Factors Affecting the Sleep Quality of Patients in the Intensive Care Unit

Barkah Waladani¹*, Endah Setianingsih¹, & Juni Sofiana¹

¹Universitas Muhammadiyah Gombong, Kebumen, Indonesia

Abstract

Introduction: The condition of the patient in the intensive room and the environmental conditions that occur in the intensive room can affect the quality of the patient’s sleep. The purpose of this study was to determine the factors that influence the quality of sleep of patients in the intensive care unit.

Methods: This research is a type of quantitative research using descriptive analytical methods. The time approach used is cross-sectional. The sample in this study amounted to 90 respondents.

Results: The results showed that the p value of each factor was physical factor p 0.027, noise p 0.020, lighting p 0.043, and activity p 0.000. The p value of the 4 factors is smaller than <0.05, thus indicating that physical variables, noise, lighting and activity have an influence on sleep quality. The strength of the relationship can be seen from the value of OR (EXP [B]), seen from the largest to the smallest values are activity (OR: 5.686), lighting (OR: 2.781), physical (2.040) and noise (OR: 1.491). Based on these results, the most influencing factor for sleep quality is activity.

Conclusion: The conclusion of this study is that the factors that affect sleep quality are physical, noise, lighting, and activity. The most influencing factor for sleep quality is activity. Recommendations that can be done are to suppress or reduce factors that affect sleep quality.

Keywords: activity, lighting, intensive care unit, noise, sleep quality

*Corresponding Author:

e-mail: b.waladani@unimugo.ac.id

This work is licensed under a Creative Commons Attribution 4.0 International License.
INTRODUCTION

Sleep disturbances in patients receiving intensive care with various cases are one of the problems that need attention to see significant events, which cause their sleep needs to be disturbed [1]. Patients who receive intensive care with supervision experience several sleep disorders, including noise, lighting, diagnostic and therapeutic procedures, mechanical ventilation of drugs, and their critical illness [2].

Poor sleep quality was found in 15 of 32 patients (47%), the prevalence was experienced by patients on mechanical ventilation [3]. While sleep disturbances in 32 patients caused discomfort including, Foleys catheter, nasogastric tube and succioning of endotracheal tube (100%), diagnostic tests such as X-Ray and blood tests (93.75%), nursing care such as bedding and bathing (93.75%), lighting at night and administering drugs by injection (87.5%), adaptation to other patients and time orientation (78.1%), conversations by health workers in the ICU (62.5%) [4].

The consequences of poor sleep quality include increasing cardiovascular disorders, namely coronary heart disease and stroke, breathing can lead to hypercapnia to hypoventilation, metabolic disturbances that occur in glucose tolerance, insulin release, growth hormone and cortisol secretion, appetite regulation by leptin and ghrelin and affect sleep quality [5].

Patients can get good quality sleep through pharmacological and non-pharmacological treatment [6]. The use of drugs in patients in the ICU is known to have a disruptive impact on sleep and circadian patterns, where sleep quality decreases at night [7]. Handling of sleep disorders in patients in the ICU can be overcome by adjusting the lighting system, with the right level of environmental lighting to help patients feel calm and comfortable [8]. The importance of sleep quality is often overlooked in hospitals, sleep disturbances are affected by noise, variations in temperature, lighting and staff distractions, patients at the University of Texas Southwestern Medical Center said of concern that the lack of sleep experienced by patients caused them to feel worse and hindered the healing process [9].

Based on the information obtained, 90 patients who received intensive care for 1 year in October-December 2021. Where there were several patients who reported experiencing sleep disturbances were conveyed verbally to the nurse on duty. Sleep disorders experienced by patients have various causes, one of which is noise [10]. To overcome these sleep disorders, pharmacological treatment will usually be given, namely the administration of benzodiazepines. To help improve the patient's sleep quality, it is necessary to first obtain what factors affect the patient’s sleep quality, in order to be able to provide intervention on each of the factors that cause it. Therefore, the formulation of the problem obtained is what are the factors that affect the patient’s sleep quality.
METHODS

This research was a quantitative study using correlation analytic methods, namely research that tries to find the relationship between variables to be studied so that it is made in a statistical test to determine the final hypothesis. With a cross-sectional approach, which is a data collection at the same time and one-time data collection.

This research was conducted in the ICU room of RSUD Dr. Sudirman Kebumen, and carried out after the research proposal process was submitted and accepted. The population in this study were patients undergoing treatment in the intensive room of RSUD Dr. Sudirman Kebumen. Data was obtained from the number of patients undergoing treatment in the ICU for 3 months as many as 90 patients.

