Environmental Factors as Contributors to Sleep Disturbance in Critically Ill Patients in Intensive Care Units (ICU): A Descriptive Study

Junaidy Suparman Rustam[1*], Reny Chaidir[1]

1. *Nursing Department, Faculty of Health Science, Universitas Mohammad Natsir Bukittinggi, Bukittinggi, Indonesia*

**corresponding author*

DOI: 10.55497/majanestcricar.v42i3.342

ABSTRACT

Background: Sleep disturbance is a common problem among critically ill patients in the ICU and can significantly affect their overall experience of care. This study aims to study the experience of sleep disturbance in critically ill patients in the ICU.

Methods: This study was conducted in a public hospital in West Sumatra, Indonesia from June to August 2022, using a descriptive approach and focusing on a population of critically ill patients admitted to the ICU. The sample size of 80 participants was determined using power analysis from previous studies, and sampling was done using purposive technique based on inclusion criteria.

Results: The results of this study showed that 37.5% of participants reported experiencing sleep disturbances while being treated in the ICU. This demonstrates the prevalence of problems experienced by critically ill patients and highlights the need for targeted interventions to address them. It is imperative for healthcare providers to recognize the impact of sleep disturbances on patient health and recovery and implement strategies to reduce their impact.

Conclusion: This study showed a significant prevalence of sleep disturbance among critically ill patients in the ICU. This underscores the importance of proactive measures to address this issue and emphasizes the role of healthcare facilities in providing support and education to individuals affected by sleep disturbance. Further research and appropriate interventions need to be conducted to improve the sleep quality of critically ill patients in the ICU contributing to better overall outcomes and quality of care in the ICU.

Keywords: Critically ill patient; intensive care unit; sleep disturbance

Pengalaman Gangguan Tidur pada Pasien Sakit Kritis di Intensive Care Unit (ICU)

Junaidy Suparman Rustam[1*], Reny Chaidir[1]

1. *Departemen Keperawatan, Fakultas Ilmu Kesehatan, Universitas Mohammad Natsir Bukittinggi, Bukittinggi, Indonesia*

**penulis korespondensi*

DOI: 10.55497/majanestcricar.v42i3.342

ABSTRAK

Latar Belakang: *Gangguan tidur adalah masalah yang umum terjadi di antara pasien yang sakit kritis di ICU dan secara signifikan dapat berdampak pada pengalaman perawatan mereka secara keseluruhan. Penelitian ini bertujuan untuk mempelajari pengalaman gangguan tidur pada pasien yang sakit kritis di ICU.*

Metode: *Penelitian ini dilakukan di sebuah rumah sakit umum di Sumatera Barat, Indonesia dari bulan Juni hingga Agustus 2022, dengan menggunakan pendekatan deskriptif dan berfokus pada populasi pasien yang sakit kritis yang dirawat di ICU. Jumlah sampel sebanyak 80 orang yang ditentukan dengan menggunakan power analysis dari penelitian sebelumnya, dan pengambilan sampel dilakukan dengan teknik purposive sampling berdasarkan kriteria inklusi.*

Hasil: *Hasil penelitian ini menunjukkan bahwa 37,5% partisipan melaporkan mengalami gangguan tidur selama dirawat di ICU. Hal ini menunjukkan prevalensi masalah yang dialami pasien yang sakit kritis dan menyoroti perlunya intervensi yang ditargetkan untuk mengatasinya. Sangat penting bagi penyedia layanan kesehatan untuk mengenali dampak gangguan tidur terhadap kesehatan dan pemulihan pasien, serta menerapkan strategi untuk mengurangi dampaknya.*

Simpulan: *Penelitian ini menunjukkan prevalensi gangguan tidur yang signifikan di antara pasien yang sakit kritis di ICU. Hal ini menggarisbawahi pentingnya langkah-langkah proaktif untuk mengatasi masalah ini dan menekankan peran fasilitas perawatan kesehatan dalam memberikan dukungan dan edukasi kepada individu yang terkena dampak dari gangungguan tidur. Penelitian lebih lanjut dan intervensi yang tepat perlu dilakukan untuk meningkatkan kualitas tidur pasien yang sakit kritis di ICU yang berkontribusi terhadap hasil keseluruhan yang lebih baik dan kualitas perawatan di ICU.*

