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# ANALYSIS OF FACTORS AFFECTING THE SLEEP QUALITY OF PATIENTS IN INTENSIVE CARE UNIT

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## ABSTRACT

Lack of sleep in patients in the Intensive Care Unit (ICU) is associated with dysfunction of the immune, cardiovascular, metabolic, memory, and cognition systems, as well as increased mortality. Various factors that are thought to be related to patient sleep quality come from patient and environmental factors. The purpose of this study was to determine the factors that affect the sleep quality of ICU patients. This research is a quantitative study, using a cross-sectional approach, with as many as 44 patients involved in this study. The research instrument used the observation sheet and The Richards-Campbell Sleep Questionnaire (RCSQ) is also equipped with a thermohygrometer to measure temperature and humidity and a sound level meter to measure noise. Data analysis used the Spearman Rank test, and research ethics was obtained from the Ethics Commission of RSMS Margono. The results showed that most of them were women (75%), aged ≥40 years (68.2%) with the most days of stay less than 4 (93.2%), postoperative (95.5), and with poor sleep quality (72.7%). Factors that affected the sleep quality of the patient are heart rate (0.030), MAP (0.042), patient pain score (0.031), and sleep position (0.002). There was no affecting the SpO2 factor, temperature humidity, noise, patient perceptions of noise, light, and action with p value> 0.05. In conclusion, most of the respondents have poor sleep quality. There is an effect of the heart rate, sleep position, and pain score on the patient's sleep quality. It is necessary to apply a combination of pharmacological management and nursing measures to improve sleep quality.

Keyword: factor analysis; ICU; sleep quality

## INTRODUCTION

Pain, fear, isolation, helplessness, anxiety and sleep disorders are experiences experienced by patients who are admitted to the Intensive Care Unit (ICU) (Pieris et al., 2018). The results of research by (Wilcox et al., 2018) state that almost all patients treated in the ICU experience sleep disorders in terms of sleep stage, sleep efficiency, and sleep arousal index. The prevalence of poor sleep quality in patients in intensive rooms is around 50% (Bihari et al., 2012; Tembo et al., 2013) 30% (Sterniczuk ,R. et al., 2014), 73.1%, (Rahmawan, 2013), 87.5% (Afianti & Mardhiyah, 2017), 47% and this condition increased in patients with mechanical ventilation 66.7%, and the elderly(Naik et al., 2018). Sleep and circadian rhythm in critically ill patients are severely disturbed due to multiple stimuli, lack of deep sleep and irregular sleep and abnormal (Ding et al., 2017; Naik et al., 2018; Pieris et al., 2018; Topçu et al., 2017). Immune and cardiovascular system, metabolic disorders, impaired memory, cognition, and increased mortality are associated with a patient's lack of sleep (Mukherjee et al., 2015), including causing prolonged ICU stay and increased mortality (Kaplow, 2016; L.J. et al., 2015). Furthermore, according to research by Boyko et al., (2017), the presence of typical sleep patterns has a higher chance of experiencing death in the ICU. The multiple

sclerosis patients with poor sleep quality also indicate worsening cerebrovascular function because it is associated with an increased risk of CVD (Grigoriadis et al., 2018).

Factors predicted to affect the sleep quality of patients are noise level at night, discomfort, pain, action procedures, medical equipment, stress / anxiety and lighting levels (Kaplow, 2016; Stewart et al., 2017).The pain factor is a large enough factor affecting patient sleep (Dolan et al., 2016). Further, Ding et al., (2017) state that the factors affecting the sleeping quality of patients in the ICU are their emotional and anxious feeling, especially the environmental factors of intensive space (noise, light, interruption of action), including alarms for medical devices and peripheral intravenous insertion (Carrera-Hernández et al., 2018). The results of Hadi's (2017) study stated that poor sleep quality in patients in the ICU could occur due to noise (53.3%), lighting (40.0%), and (33.3%) nursing interventions (43.3%).

The results of a study Iftikhar et al., (2020) state that the lack of sleep quality is a common problem in the ICU with a multifactorial cause, namely environmental noise stimulation. Another factor is the alarm and conversation at a loud volume. Patient reports indicate poor sleep quality happens due to environmental problems in the ICU that can be modified. Noise is one of the leading environmental factors associated with sleep quality , (Simon. et al., 2018; Miranda-Ackerman et al., 2020; Suparti & Suroso, 2020). Achieving good sleep quality is essential for patients who are treated in the ICU. This study is aimed at restoring their health condition and status, including meeting basic human needs. Patients who are sick often need more sleep and rest than those who are healthy. So far, studies have focused more on patient-external (environmental) factors, but not many studies have examined internal and external factors related to the patient's sleep quality. Therefore, it is necessary to study the factors that affect sleep quality. In general, this study aimed to determine the factors that affect the sleep quality of the Intensive Care Unit (ICU) patients at the hospital. Prof. Dr. Margono Soekarjo Purwokerto (RSMS).