The sample in this study was patients undergoing treatment in the Intensive Care Unit of RSUD Dr. Sudirman Kebumen. Determination of the sample in this study using the non-probability sampling method, with the total sampling method, which is a sampling method in which all populations are used in the study. So, the sample in this study were 90 people who had met the inclusion and exclusion criteria. Inclusion criteria included patients who were admitted to the ICU on day 2 and were able to communicate well, while the exclusion criteria were patients with GCS values <12, patients on mechanical ventilators, patients with hemodynamic supervision.

The instrument used in the study used a sleep quality measurement questionnaire, namely the RSCQ and observation sheets. The data collection process is carried out after going through the ethical test stage and submitting a research permit to the research site. The ethical test was declared passed and the research was approved by the hospital, then conveyed the aims and objectives of the research to the head of the room. Data collection was carried out with the help of 3 students, where apperception would be carried out first using questionnaires and observation sheets. The research took place by obtaining samples that matched the inclusion and exclusion criteria, continued to convey the aims and objectives and gave informed consent to the respondents. The filling of questionnaires and observation sheets was assisted by students using the interview method.

Data analysis using univariate analysis was carried out on each variable from the research results to produce the distribution and percentage of each variable. Bivariate analysis was used to test the hypothesis with Kendall's Tau. Kendall's Tau correlation is to test the relationship of two or more variables with ordinal data scales and the number of samples is more than 30 respondents. Multivariate analysis uses multiple logistic regression in order to get the linkage of related factors and which one is the most dominant influencing an event. This research has been declared ethical by the Institute for Health Research Ethics Commission, Universitas Muhammadiyah Gombong with 149.6/II.3.AU/F/KEPK/IV/2022.
RESULTS

We found that activity, physical and noise factors had an influence on the patient’s sleep quality with $p<0.05$, with the value of the relationship being most influenced by activity. The activity referred to here is the activity of the nurse when carrying out nursing actions.

The value of discrimination the Area Under the Curve (AUC) is 89%. Based on these results, it can be interpreted that the AUC value is statistically included in the strong category, which means that the multivariate analysis results are feasible to use to determine the factors that affect the sleep quality of patients in the intensive care unit.

Table 1
Research Variable and Bivariate Analysis

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support</td>
<td>45</td>
<td>50</td>
<td>0.027</td>
</tr>
<tr>
<td>No Support</td>
<td>45</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support</td>
<td>61</td>
<td>67.8</td>
<td>0.020</td>
</tr>
<tr>
<td>No Support</td>
<td>29</td>
<td>32.2</td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support</td>
<td>47</td>
<td>52</td>
<td>0.043</td>
</tr>
<tr>
<td>No Support</td>
<td>33</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support</td>
<td>52</td>
<td>75.5</td>
<td>0.000</td>
</tr>
<tr>
<td>No Support</td>
<td>48</td>
<td>24.5</td>
<td></td>
</tr>
<tr>
<td>Sleep Quality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bad</td>
<td>62</td>
<td>68.8</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>28</td>
<td>21.2</td>
<td></td>
</tr>
</tbody>
</table>

Table 2
Multivariate Analysis of Factors that Affect Sleep Quality

<table>
<thead>
<tr>
<th></th>
<th>$p$</th>
<th>OR</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>Physical</td>
<td>0.027</td>
<td>2.040</td>
<td>0.263</td>
<td>15.792</td>
</tr>
<tr>
<td>Noise</td>
<td>0.037</td>
<td>1.491</td>
<td>0.131</td>
<td>16.943</td>
</tr>
<tr>
<td>Lighting</td>
<td>0.047</td>
<td>2.781</td>
<td>0.266</td>
<td>29.119</td>
</tr>
<tr>
<td>Activity</td>
<td>0.000</td>
<td>5.686</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION

One of the factors that affect sleep quality is physical factors in which there are patient responses or clinical manifestations presented by patients in the ICU. The results of the study showed that physical factors supported the effect of sleep quality on patients, amounting to 45 respondents (50%) of a total of 90 respondents. Physical factors conveyed by respondents such as pain, nausea, dizziness, and shortness of breath. Respondents who submitted complaints of pain and nausea in patients with cardiovascular disorders; complaints such as dizziness, shortness of breath to nausea in patients with neurological disorders (stroke). Most respondents said that their sleep often woke up due to complaints of shortness of breath experienced in patients with respiratory disorders such as tuberculosis and COPD. One night of sleep deprivation reduces respiratory motor output by altering its cortical component by halving inspiratory endurance [11]. These results suggest that sleep changes trigger brain dysfunction that can lead to respiratory failure [12]. Patients admitted to the ICU can have pre-existing diseases that contribute to poor sleep quality. Obstructive pulmonary disease, such as asthma and COPD, is a common comorbidity and can be associated with sleep fragmentation and poor sleep efficiency, as well as with changes in sleep architecture. Patients with neurologic impairment or severe systolic heart failure often exhibit nocturnal Cheyne-Stokes respiration, which
can cause sleep fragmentation, excessive daytime sleepiness, paroxysmal nocturnal dyspnea, and insomnia [13]. Pain is included in one of the list of factors that interfere with sleep. In addition, it was shown that the higher the level of pain reported on the first day of hospitalization in the ICU, the stronger the position of pain as a factor affecting sleep. Pain contributes to sleep disturbances in the ICU [14]–[16]. The results of the study show that patients with sleep disorders have cardiovascular and nervous disorders, one of which is due to coronary artery disease and stroke, so that the average hours of sleep at night are around 6 hours [17], [18].