Kata Kunci: *Gangguan tidur; intensive care unit; pasien kritis*

INTRODUCTION

Sleep quality is crucial for the psychological well-being and recovery of critically ill patients, yet many experience sleep disturbances during their treatment.[1] These disturbances can lead to physical and psychological discomfort, including anxiety. Symptoms of sleep disturbance often include difficulty initiating sleep, early awakening, and difficulty returning to sleep.[2] Research has shown that sleep disturbances in critically ill patients can result in impaired immune function, decreased respiratory muscle ability, disruption of the metabolic and central nervous systems, and prolonged treatment time.[3] Additionally, they may experience excessive daytime sleepiness, impaired attention and memory, depressed mood, and decreased quality of life.[4]

Furthermore, sleep disturbances can have an impact on cardiovascular and respiratory disorders, as well as metabolic disorders such as glucose tolerance, insulin release, and hormone secretion.[5] Factors associated with sleep disturbances in ICU patients include environmental noise, lighting, nursing interventions, and patient illnesses.[6] Environmental noise in the ICU can lead to psychological and physiological disorders, as well as an increased need for medication. The excessive noise in ICUs, including monitor sounds and conversations between staff and visitors, can disrupt patients' sleep, as can overly bright lighting.[7]

To address sleep disturbances in critically ill patients, pharmacological treatments such as benzodiazepines, non-benzodiazepines, ramelteon, low-dose sinequan, and suvorexant may be used.[8] However, these medications can have side effects such as drug dependence, agitation, difficulty concentrating, confusion, and hallucinations. Non-pharmacological approaches include adjusting lighting levels, minimizing noise from staff conversations, and scheduling routine maintenance activities at night.[9] Additionally, the use of ear plugs and eye masks has been found to improve sleep quality and increase melatonin production.[10]

Addressing sleep disturbances in critically ill patients is crucial for their overall well-being and recovery. Both pharmacological and non-pharmacological interventions should be considered to improve sleep quality and mitigate the negative effects of sleep disturbances on patients' physical and psychological health.

METHOD

A descriptive study was conducted at a public hospital in West Sumatra, Indonesia, focusing on critically ill patients admitted to the ICU. The study, was conducted from June to August 2022, involved a total of eighty participants who were selected using a purposive random sampling technique. Inclusion criteria for the participants required them to be over 18 years old, to have spent at least 24 hours in the ICU, and to be conscious and cooperative.

The primary instrument used in the study was the Pittsburgh Sleep Quality Index (PSQI), which was employed to assess the presence of sleep disturbance among the participants. The sample size for the study was determined through power analysis based on previous research. This study aims to provide valuable insights into the prevalence of sleep disturbance among critically ill patients in the ICU setting, which could potentially inform future interventions and treatment strategies for this population.

Ethical approval was given by the Research Ethics Committee of Ibnu Sina Islamic Hospital West Sumatera (No. 29/KEPK/ISBT/V-2022). In order to protect human rights and the welfare of health research subjects, an informed consent form was provided to declare the willingness and understanding of the participants to participate in this study. Verbal consent was obtained due to the alteration of the physical capability of the participants to sign the consent.

RESULTS

Characteristic of the participants were shown on Table 1, half of the participants in the study were female (55%), with average age 52.1 years old (SD=13.8), and average length of stayed in the ICU for two days (SD=0.66).

The prevalence of sleep distrubance among 80 participants (Table 2) showed that 26 participants (28.4%) had severe sleep disturbance, 31 people (38.75%) had moderate sleep disturbance and 9

Table 1. Characteristics of the participants (N=80)

Characteristics	n (%)	Mean ± SD
Age		52.1 ± 0.66
Gender		
Male	44 (55)	
Female	36 (45)	
Length of stay in ICU		1.87 ± 0.66

Table 2. The prevalence of sleep disturbance of the participants (N=80)

Categories	n (%)
Sleep disturbance	
Mild	26 (32.50)
Moderate	31 (38.75)
Severe	23 (28.75)

participants (39.1%) had mild sleep disturbance with a total of 50 people (62.5%) and most of them did not experience as many as 30 people (37.5%).

