

## NON-PHARMACOLOGICAL THERAPIES TO IMPROVE PATIENT SLEEP QUALITY IN ICU/CCU: LITERATURE REVIEW

Elfa Lailatul Izza<sup>1\*</sup>

<sup>1</sup> Faculty of Health Science, Merdeka University of Surabaya, East Java 60232, Indonesia

**\*Correspondence:**

Elfa Lailatul Izza

Email: [elfalailatul@gmail.com](mailto:elfalailatul@gmail.com)

### ABSTRACT

**Background:** Sleep is one of the basic human needs. Good sleep quality can improve repair of the disease. Sleep disorders are common in inpatient patients at CCU and ICU. The use of sedative and hypnotic medicines can significantly improve the quality of sleep, but can cause a wide range of side effects.

**Objectives:** The purpose of this review literature compares some of the research results on non-pharmacological therapies (eye masks, earplugs, music therapy, switching off lights, environmental modifications) in improving sleep quality to determine the best nursing action and safe to overcome patient sleep disorders by literature review and followed the PRISMA statement guidelines.

**Design:** Search the article using the PICO framework in the database.

**Data Sources:** Data sources included four electronic databases: Google Scholar, EBSCO, Science Direct, Scopus, MedLine, CINAHL, PubMed, and ProQuest, are limited to the last 10 years; 2007 to 2016

**Review Methods:** Data synthesis with qualitative synthesis.

**Results:** This article review obtained 13 international journals with RCT design and quasi-experiments. Improved sleep quality can be done in several ways; Eye mask use, earplugs, music therapy, exposure and sound reduction, the transfer of the treatment schedule outside the bedtime, and combinations.

**Conclusion:** Review results show the most effective action locally applied to improve sleep quality i.e. lowering lighting and noise as well as switching of treatment schedules outside of bedtime as it is easy, safe, and not Require a fee. If the intervention has not been helped can be offered eye mask, earplugs, and or music according to the choice of patients, local culture, and facilities available in the hospital. Advanced research on patients outside the ICU/CCU with more sample counts, different age and condition characteristics, longer treatment duration, and using objective sleep quality gauge such as polysomnography.

**Key words:** Eye mask, earplug, music, ICU/CCU, sleep quality.

### INTRODUCTION

Sleep is one of the basic human needs to restore health, energy and physical well-being. At bedtime, certain hormones such as serotonin and growth hormone will undergo chemical changes and improved cellular nutrients. Sleep disorders often occur in patients treated in the CCU and ICU which can increase blood pressure and heart rate. Approximately 56% of patients with acute coronary syndrome suffer from this problem (Abolhassani SH., 2006). Results of studies in Shahrekord-Iran,

expressed approximately 51% of patients with congestive heart failure suffered from sleep disorders (Babaii, Atye, et.al., 2015). Sleep disorders are usually influenced by several factors, among others; Environmental factors (sound/hustle), continuous lighting, 24-hour care activity, discomfort/pain, isolation, treatment activity and psychological stress related to a life-threatening illness or complications from illness (Li, S.Y., et.al., 2011).

Improving sleep quality in ICU and CCU patients is important because it can

cause an increased risk of infections, complications, ductility hospital stay and mortality (Li, Shu-Yen, et.al., 2011). The use of sedative and hypnotic drugs can significantly improve the quality of sleep, but can lead to a wide range of side effects (Babai, Atye, et.al., 2015). Complementary Therapies (music therapy, use of eye masks, earplugs, environmental modifications and nursing actions) can also improve the quality of sleep without serious side effects (Saeedi M. et.al., 2012; Jones C et.al., 2012). Various studies have been conducted to explain the effect of the use of nonpharmacological therapies on the sleep quality of patients treated in the CCU/ICU. But there are still some limitations such as; Methods, time span, scope, measuring instruments, and research populations so that it has not quite concluded the influence of the use of non-pharmacological therapies on the quality of sleep patients with those treated in ICU/CCU.

