

## HEALTH EDUCATION: USING EYE MASKS, EAR PLUGS, AND WHITE NOISE TO IMPROVE SLEEP QUALITY FOR CRITICAL PATIENTS IN THE ICU AT BANDUNG CITY HOSPITAL

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### Abstrak

Kualitas tidur merupakan faktor penting dalam kesehatan fisik dan mental seseorang. Kebisingan, nyeri, cahaya, dan aktivitas perawatan yang sering merupakan penyebab kualitas tidur yang buruk pada pasien ICU. Pengetahuan perawat dianggap penting dalam peningkatan kualitas tidur pasien, sehingga diperlukan edukasi kesehatan untuk perawat ICU dalam melakukan intervensi untuk optimalisasi kualitas tidur pasien kritis di ICU. *Eye mask, ear plug dan white noise* merupakan intervensi dalam mengatasi kebisingan dan cahaya pada pasien kritis. Terapi tersebut bertujuan untuk meningkatkan kualitas tidur pasien. Edukasi kesehatan ini dilakukan untuk mengoptimalkan implementasi asuhan keperawatan pada pasien di ICU. Metode: Metode pengabdian masyarakat ini dilakukan dengan pendekatan edukasi kesehatan langsung yang berlokasi di beberapa rumah sakit di Kota Bandung yang dilaksanakan selama bulan September 2024 dengan jumlah peserta sebanyak 8 orang. Sasaran edukasi kesehatan ini adalah perawat ICU. Seluruh peserta dalam kegiatan diberikan edukasi kesehatan tentang optimalisasi penggunaan *eye mask, ear plug dan white noise* diukur skala pengetahuan sebelum dan pasca intervensi, secara kualitatif, kegiatan edukasi kesehatan yang dilaksanakan berjalan lancar tanpa hambatan, edukasi kesehatan yang dilakukan dapat menambah pengetahuan perawat ICU secara signifikan dengan nilai  $p = < 0,001$ . Hasil edukasi kesehatan ini dapat meningkatkan pengetahuan perawat ICU tentang penggunaan *eye mask, ear plug dan white noise* dalam peningkatan kualitas tidur pasien ICU.

**Kata kunci:** *Ear Plug, Eye Mask, Kualitas Tidur, Pendidikan Kesehatan, White Noise.*

### Abstract

Sleep quality is important to a person's physical and mental health. Noise, pain, light, and nursing activities are frequent causes of poor sleep quality in ICU patients. Nurses' knowledge is considered important in improving the quality of patient sleep, so health education is needed for ICU nurses to carry out interventions to optimize the sleep quality of critical patients in the ICU. *Eye masks, ear plugs and white noise* are interventions to deal with noise and light in critical patients. This therapy aims to improve the quality of the patient's sleep. This health education is carried out to optimize the implementation of

nursing care for patients in the ICU. Method: This community service method is carried out using a direct health education approach located in several hospitals in Bandung City, which will be implemented in September 2024 with a total of 8 participants. The target of this health education is ICU nurses. All participants in the activity were given health education about optimizing the use of eye masks, ear plugs and white noise; the knowledge scale was measured before and after the intervention; qualitatively, the health education activities carried out ran smoothly without any obstacles, the health education carried out was able to increase the knowledge of ICU nurses significantly. with  $p$  value =  $<0.001$ . The results of this health education can increase ICU nurses' knowledge about the use of eye masks, ear plugs and white noise in improving the sleep quality of ICU patients.

**Keywords:** Ear Plug, Eye Mask, Sleep Quality, Health Education, White Noise.

## INTRODUCTION

Sleep quality in the Intensive Care Unit (ICU) is generally reported to be poor, with patients experiencing fragmented sleep and reduced restorative stages (Kakar et al., 2021). Sleep quality is an important factor in physical and mental health, and a lack of sleep in patients will have detrimental consequences for the patient's condition (Hughes et al., 2020). Various factors contribute to sleep disorders, including environmental stimuli such as noise, light, frequent nursing activities, and patient-related factors and treatments such as mechanical ventilation (Little et al., 2010). Other factors contribute to sleep disorders, including environmental stimuli, patient disease factors, and medical interventions (Bihari et al., 2012). According to Little et al., noise, pain, light, and maintenance activities are often causes of poor sleep quality.