DISCUSSION

Respondent characteristics regarding gender in this study found that 55.0% were female. Previous study stated that sleep disturbances can occur to anyone, both male and female.[11] However, the causes of sleep disturbances in men and women are slightly different. In men, it is generally caused by work activities and daily routines, while in women, apart from work activities and age, hormonal factors are also very influential.[11] The difference in hormonal factors makes women have their own sleep problems.[12] Generally, the hormones progesterone and estrogen affect a woman's sleep pattern. This is caused by the hormone progesterone and estrogen receptors located in the hypothalamus. The position of these two hormones is thought to directly affect circadian rhythms and sleep patterns. It is known that the hormone progesterone can shorten REM latency.[13] Gender is a factor that shows differences in physical, biological, and individual characteristics.[14] A study by Bhaskar found that 50% of female participants experienced complaints of sleep disturbances caused by anxiety factors. In accordance with the above theory, it can be assumed that gender can affect the occurrence of sleep disorders.[15]

The average age of the participants in this study was 52 years. Bhaskar states that age is a risk factor for sleep disorders, the higher the age, the higher the risk of sleep disorders. Environmental factors in the ICU are one of the factors that affect the sleep quality of critically ill patients.[15] Similarly, Rustam also mentioned that sleep disorders can also be said when a person's condition is unconscious, but can be awakened by a stimulus or sensory appropriate to minimal physical activity, the level of consciousness varies, changes in physiological processes occur and a decrease in responding to external stimuli and can affect all ages.[16] However, many literature reports that the incidence of sleep disorders increases with age. In other words, symptoms of sleep disorders are common in the elderly, even almost half of the elderly reported difficulty in initiating and maintaining sleep.[17]

Furthermore, the findings of this study indicated that all respondents reported experiencing sleep disorders during the course of their treatment. Kwak and Young demonstrated that environmental noise in ICUs may elevate the frequency of arousals during sleep and diminish the slow-wave phase of sleep (also known as deep sleep).[18] This condition is associated with a reduction in sleep quality. In accordance with Bihari, noise is perceived as a stimulus to cells

in the auditory nerve within the ear by way of longitudinal waves, resulting from vibrations emanating from a source of sound or other conductors.[12] These waves are transmitted through the medium of air or other conductors. Should the sound in question be considered unwanted, due to its disruptive or involuntary nature, it is designated as noise.[18] Furthermore, as outlined by Kenneth and Monique, light within a room may inhibit the release of the hormone melatonin. Melatonin is naturally produced at night before bedtime; however, exposure to room light at the beginning of the night prevents the secretion of this hormone.[19] Melatonin plays a role in several physiological processes, including homeostasis, glucose regulation, thermoregulation, and blood pressure, and is also involved in the regulation of sleep. Chronic suppression of melatonin has been linked to negative health outcomes.[20]

CONCLUSION

The findings of the study indicated that the majority of participants experienced a decline in the quality of their sleep. It is imperative that an efficacious intervention be implemented to enhance the sleep quality of critically ill patients during their ICU stay. Further study may also identify factors that could affect sleep disturbance.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article

ACKNOWLEDGEMENT

The authors gratefully acknowledge the nursing and medical staff at Ibnu Sina Islamic Hospital, Bukittinggi, Indonesia, as well as the patients and their families, for their invaluable contributions.