The purpose of this study is to conduct literature review of the effectiveness of nonpharmacological therapy (eye mask, earplugs, music therapy, reducing lighting, sound modification of environmental noise, transfer of treatment schedules outside of sleep hours) to Quality of sleep, comparing the research results to the similarities, advantages, and disadvantages of each study to conclude where the best interventions can be applied locally, as well as determining the research gap as research advice Next. The literature of this review is presented in the form of articles consisting of; Abstract, introduction, methods, outcomes and discussion, implications for practice, conclusion, bibliography, and attachment.

## **METHODS**

Literature review begins with the search articles using the PICO framework. A reviewed journal population is an ICU or

CCU patient. The intervention is the installation of eye masks compared to; Earplugs, music therapy, exposure reduction, noise reduction, and or combinations that can significantly improve sleep quality. The keywords used; Eye masks, earplugs, music, noise, and sleep quality on Google Scholar databases, EBSCO, Science Direct, Scopus, Medline, CINAHL, PubMed, and ProQuest. Search of English-language journals is limited to the last 10 years starting from 2007 to 2016. The search results obtained 18 articles then studied critically, leaving 18 international journals with RCT (Randomized Controlled Trial) design and quasi-experiments.

After getting a number of articles, then checked to see the existence of the same article / double. If found the same article, then do the disposal so that there is only one article whose title and content are the same.

The next stage of the feasibility study of the article whether in accordance with the inclusion criteria that we set or not. If it does not meet the specified inclusion / eligibility criteria, the article is excluded or not included in the next analysis. In the inclusion and exclusion criteria referred to consider the population, interventions, outcomes, place of intervention, design, and year of publication. For more details see Figure 1 following PRISMA.

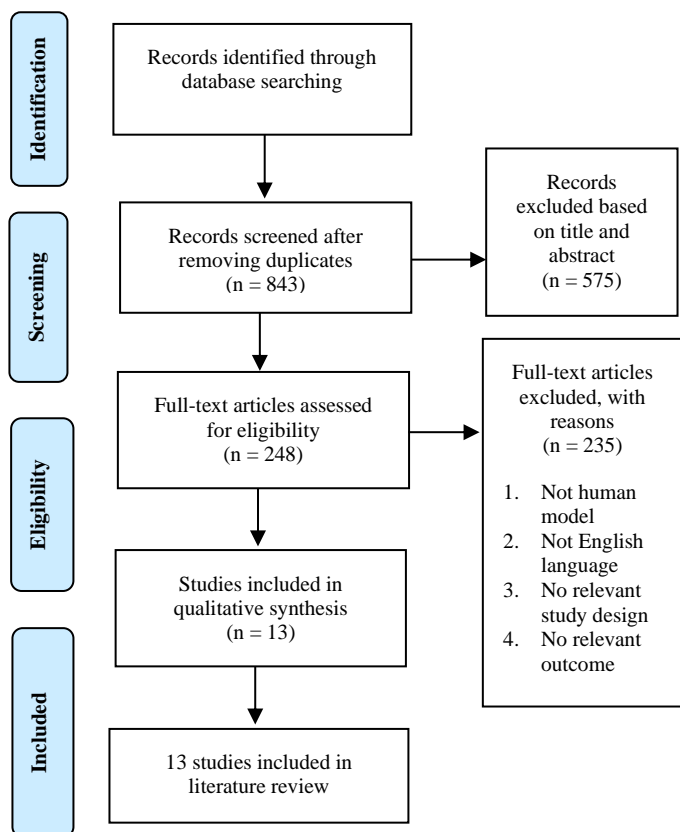


Fig. 1. Flow Diagram

## RESULTS

### *Eye Mask*

There are three studies conducted to prove the effectiveness of eye masks to improved sleep quality in cardiac patients at the CCU in different hospitals in Iran include; Mohammad Daneshmandi, et.al. (2012), Mashayekhi, et. el. (2013), and Atye Babaii, et.al. (2015) using the design of the RCT (Level 2 of the 7 levels of evidence) in 60 cardiac patients aged > 18 years. Two studies use the PSQI (Petersburg's Sleep Quality Index) gauge and 1 using VSH (Verran and Snyder-Halpern Sleep Scale). The third result of the study showed that eye masks could significantly improve sleep quality in heart patients.