Sleep disorders are pervasive in ICU patients, with previous research results reporting a prevalence of sleep disorders of 47-66% while patients were treated in the ICU (Naik et al., 2018). Other research shows that 59% of patients had poor or inferior sleep quality while in the ICU compared to 24% at home (Little et al., 2010). These sleep problems continue after the patient is hospitalized, with prevalence ranging from 28% to 64% up to one year after hospital discharge (Shih et al., 2022).

Poor sleep quality in patients in the ICU can have detrimental consequences on various physiological systems, although its impact on clinical outcomes remains unclear (Brito et al., 2020). Complications from sleep disorders can have serious consequences, affecting the patient's healing process and overall prognosis (Bani et al., 2018). Other complications of sleep disorders in ICU patients can impair the immune, metabolic, cardiovascular, respiratory, and neurological systems, although the full extent of these effects remains unclear (Brito et al., 2020).

Previous research suggests various interventions to improve sleep quality, such as minimizing nighttime disturbances, dimming lights, and closing doors (Naik et al., 2018). Many interventions can be done to improve the quality of sleep for patients in the ICU, including eye masks, ear plugs and white noise. Given their low cost and ease of use, eye masks, ear plugs and white noise are recommended as simple interventions to improve hospital sleep quality (Salamati et al., 2017). The author chose eye masks, ear plugs, and white noise because they have advantages. For example, this therapy can be done very quickly, independently or with the help of family, and can improve the quality of the patient's sleep.

The need to optimize sleep quality in ICU patients requires health education for nurses to increase their' knowledge. This education is carried out to optimize the patient's sleep quality. Educational activities are one of the determinants of behaviour change theory. This health belief model seeks to modify knowledge factors that influence individual beliefs about a disease's susceptibility and threat, which will then trigger individuals to make behavioural changes that can improve the patient's quality of life. Therefore, the author and team conducted health education about using eye masks, ear plugs and white noise to improve the sleep quality of critical patients.

## METHODS

This community service method is carried out with a direct health education approach. The title of this health education is The Effect of Health Education on the Use of Eye Masks, ear Plugs and white noise on Improving the Sleep Quality of Critical Patients in Intensive Care Unit Nurses. The material presented by the speaker, who is also the author, namely the use of eye masks, ear plugs and white noise to improve the sleep quality of critical patients, includes (1) a Summary of Eye Masks, (2) a Summary of Earplugs, (3) Summary of White Noise. Preparation before Health Education for Nurses. This health education was carried out directly face to face by filling out a questionnaire form given by the author to nurses to measure the knowledge of ICU nurses regarding the use of eye masks, ear plugs and white noise to improve the sleep quality of critical patients among ICU nurses in several hospitals in the city of Bandung. In September 2024. The sample size is 8 ICU nurses. The targets of this health education are ICU nurses in several Bandung City Hospitals. Targets or participants are recruited through a personal approach. This health education activity is carried out through various stages: (1) Preparation stage: This stage consists of literature review activities, making activity proposals and Education Teaching Units (SAP), looking for activity targets, and organizing targets or participants through a personal approach (2) Implementation stages: this stage consists of opening the activity, pre-test, presentation, post-test, and closing. (3) Evaluation stages: Activity evaluation consists of summative evaluation, which is carried out when health education activities occur, and the author qualitatively assesses the quality of the activities.

Questionnaire Filling in Knowledge This activity takes the form of a questionnaire used to assess nurses' level of knowledge, consisting of 11 statements. Statements in the knowledge questionnaire include eye mask knowledge with four questions, ear plugs knowledge with four questions, and white noise knowledge with three questions. The data analysis was univariate in the form of frequencies and percentages of participant demographic variables, and bivariate analysis was performed by comparing pre-and post-tests via an independent t-test. The data analysis did not include participants who did not complete the pre-and/or pre-test. Data analysis uses statistical software.