## METHOD

This research uses quantitative research methods, with observational research type, using a cross-sectional approach. Cross-sectional research emphasizes the time of measurement or observation of data on the independent and dependent variables only once at a time (Nursalam, 2015). There were 44 patients, as the respondents in this research. Observation sheet and questionnaire of The Richards-Campbell Sleep Questionnaire (RCSQ) equipped with a thermohygrometer and sound level meter were used as the measurement tool. Hemodynamic data were taken from the patient's bedside monitor. Data analysis using the Spearman Rank test, research ethics was obtained from the RSMS Ethics Commission.

## RESULTS AND DISCUSSION

This research was conducted at Prof. Dr. Margono Soekarjo Purwokerto in June-July 2020, with 44 respondents who were treated at the ICU. The characteristics of the respondents were explained in the following table:

Table 1.
The results of the analysis of factors affecting the quality of sleep (QOS) of patients in the ICU (n = 44)

| Characteristic | f | % | *r* | *p* |
|---|---|---|---|---|
| Patient Factors | | | | |
| $SpO_2$ | | | | |
| Normal | 42 | 95.5 | 0.176 | 0.253 |
| Abnormal | 2 | 4.5 | | |
| Heart rate | | | | |
| Normal | 34 | 77.3 | 0.328 | 0.030 |
| Abnormal | 10 | 22.7 | | |
| MAP | | | | |
| Hypotension | 3 | 6.8 | 0.307 | 0.042 |
| Normal | 34 | 77.3 | | |
| Hypertension | 7 | 15.9 | | |
| Pain | | | | |
| Mild | 4 | 9.1 | 0.326 | 0.031 |
| Moderate | 9 | 63.6 | | |
| Severe | 31 | 20.5 | | |
| External Factors | | | | |
| Sleep position | | | | |
| Semi fowler | 15 | 34.1 | 0.457 | 0.002 |
| Fowler | 24 | 54.5 | | |
| Supine | 5 | 11.4 | | |
| Temperature | | | | |
| Normal | 6 | 13.6 | 0.201 | 0.192 |
| Abnormal | 38 | 86.4 | | |
| Humidity | | | | |
| Normal | 37 | 84.1 | 0.075 | 0.627 |
| Abnormal | 7 | 15.9 | | |
| Noise | | | | |
| Normal | 7 | 15.9 | 0.050 | 0.746 |
| Abnormal | 37 | 84.1 | | |
| Perceptions of Noise | | | | |
| Mild | 7 | 15.9 | 0.170 | 0.271 |
| Moderate | 27 | 61.4 | | |
| Severe | 10 | 22.7 | | |
| Perceptions of Light | | | | |
| Mild | 7 | 15.9 | 0.033 | 0.830 |
| Moderate | 28 | 63.6 | | |
| Severe | 9 | 20.5 | | |
| Perceptions of Intervention | | | | |
| Mild | 14 | 31.8 | 0.067 | 0.664 |
| Moderate | 27 | 61.4 | | |
| Severe | 3 | 6.8 | | |

The factors affecting the patient's sleep quality are heart rate (0.030), MAP (0.042), patient pain (0.031), and sleep position (0.002). There was no effect of the SpO2 factor, temperature humidity, noise, patient perception of noise, light, and action with p value> 0.05.

Table 2.
Distribution of Characteristics of Research Respondents (n = 44)

| Characteristic | f | % |
|---|---|---|
| Sex | | |
| Female | 33 | 75.0 |
| Male | 11 | 25.0 |
| Age | | |
| <40 years old | 14 | 31.8 |
| ≥40 years old | 30 | 68.2 |
| Hospitalization time | | |
| <4 day | 41 | 93.2 |
| ≥4 day | 3 | 6.8 |
| Medical treatment | | |
| Surgery | 42 | 95.5 |
| Non-surgery | 2 | 4.5 |
| Quality of Sleep | | |
| very poor | 4 | 9.1 |
| poor | 32 | 72.7 |
| good | 8 | 18.2 |

The result of the study shows that most of the respondents were women (75%), aged ≥40 years (68.2%) with the most days of stay less than 4 (93.2%), post-surgery (95.5), and with poor sleep quality (72.7%).