REFERENCES

1. Kamdar BB, Needham DM, Collop NA. Sleep deprivation in critical illness: Its role in physical and psychological recovery. J Intensive Care Med. 2012;27(2):97-111. doi:10.1177/0885066610394322.
2. Pulak LM, Jensen L. Sleep in the Intensive Care Unit: A Review. J Intensive Care Med. 2014;31(1):14-23. doi:10.1177/0885066614538749.
3. Delaney LJ, Van Haren F, Lopez V. Sleeping on a problem: the impact of sleep disturbance on intensive care patients - a clinical review. Ann Intensive Care. 2015;5(1):1-10. doi:10.1186/S13613-015-0043-2/TABLES/3.
4. Pisani MA, Friese RS, Gehlbach BK, Schwab RJ, Weinhouse GL, Jones SF. Sleep in the intensive care unit. Am J Respir Crit Care Med. 2015;191(7):731-8. doi: 10.1164/rccm.201411-2099CI.
5. Karimi L, Rahimi-Bashar F, Mohammadi SM, Mollahadi M, Khosh-Fetrat M, Vahedian-Azimi A, et al. The Efficacy of Eye Masks and Earplugs Interventions for Sleep Promotion in Critically Ill Patients: A Systematic Review and Meta-Analysis. Front Psychiatry. 2021 Dec 3;12:791342. doi:10.3389/fpsyt.2021.791342.
6. Suparman Rustam J, Kongsuwan W, Kitrungrote L. Comfort in Patients Receiving Mechanical Ventilation: A Literature Review. Crit Care Nurs. 2018;11(2). doi:10.5812/ccn.64159.
7. Elbaz M, Léger D, Sauvet F, Champigneulle B, Rio S, Strauss M, et al. Sound level intensity severely disrupts sleep in ventilated ICU patients throughout a 24-h period: a preliminary 24-h study of sleep stages and associated sound levels. Ann Intensive Care. 2017;7(1):1-9. doi:10.1186/S13613-017-0248-7/TABLES/6.
8. Alexopoulou C, Kondili E, Diamantaki E, Psarologakis C, Kokkini S, Bolaki M, Georgopoulos D. Effects of dexmedetomidine on sleep quality in critically ill patients: a pilot study. Anesthesiology. 2014 Oct;121(4):801-7. doi: 10.1097/ALN.0000000000000361.
9. Engwall M, Fridh I, Johansson L, Bergbom I, Lindahl B. Lighting, sleep and circadian rhythm: An intervention study in the intensive care unit. Intensive Crit care Nurs. 2015;31(6):325-35. doi:10.1016/J.ICCN.2015.07.001.
10. Demoule A, Carreira S, Lavault S, Pallanca O, Morawiec E, Mayaux J, et al. Impact of earplugs and eye mask on sleep in critically ill patients: A prospective randomized study. Crit Care. 2017;21(1):1-9. doi: 10.1186/

s13054-017-1865-0.
11. Mallampalli MP, Carter CL. Exploring Sex and Gender Differences in Sleep Health: A Society for Women's Health Research Report. https://home.liebertpub.com/jwh. 2014;23(7):553-62. doi:10.1089/JWH.2014.4816.
12. Bihari S, Doug McEvoy R, Matheson E, Kim S, Woodman RJ, Bersten AD. Factors Affecting Sleep Quality of Patients in Intensive Care Unit. J Clin Sleep Med. 2012;8(3):301-7. doi:10.5664/JCSM.1920.
13. Bhaskar S, Hemavathy D, Prasad S. Prevalence of chronic insomnia in adult patients and its correlation with medical comorbidities. J Fam Med Prim Care. 2016;5(4):780. doi:10.4103/2249-4863.201153.
14. Elliott R, Rai T, McKinley S. Factors affecting sleep in the critically ill: An observational study. J Crit Care. 2014;29(5):859-63. doi:10.1016/J.JCRC.2014.05.015.
15. Elliott R, McKinley S, Cistulli P, Fien M. Characterisation of sleep in intensive care using 24-hour polysomnography: an observational study. Crit Care. 2013;17(2). doi:10.1186/CC12565.
16. Rustam JS, Makmee W, Jugjali R. Implementation of Innovative Nursing Care Program for Relieving Discomfort in Mechanically Ventilated Patients : an Exemplar in Practice. 2018;9(January 2018):34–44.
17. Boyko Y, Ørding H, Jennum P. Sleep disturbances in critically ill patients in ICU: how much do we know? Acta Anaesthesiol Scand. 2012;56(8):950-8. doi:10.1111/J.1399-6576.2012.02672.X.
18. Simons KS, Verweij E, Lemmens PMC, Jelfs S, Park M, Spronk PE, Sonneveld JPC, Feijen HM, van der Steen MS, Kohlrausch AG, van den Boogaard M, de Jager CPC. Noise in the intensive care unit and its influence on sleep quality: a multicenter observational study in Dutch intensive care units. Crit Care. 2018 Oct 5;22(1):250. doi: 10.1186/s13054-018-2182-y.
19. Parthasarathy S, Tobin MJ. Sleep in the intensive care unit. Intensive Care Med. 2004;30(2):197-206. doi:10.1007/S00134-003-2030-6.
20. Romero-Bermejo FJ. Sleep quality in intensive care unit: Are we doing our best for our patients? Indian J Crit Care Med. 2014;18(4):191-2. doi:10.4103/0972-5229.130567.