Picture. 1 Poster

## FINDING AND DISCUSSION

This health education was carried out directly at several hospitals in Bandung City. Eight participants took part in the activity. All respondents or participants filled out the pre and post-test. The mean age of participants was 35.3 years (SD = 1.35). During the health education process, respondents showed active participation by listening and asking questions. Most respondents were women, educated as nurses, and had worked for more than 5 years in the ICU. (Table 1).

Table 1. Frequency and Percentage of Demographic Data of Health Education Respondents in several Bandung City Hospitals

Variable	Frequency	Percentage
Age	M=35.3	SD=1.35
Gender		
Man	2	25%
Woman	6	75%
Education		
DIII	1	12,5%
S1	7	87,5%
S2	-	-
Ethnic group		
Sundanese language	7	87,5%
Java	1	12,5%
Long time working in ICU		
< 5 years	3	37,5%
≥ 5 years	5	62,5%

All participants in the activity were given health education about the use of eye masks, ear plugs and white noise which was measured on a knowledge scale before and after the exercise was given. Qualitatively, the health education activities carried out ran smoothly without any problems. This health education activity increases nurses' knowledge so it is hoped that it can improve the sleep quality of ICU patients ( $p < 0.001$ ). (Table 2).

Table 2. Effect of Health Education on the Use of Eye Masks, Ear Plugs and White Noise on Improving the Sleep Quality of Critical Patients in Nurses

Variable	Pre-Test		test-t	value-p
	M	SD		
Knowledge Pre-Test	6,68	2,67	-4,65	<0,001
Knowledge Pasca-Test	7,75	1,98		

The main results of this health education activity are as follows: (1) health education using the face-to-face method was successfully implemented and stimulated participant activity during the activity; (2) the health education carried out was able to increase participants' knowledge significantly; This health education activity aims to increase nurses' knowledge, it is hoped that ICU patients can improve their sleep quality. Health education is one way to support health programs that can produce change and increase knowledge quickly. Health education is a learning process for individuals, groups or communities, from not knowing health values to knowing them, from being unable to overcome health problems to being able to (Notoatmodjo, 2017).

Several previous studies stated that using an eye mask can significantly improve sleep quality in heart patients (Mutarobin et al., 2019). Eye masks can improve various aspects of sleep, including subjective sleep quality, sleep latency, duration, and efficiency (Arttawejkul et al., 2020). In patients with acute coronary syndrome, eye masks caused a significant reduction in overall sleep quality scores, indicating improved sleep (Darbandsar Mazandarani et al., 2016). In addition, eye masks can help reduce the incidence of delirium in ICU patients (Locihová et al., 2018).

Apart from eye masks, another intervention in improving the sleep quality of ICU patients based on research is the use of eye masks in various clinical settings. Studies have shown that earplugs significantly improve sleep quality in coronary care unit patients with acute coronary syndrome (dos Santos Bento et al., 2023). However, findings are not consistent across studies. A randomized controlled trial in a medical intensive care unit found that the effect of earplugs alone had an inconclusive impact on sleep quality with related parameters (Lin, 2020).

The use of white noise as a potential non-pharmacological intervention to improve sleep quality. Several studies have explored its effects on various sleep parameters, including sleep onset latency, fragmentation, and overall sleep quality (Masa et al., 2020). While some studies suggest that white noise can improve sleep by masking distracting environmental sounds and providing a comfortable sleep environment (Dai et al., 2021), the quality of the evidence is considered very low, and the findings are inconsistent. However, specific studies have demonstrated the positive effects of white noise on subjective and objective sleep measures in hospitalized patients (Park et al., 2020). For example, white noise increases sleep time and efficiency in rehabilitation patients (Busse et al., 2020) and helps maintain sleep duration in coronary care unit patients (Shorofi et al., 2023). Despite these promising results, further research with objective sleep measures and detailed noise



exposure descriptions is needed to establish white noise as a reliable sleep aid (Matsui et al., 2022). Combining the three is expected to improve the patient's sleep quality further. Health education activities aimed at nurses are a curative effort to increase nurses' knowledge. This health education increased nurses' knowledge significantly from the pre-test with a mean = 6.68 (SD = 2.67) to a mean = 7.75 (SD = 1.98) at the post-test.