### *Earplug*

There are two journals examining the effectiveness of earplugs for the enhancement of ICU/CCU patient sleep quality. Carrie J Scotto, et.al. (2009)

Examining 88 ICU patients aged > 18 years (49 intervention /39 control), quasi-experimental design with post-test-only design in Midwestern US with VSH measuring instrument. The treatment group was installed earplugs for 1 night at night sleep, 12 respondents drop out (7 because of a falling-earplugs or because the respondent felt uncomfortable using it, 5 was not resumed due to decreased conditions or needed treatment Special). The results showed the use of earplugs improves the quality of sleep subjectively without disturbing the treatment action.

Fateme Neyse, et.al., (2011) examined 60 cardiac patients at CCU > 18 years of age in Tehran Iran with an RCT pre-posttest design. 60 patients divided into 2, 30 mounted earplugs, 30 without earplugs, no one to drop out. The installation of earplugs is performed every night during the patient in the hospital. The sleep quality is measured using PSQI prior to mounting the earplugs and at the end of the hospitalization (posttest). The results showed that the use of earplugs could improve sleep quality (p value < 0.05) in the treat group compared to the control group. Eye Mask and Earplug Yazdannik, et.al. (2014) Conducted research on 50 ICU patients > 18 years in Isfahan with RCT cross over design. Respondents were divided into 2 groups, no one dropped out. The measurement of sleep quality is done after both groups are done intervention using VSH. The results showed that treatment had a positive effect on sleep effectiveness and there was a significant difference (P. < 0.001) between the treatment group and the control group.

Year 2015, Dave, ET. Al. conducted the same study in 50 ICU patients in India aged 20-70 years with the same design (RCT cross over design), but using a different measuring instrument namely RSCQ (Richards Campbell Sleep

Questionnaire). Respondents divided 2 groups; nothing is drop out. The results showed that there was a significant difference in sleep quality when treatment with no treatment ( $P < 0.001$ ).

#### *Controlling Night-Time Noise*

The research was conducted by Shu-Yen Li, et al. (2011) with a quasi-experimental design in 60 > 18-year-old surgical patients in ICU in Taiwan. 60 patients divided into 2, 30 treatment groups given the sleep care guidelines for noise and light reduction, 30 control groups receiving routine maintenance. 5 patients drop out because of loss of follow up so at the end of the study group treatment 28 patients and control group 27. The measuring instruments used are SICUQ (Sleep in The Intensive Care Unit Questionnaire), RSCQ, and meter sound meter which are used to monitor noise levels from 11:00 p.m. – 07.00 a.m. continuously in the bedside and nursing station in Surgical ICU. The RSCQ score indicates that the quality of sleep in the treatment group is higher than the control group ( $p < 0.05$ ).

#### *Combination of Eye Mask, Earplug, and music*

The study conducted Min-Jung Ryu, et al. (2011) in 58 PTCA (Percutaneous Transluminal Coronary Angiography) patients  $\geq 20$  years at the CCU. Research using the design of the RCT, divided into 2, 29 patients (treatment group) installed earplugs + Eye shield + music that triggers sleep for 52 minutes at the beginning of 10 pm (only 1 night), 1 patient drop out due to taking sleeping medicine, 29 patients (group Control) installed earplugs + Eye shield without music, 1 person drop out because it is moved into the room. The morning at 7 am performed sleep quality measurements using VSH and sleep

quantity was measured using a questionnaire that contained about the total number of hours of sleep. The results showed the earplugs + Eye shield + Music treatment group to experience improved quality ( $P = 0.001$ ) and the quantity ( $P = 0.002$ ) of sleep significantly compared to no music in the control group.