This study indicates that the average patient has poor sleep quality while being treated in the ICU. Current research confirms previous research that most patients in intensive rooms have poor sleep quality (Sulistyowati, 2015). Based on the findings, it can be seen that the variables of patients related to sleep quality are heart rate, MAP, pain, and patient position. In contrast, other variables are not proven to have a significant effect with a p-value <0.05. There is a relationship between sleep quality and heart rate seen from the EKG image in patients with myocardial infarction (Desiani, 2018; Haryati, 2013). The impact of sleep disturbances in the Intensive Care Unit (ICU) may lead to delirium diagnosis. However, the relationship between the two is still being debated, extending the length of stay in the ICU and increasing mortality (Boyko et al., 2017).

The mean heart rate increased significantly higher in the supine position. The highest length of sleep is in the right side position in patients over 60 years old. Patients aged 40-60 years have a higher sleep duration on the right side and supine positions. The women sleep more in the supine position while the men sleep more on the right side. The patient's sleep stages can change according to the position. A decrease in sleep quality parameters (RDI), lowest saturation, arousal index, heart rate) occurred in patients with RDI <5 and patients with obstructive sleep apnea (OSA) in the supine position (Kutbay Özçelik et al., 2015).

Based on the research results, it is known that some of the MAP values are in the normal range because it is measured in sleep conditions. Some who have experienced an increase

may be due to the severity of the disease, including poor sleep quality. This condition is in line with the statement of Pepin et al., (2014), mentioning that changes in the regulation of the cardiovascular autonomic system at all stages of sleep, blood pressure, heart rate, and peripheral vascular resistance are decreasing in sleep conditions. Any decrease in the quality or quantity of sleep could be associated with increased blood pressure at night due to poor hypertension control. Shorter and longer sleep duration was associated with the prevalence or incidence of hypertension.

Based on the results of the study, almost all respondents (95.5%) were postoperative patients so that it was possible to have a fairly high pain experience. The results of this study are in line with the research of Stewart et al., (2017) which shows that pain is a factor related to the quality of sleep of patients. Poor sleep quality in patients with cardiovascular disorders is caused by anxiety and pain, the pain that is felt can be caused by tightness or pain, such as being crushed by something heavy. Pain must be treated immediately to prevent sympathetic nerve activity which can cause tachycardia, vasoconstriction and increased blood pressure which can exacerbate the burden on the heart (Fachrunnisa et al., 2015). The results of the study by Miranda-Ackerman et al., (2020) state that there is a relationship between the patient's biological factors and the environment. It was found that biological factors such as pain, tightness, delirium, anxiety are quite strong in influencing the patient's sleep quality. Pain changes the patient's sleep patterns during their staying in the hospital. It is even said that the longer they stay in hospital, the stronger the effect of pain they have because it causes the patients more stressful and it affects the quality of sleep.

Sleep position also affects the sleeping quality of the patients; the semi fowler position impacts increasing oxygen saturation. Based on oxygen saturation measurements in the ears, hands, and feet, the ear position is the most accurate and the highest results in both patients with heart and respiratory problems (Najafi et al., 2018). Based on the research results, it is known that most of them sleep in the fowler and semi-fowler positions. This position is known to increase lung expansion as well as the efficiency of the respiratory muscles. This position can help expand the airway, which can increase oxygen inspiration and increase the value of oxygen saturation (Dwi Istiyani, Sri Puguh Kristiyawati, 2015). It is said that sleeping position 30 produces a good sleeping quality compared to sleeping position 45 without a significant effect on changes in blood pressure. Especially in patients with heart failure, the semi-fowler position is used to intervene in sleep disorders and apnea (Basoglu et al., 2015).

In contrast to the research of Miranda-Ackerman et al., (2020), this study found that there environmental factors, noise, temperature, humidity, nursing actions were not related to sleep quality including oxygen saturation factors. This could be due to the limited number of respondents so that the data did not vary, including based on patient perceptions such as noise, humidity, and the actions of health workers. These perceptions were hospital conditions that had to be tolerated. Drug use might keep them asleep even though it was not optimal. Besides, patients were observed the last night before they were moved to another ward to have adapted themselves during their stay in the hospital. The oxygen saturation variable in this study also does not affect sleep quality; it is known that almost the oxygen saturation value of all patients is in the normal range. However, but it is necessary to know that the patient should take oxygen therapy in this condition. Therefore, with this homogeneous data, it cannot automatically be related. Further research with a larger sample size is needed to prove this

## CONCLUSION

Most of the respondents have poor sleep quality. Therefore, there is an effect of the heart rate, sleep position, and pain score on the patient's sleep quality. Therefore, it is necessary to apply a combination of pharmacological management and nursing measures to improve sleep quality.

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