures, 80% of the patients stated the reason as light, and 75% reported the continuous blood pressure measurements as the reason (Taştan, et al., 2010). In the study of Çelik et al. (2005), which determined the nursing interventions and types performed at night in ICU patients, it was demonstrated that a mean of 51 interventions were performed overnight per patient (Çelik et

al., 2005). In the study of Le et al. investigating the frequency and type of the nursing interventions at the night sleep time in various intensive care units, they demonstrated that the number and type differed in each intensive care unit; however, the most common nursing assessment activities were performed in the intensive care units where patients with cardiac disorders had been hospitalized (cardiothoracic: 133, pediatric:158) (Le, et al., 2012). Frequent monitoring of vital signs and diagnostic tests were reported to affect sleep negatively, and most of the patients had their sleep in the NREM phase 1; NREM phase 2 and REM were reduced or never existed (Freedman 2001).

In our study, the difference between the diagnosis of the patients and the sleep quality was not statistically significant ($p=0.784$), and patients diagnosed with MI had better sleep quality on the first night than CHF patients. Although MI is an acute condition, it has been evaluated that patients may feel themselves safe with the medical interventions, effective pain control, maintenance of sedation and being in an equipped environment. On the other hand, it was suggested that CHF patients could already be having sleep troubles due to respiratory distress. Krachman et al., (1995) reported that in particular, CHF patients with cheyne stokes respiration had fragmented sleep (Krachman et al., 1995). In several studies demonstrated that patients with heart failure had low quality of sleep (Gökçe 2008; Liu et al., 2011; Broström 2004; Chen & Clark, 2007). Apart from this, in all patients connected to the mechanical ventilator, the disturbances in sleep-wake order is reported not to have been related to factors such as age, gender, duration of stay in the unit and the severity of the disease (Freedman, 2001).

As it is taken into consideration that a sufficient and quality sleep will improve the recovery of CICU patients, regular night sleeps and additional sleep times even during the day should be provided for the rest of the patients. Nurses should know the physiology of sleep and the factors that cause sleep problems, must evaluate the patients' sleep for quality and the duration, and should correctly plan and implement the care for maintaining a sufficient sleep. Team members should be informed about the importance and the necessity of sleep, and speed up the healing process, and should be cooperative for the

maintenance of an optimum level of sleep and rest for ICU patients.

The Limitations of the Study

The results of the study are limited to the subjective statements about sleeping experiences of the patients included in the study. The sleep structures and the affecting environmental factors were not measured. The severity of the disease and the effect of medical treatment that can affect their sleep were not compared.

Conclusions and Recommendations

It was determined that although the sleep quality of CICU patients is slightly decreased on the first night of hospitalization, the quality approaches the quality of sleep at home when the patient is transferred to the ward from the ICU. However, the difference was not statistically significant. The most common factors disrupting the quality of sleep were determined as noise, light and nursing activities.

By defining and taking appropriate steps by nurses for the common sleep disorders of ICU patients, it is suggested that patients will have optimum benefit from treatment and care, and the recovery process will be positively affected. The visiting hours, treatments, nursing care procedures and the patient visits should be arranged for long rest periods, and the night activities should be restricted as much as possible. The use of recommended headphones, apparatus such as ear plugs, reducing the phone sounds and loud conversations in the unit to minimum levels can be recommended to reduce the noise. The nurses should control the environmental noise, except for the life support equipment that must work, and should use silent alert monitors. Although there are many descriptive studies with sleep disorders and noise at the intensive care units, the number of experimental studies is rather low. For this reason, conducting experimental studies using polysomnography to explore the environmental factors on sleep order is suggested.

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