Rong-Fang Hu, et.al., (2015) conducted RCT research on 45 ICU patients aged  $\geq 40$  years, divided into 2; 25 treatment groups (combining between earplugs, eye masks, and 30-minute music delivery at the 9 pm until 6 am) compared to 25 control groups that did not do any intervention. 5 Respondents group treatment drop out; 2 experiencing complications post serious surgery, 2 refused to wear earplugs + eye masks, and 1 refused to be heard of music. Subjective sleep quality measured Day 1 or 2nd after moving from ICU using RCSQ. In addition, levels of melatonin and cortisol are also evaluated before surgery and after surgery. The results showed the use of earplugs + eye masks + music helped improve the perception of sleep evidenced by the higher subjective sleep quality in the intervention group compared to the control group (the  $< 0.05$  P value) and this treatment Does not affect the level of melatonin and cortisol at night.

Hua Wei Huang, et.al. (2015) conducted the same research but added treatment with oral melatonin administration with RCT-cross over design conducted on 40 ICU patients aged > 18 years. The treatment process is divided into two phases, the first phase divided by 2 groups (20:20) then the second phase is divided into 4 (10:10:10:10) which are given different interventions. The measuring instruments used include; PSG (Polysomnography), Subjective Sleep quality (visual analog scale), and Serum melatonin concentration. The results

showed that the use of melatonin is better in improving sleep quality compared to the use of earplugs and eye masks. The result of the evaluation of the respondent's response to the use of eye masks and earplugs was found that the eye mask was more comfortable, easier, and more effective than earplugs.

## **DISCUSSION**

This review literature identifies 6 interventions to improve the sleep quality of patients in the ICU/CCU include; The use of eye masks, earplugs, music therapy, reducing lighting reduces environmental noise in bedtime, switching of treatment schedules outside of sleep hours, as well as combinations of earplugs + Eye mask + music with/without melatonin, which are all proven Effective for improving sleep quality. Earplugs are reportedly some of the respondents experiencing discomfort in usage.

In terms of design, 9 journals use RCT and 2 quasi for so this review is quite strong based on the level of evidence. In terms of measuring instruments, 10 journals use subjective measuring instruments and 1 journal using PSG (Polysomnography) that uses healthy respondents in ICU setting. PSG is the gold standard for measuring sleep objectively with high accuracy, but it is not easy to apply to patients in ICU because it is expensive and requires manipulation that can interfere with the treatment process in ICU/CCU.

Review results show that all given treatment (eye mask, earplugs, reduce exposure, reduce noise, divert maintenance schedules outside of sleep hours, nor any combination of earplugs + Eye mask + music) can improve sleep quality Subjectively. Review results can only be applied to adult ICU/CCU patients who are conscious, non-complications, and cooperative so that they cannot be used in

patients who have decreased awareness, anxiety, or ventilators. It is also not applicable to different age characteristics and other inpatient rooms.

## *Implications of Practice*

From some treatments, the possible actions can be applied locally that reduce exposure, reduce environmental noise, divert maintenance schedules outside of sleep because it is easy, effective, and not cost. This can be a supportive therapy in patients who are experiencing sleep disorders before collaborating with medical treatment. When exposure reduction, environmental noise lowering, and the transfer of treatment schedules outside the sleep hours do not help improve sleep, patients can offer additional therapies such as eye masks, earplugs, or combinations of eye masks + Earplugs + music adapted to the habits of patients, cultures, and facilities available in hospitals.

## *Limitation*

There are some limitations in this study. That is a small sample size. More research needs to be done to learn the effectiveness of non-pharmacological therapies to improve patient sleep quality in ICU/CCU, as this will allow the transfer of findings.

## **CONCLUSION**

Sleep is one of the basic human needs. Sleep disorders often occur in patients treated in the CCU or ICU. This review literature identifies 6 interventions to improve sleep quality in ICU/CCU patients include; Use of eye mask, earplugs, music therapy, reduce lighting and environmental noise in bedtime, transfer of treatment schedules outside of night sleep hours, as well as a combination of Eye mask + earplugs + music with/without melatonin, all of which proved effective To improve



sleep quality. Review results concluded the most effective action in improving sleep quality to be applied locally which is lowering lighting and noise, as well as switching of maintenance schedules in the sleep because it is easy, safe, and does not require Cost. However, it can only be applied to adult ICU/CCU patients who are conscious, non-complications, and cooperative so as to not be generalized to different age, condition, and setting characteristics such as in inpatient rooms other than ICU/CCU. Advanced research is required in patients outside the ICU/CCU with more sample count, different age and condition characteristics, longer treatment duration, and using objective measuring instruments such as polysomnography.