## CONCLUSIONS

The conclusion of this activity is health education on using eye masks, ear plugs and white noise to improve the sleep quality of critical patients among nurses, which the author carried out in several hospitals in Bandung. The activity carried out is health education in the form of Health Education, with pre and post-measurements of nurses' knowledge levels. The results of this health education can increase ICU nurses' knowledge regarding optimizing patient sleep quality.

## REFERENCE

- Arttawejkul, P., Reutrakul, S., Muntham, D., & Chirakalwasan, N. (2020). Effect of nighttime earplugs and eye masks on sleep quality in intensive care unit patients. *Indian Journal of Critical Care Medicine*, 24(1), 5–10. <https://doi.org/10.5005/jp-journals-10071-23321>
- Bani Younis, M., & Hayajneh, F. A. (2018). Quality of Sleep among Intensive Care Unit Patients: A Literature Review. *Critical Care Nursing Quarterly*, 41(2), 170–177. <https://doi.org/10.1097/CNQ.0000000000000196>
- Brito, R. A., do Nascimento Rebouças Viana, S. M., Beltrão, B. A., de Araújo Magalhães, C. B., de Bruin, V. M. S., & de Bruin, P. F. C. (2020). Pharmacological and non-pharmacological interventions to promote sleep in intensive care units: a critical review. *Sleep and Breathing*, 24(1), 25–35. <https://doi.org/10.1007/s11325-019-01902-7>
- Busse, L. W., Nicholson, G., Nordyke, R. J., Lee, C. H., Zeng, F., & Albertson, T. E. (2020). Angiotensin II for the treatment of distributive shock in the intensive care unit: A US cost-effectiveness analysis. *International Journal of Technology Assessment in Health Care*, 36(2), 145–151. <https://doi.org/10.1017/S0266462320000082>
- Dai, W. S., Xie, W. P., Liu, J. F., Chen, Q., & Cao, H. (2021). *The Effect of Family-centered Care Model on Sleep Quality and Medication Compliance of Children With Simple Congenital Heart Disease After Transcatheter ...*. researchsquare.com. <https://www.researchsquare.com/article/rs-786722/latest>
- Darbandsar Mazandarani, P., Heydari, K., Hatamabadi, H., Kashani, P., & Jamali Danesh, Y. (2016). Acute Physiology and Chronic Health Evaluation (APACHE) III Score compared to Trauma-Injury Severity Score (TRISS) in Predicting Mortality of Trauma Patients. *Emergency (Tehran, Iran)*, 4(2), 88–91.