Another factor that affects sleep quality is the noise felt by patients in the ICU. The results of the study based on the observation sheet given to the respondents obtained 61 respondents (67.8%), conveying that the quality of sleep experienced by patients is influenced by noise. The noise obtained comes from the sound source from the nurse station; conversation, telephone ringing, equipment in intensive care; alarm syringe pump, infusion pump, mechanical ventilator and bedside monitor. Several studies have suggested that noise sources have been implicated in the development of sleep disturbances in the ICU. Sources of noise that affect sleep are alarms from monitoring devices for infusion pumps, ventilators and the normal function of ventilators, telephones, pagers, overhead paging and health care providers, one of which is at the patient’s bedside (bedside monitor) [19]–[22]. To some extent, sleep disturbances in ICU patients depend on the disease itself, the respective acute symptoms and possible pre-existing sleep disturbances. A number of studies categorize the causes of sleep disorders into environmental and non-environmental factors or external and internal factors. External negative influences were considered to be exposure to light and noise, multiple routine care, diagnostic and treatment procedures, and lack of orientation guidance [23], [24].

According to the World Health Organization (WHO), noise is the background for the occurrence of sleep disturbances that occur continuously with a value of 30dB and a maximum peak noise level of 45dB which should be avoided during sleep. Long-term studies conducted by several investigators showed the significance of noise factors affecting sleep quality which was almost constant from this set limit in the ICU [25], [26]. Environmental noise is often considered a relevant contributing factor to sleep changes in the ICU, but the relative contribution of noise to sleep disturbances is often debated when compared to other confounding factors. In fact, a recent systematic review concluded that it is currently impossible to properly measure the extent to which noise is a contributor to sleep disturbances in ICU patients [27]. The most frequently reported sources of noise disturbance are staff conversations, alarms, and those associated with patient care interventions [28], [29].

Lighting affects sleep quality in patients in the ICU with the results obtained are 47 respondents (52%). Light is the second most disturbing factor for sleep. Unfortunately, the ICU environment in question is not equipped with a separate patient room that is shaded. During the intervention, the medical staff
should turn on the lights throughout the ICU. A similar conclusion was reached by Reinstein, who also emphasized that appreciable light disturbances during patients' nighttime rest can disrupt their circadian rhythms [30]-[32]. One third of patients report sleep disturbances caused by night light. Light causes direct sleep disturbances and affects circadian function, a fundamental process that supports high-quality sleep. Light obtained at night or lack of bright daylight interferes with circadian alignment, leading to sleep deprivation. To improve understanding of 24-hour light patterns, we conducted a longitudinal study of light levels in the intensive care unit (ICU). Over 450 rooms, high variability, dim daylight, and active dimming of natural sunlight were observed. This noncircadian light pattern has a multifactorial influence on sleep and is a major target for sleep improvement in the ICU [33].

The results of research on activities that occur in the ICU such as checking vital signs, administering drugs at night, and medical procedures reached 68 respondents (75.5%). Medical treatments and procedures significantly affect the patient's sleep. Routine procedures such as suctioning, documentation, taking vital signs, or administering drugs amounted to an average of 7.8 per hour. The activities of nurses in carrying out nursing care for sleeping patients show changes in the patient's sleep. The activities involved are checking vital signs, changing positions, taking blood samples, fluid replacement, administering medication and other nursing care [34], [35].

A retrospective analysis involving 50 patients in 4 ICUs recorded an average of 42.6% of diagnostic or therapeutic procedures in patients between 7 p.m. and 7 p.m. indicating factors affecting sleep quality. If consultation time with the patient is included or excluded, this confounding factor increases. Survey among ICU patients, it was found that noise and repeated consultations are the main sources of disturbance [36], [37]. According to the subject, measurement of vital signs is the most disturbing factor for sleep. This is confirmed by a 2013 study which identified a blood pressure cuff that restricts patient movement and emits unpleasant odors as one of the five most disruptive factors for sleep [15].

CONCLUSION

Physical factors, noise, lighting, and activities have an influence on the quality of sleep in patients in the Intensive Care Unit. The results of multivariate analysis showed that the most dominant factor influencing the quality of sleep of patients was activity. Further research needs to be done to find out other more complex factors that have an influence on sleep quality along with the type of medical case.

REFERENCES