## REFERENCES

- Abolhassani SH. (2006). Effect of Sensory Stimulation on Sleep Deprivation Symptoms in Patients Admitted to Coronary Care Unit. *Journal of Semnan Medical Sciences*, 7(1-2):71-6.
- Babaii, A., Adib-Hajbaghery, M., & Hajibagheri, A. (2015). Effect of Using Eye Mask on Sleep Quality in Cardiac Patients: A Randomized Controlled Trial. *Nursing and Midwifery Studies*, 4(4), e28332.
- Daneshmandi, M., Neiseh, F., Sadeghi Shermeh, M., & Ebadi, A. (2012). Effect of Eye Mask On Sleep Quality In Patients With Acute Coronary Syndrome. *Journal of Caring Sciences*, 1(3), 135–43.
- Dave, K., Qureshi, A., & Gopichandran, L. (2015). Effect of Earplugs and Eye Masks on Perceived Quality of Sleep during Night among Patients in Intensive Care Units. *Asian Journal Nursing Education and Research*, 5(3), 319-322.
- Huang, H.-W., Zheng, B.-L., Jiang, L., Lin, Z.-T., Zhang, G.-B., Shen, L., & Xi, X.-M. (2015). Effect Of Oral Melatonin And Wearing Earplugs And Eye Masks On Nocturnal Sleep In Healthy Subjects In A Simulated Intensive Care Unit Environment: Which Might Be A More Promising Strategy For ICU Sleep Deprivation? *Critical Care (London, England)*, 19(1),124.
- Hu, Rong Fang, Jiang, X.Y., Hegadoren, K.M., & Zhang, Y.H. (2015). Effect Of Earplugs and Eye Mask Combine With Relaxing Music On Sleep, Melatonin, And Cortisol Level in ICU patients: a randomized contolled trial. *Critical Care*. 19,115.
- Leland, N. E., et.al. (2014). What Is Occupational Therapy's Role In Addressing Sleep Problems Among Older Adults. *OTJR: Occupation, Participation and Health*. 34(3).
- Li, S.Y., Wang, T.J., Vivienne Wu, S.F., Liang, S.Y., & Tung, H.H. (2011). Efficacy of Controlling Night-Time Noise and Activities to Improve Patient's Sleep Quality in a Surgical Intensive Care Unit. *Journal of Clinical Nursing*, 20, 396-407.
- Mashayekhi, F., Arab, M., Pilevarzadeh, M., Amiri, M., & Rafiei, H. (2013). The Effect of Eye Mask on Sleep Quality in Patients of Coronary Care Unit. *Sleep Science*, 6 (3), 108-111.
- Neyse, F., Daneshmandi, M., Sharame, M. S., & Ebadi, A. (2011). The effect of earplugs on sleep quality in patients with acute coronary syndrome, *Journal Of Caring Sciences*, 4(3), 127–134.
- Ryu, M.J., Park, J.S., & Park, H. (2011). Effect of Sleep-Inducing Music on Sleep in Persons with Percutaneous Transluminal Coronary Angiography in the Cardiac Care Unit. *Journal of*

*Clinical Nursing*, 21, 728-735.

Scotto, C.J., McClusky, C., Spillan, S., & Kimmel, J. (2009). Earplugs Improve Patient's Subjective Experience of Sleep in Critical Care. *British Association of Critical Care Nurses, Nursing in Critical Care*, 14(4), 180-184.

Yazdannik, A.R., Zareie, A., Hasanpour, M., & Kashefi, P. (2014). The Effect of Earplugs and Eye mask On Patients Perceived Sleep Quality in Intensive Care Unit. *Iranian Journal of Nursing and Midwifery Research*, 19(6), 673-678.