- <http://www.ncbi.nlm.nih.gov/pubmed/27274519><http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC4893757>
- dos Santos Bento, A. P., Filho, N. M., Ferreira, A. de S., Cassetta, A. P., & de Almeida, R. S. (2023). Sleep quality and polysomnographic changes in patients with chronic pain with and without central sensitization signs. *Brazilian Journal of Physical Therapy*, 27(3), 100504. <https://doi.org/10.1016/j.bjpt.2023.100504>
- Hughes, J. L., College, A. S., Brannan, D., University-idaho, B. Y., Rodriguez, M. M. D., Brown-stone, T., Lloyd, M. E., & Smith, P. (2020). *Psychological Research*. 25.
- Kakar, E., Van Mol, M., Jeekel, J., Gommers, D., & Van Der Jagt, M. (2021). Study protocol for a multicentre randomised controlled trial studying the effect of a music intervention on anxiety in adult critically ill patients (The RELACS trial). *BMJ Open*, 11(10). <https://doi.org/10.1136/bmjopen-2021-051473>
- Lin, Y. (2020). Common and co-occurring symptoms experienced by patients with gastric cancer. In *Number 2/March 2020*. onf.ons.org. <https://onf.ons.org/onf/47/2/common-and-co-occurring-symptoms-experienced-patients-gastric-cancer>
- Little, A., Ethier, C., Tirgari, S., Jiang, D., & Mehta, S. (2010). *A Patient Survey Of Sleep Quality In The Intensive Care Unit*. 268, 6705.
- Locihová, H., Axmann, K., Padyšáková, H., & Fejfar, J. (2018). Effect of the use of earplugs and eye mask on the quality of sleep in intensive care patients: a systematic review. *Journal of Sleep Research*, 27(3). <https://doi.org/10.1111/jsr.12607>
- Masa, J. F., Benítez, I., Sánchez-Quiroga, M., Gomez de Terreros, F. J., Corral, J., Romero, A., Caballero-Eraso, C., Alonso-Álvarez, M. L., Ordax-Carbajo, E., Gomez-Garcia, T., González, M., López-Martín, S., Marin, J. M., Martí, S., Díaz-Cambriles, T., Chiner, E., Egea, C., Barca, J., Vázquez-Polo, F. J., ... Bengoa, M. (2020). Long-term Noninvasive Ventilation in Obesity Hypoventilation Syndrome Without Severe OSA: The Pickwick Randomized Controlled Trial. *Chest*, 158(3), 1176–1186. <https://doi.org/10.1016/j.chest.2020.03.068>
- Matsui, K., Sato, N., Idei, M., Arakida, M., Seino, Y., Ishikawa, J. Y., Nakagawa, M., Akaho, R., Nishimura, K., & Nomura, T. (2022). An Automated Algorithm for Determining Sleep Using Single-Channel Electroencephalography to Detect Delirium: A Prospective Observational Study in Intensive Care Units. *Healthcare (Switzerland)*, 10(9). <https://doi.org/10.3390/healthcare10091776>
- Mutarobin, M., Nurachmah, E., Adam, M., Sekarsari, R., & Erwin, E. (2019). Penerapan Evidence-Based Nursing Pengaruh Earplug Dan Eye Mask Terhadap Kualitas Tidur Pada Pasien Di Icu. *Jurnal Keperawatan Indonesia*, 22(2), 129–138. <https://doi.org/10.7454/jki.v22i2.735>
- Naik, R. D., Gupta, K., Soneja, M., Elavarasi, A., Sreenivas, V., & Sinha, S. (2018). Sleep quality and quantity in intensive care unit patients: A cross-sectional study. *Indian*

*Journal of Critical Care Medicine*, 22(6), 408–414.  
[https://doi.org/10.4103/ijccm.IJCCM\\_65\\_18](https://doi.org/10.4103/ijccm.IJCCM_65_18)

- Park, J. Y., Hong, J. H., Kim, D. H., Yu, J., Hwang, J. H., & ... (2020). Magnesium and bladder discomfort after transurethral resection of bladder tumor: a randomized, double-blind, placebo-controlled study. *Anesthesiology*.  
<https://pubs.asahq.org/anesthesiology/article-abstract/133/1/64/109148>
- Salamati, A., Mashouf, S., & Mojab, F. (2017). Effect of inhalation of lavender essential oil on vital signs in open heart surgery ICU. *Iranian Journal of Pharmaceutical Research*, 16(1), 404–409.
- Shih, C. Y., Gordon, C. J., Chen, T. J., Phuc, N. T., Tu, M. C., Tsai, P. S., & Chiu, H. Y. (2022). Comparative efficacy of nonpharmacological interventions on sleep quality in people who are critically ill: A systematic review and network meta-analysis. *International Journal of Nursing Studies*, 130, 104220.  
<https://doi.org/10.1016/j.ijnurstu.2022.104220>
- Shorofi, S. A., Dadashian, P., Arbon, P., & Moosazadeh, M. (2023). The efficacy of earplugs and eye masks for delirium severity and sleep quality in patients undergoing coronary artery bypass grafting in cardiac intensive care units: A single-blind, randomised controlled trial. *Australian Critical Care*, xxx.  
<https://doi.org/10.1016/j.aucc.2023.08.003>