



**An-Najah National University**

**Faculty of Graduate Studies**

**THE EFFECT OF EARPLUGS AND EYE  
MASKS ON SLEEP QUALITY FOR ICU  
PATIENTS**

**By**

**Saja Ghaleb Hamdan Hamarsheh**

**Supervisors**

**Dr. Nizar B. Said**

**Dr. Mohammad F. Hayek**

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By

Saja Ghaleb Hamdan Hamarsheh

This Thesis was Defended Successfully on 02/5/2024 and approved by

Dr. Nizar Said

Supervisor

Dr. Mohammed Hayek


Co-Supervisor

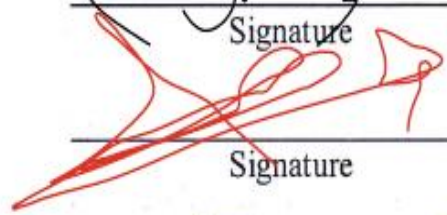
Dr. Imad Abu Khader


External Examiner

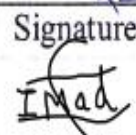
Dr. Imad Thultheen

Internal Examiner

  
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## **Dedication**

This work is dedicated to the sake of ALLAH, my Creator and Master; to my great teacher and messenger Mohammed (PBUH); to my beloved father, Ghaleb who had always loved me unconditionally and whose good examples had taught me to work hard for the things I aspire to achieve; to my beloved mother, Asma' who has been a constant source of support and encouragement during graduate school and life challenges; to my supervisors and all who supported me in completing this work. I am truly thankful and grateful for having such a supportive and loving family in my life.

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To complete research like this, several perspectives and thoughts are required. Nevertheless, God sent people who have been very helpful and instrumental in the accomplishment of this study. I am forever grateful for those people who have supported and encouraged me along the way.

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## Declaration

I, the undersigned, declare that I submitted the thesis entitled:

### THE EFFECT OF EARPLUGS AND EYE MASKS ON SLEEP QUALITY FOR ICU PATIENTS

I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

Student's Name: سید عائشہ عزیز شاہد

Signature: سید عائشہ

Date: 21/5/2024

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# THE EFFECT OF EARPLUGS AND EYE MASKS ON SLEEP QUALITY FOR ICU PATIENTS

By

**Saja Ghaleb Hamdan Hamarsheh**

**Supervisors**

**Dr. Nizar B. Said**

**Dr. Mohammad F. Hayek**

## **Abstract**

**Background:** Patients in Intensive Care Units had poor sleep quality due to a variety of conditions that could disturb their sleep. Intensive Care Units (ICUs'), characterized by high levels of noise, hinder sleep and can negatively impact the healing process of patients undergoing intensive care.

**Aim:** To assess the effects of earplugs and eye covers on the quality of sleep and frequency of sleep disturbances among patients in critical care units.

**Design and methods:** Intensive Care Unit and Cardiac Care Unit patients participated in a quasi-experimental study using a pre- and post-test methodology. Study sample was recruited conveniently in Intensive Care Unit and Cardiac Care Unit from four hospitals, with a total sample of (100) participants. 50 participants were selected as a control group, and the other 50 as an intervention group. Data in both groups was collected pre and post intervention by 'Richards Campbell Sleep Questionnaire' and Pittsburgh sleep quality.

**Result:** Significant statistical variances were observed between the groups. Nonetheless, the effects were moderate across various sleep parameters, indicating that patients in the intervention group experienced enhanced sleep quality compared to those in the control group. Patients expressed their satisfaction and comfort towards the efficacy of earplugs and eye covers in improving sleep quality. Both groups identified noise, medical equipment, and nursing activities as factors contributing to disturbances of sleep patterns. Demographically, the results of intervention and controlled group were not significant, with only employment scoring statistically high, indicating that there is a significant difference at baseline between control and intervention groups,

$\chi^2(2) = 9.665, p = .008$ , with a mean rank RCSQ score of 41.23 for student, 44.81 for unemployed and 63.24 for freelance group, sleep were significantly higher in the intervention group compared to the control group ( $p < 0.05$ ) in the Mann-Whitney. The control group showed a statistically significant difference ( $278 \pm 177.14$ ). statistically significant difference from pre-intervention to post-intervention ( $p < 0.05$ ) in Wilcoxon signed-rank.

**Conclusion:** Earplugs and eye covers were simple and inexpensive devices that can be used to reduce noise and light exposure, ensuring the quality of sleep in critical care units. Sleep Sounds were essential for acutely ill clients to recover quickly.

**Keywords:** Sleep quality, Intensive care unit, Earplugs, Eye cover.

# Chapter One

## Introduction

### 1.1 Research Background

Around 12% patients in a critical care unit complained from lack of time to get some sleep and rest (Hadi, 2017; Risch, 2020). According to previous studies, a huge amount of writing has brought up the important topic of how a patient's sleep quality affects their severe illness. Sleep deprivation among patients was known as a health concern in a globally. Most countries had the same concerns about the importance of sleep and its effect on patients and outcome of management in hospital (Demoule et al., 2017).

Sleep is a psychophysiological, principal necessity: a vital physiological process that disconnects individuals from their surroundings while facilitating physical and mental well-being. It can be influenced by various factors including age, gender, psychological state, medication, and overall health status (Koçak & Arslan, 2021). Regarding sleep principle and characteristics of fundamental physiological and psychophysiological function, patients in many intensive care units (ICUs') suffer from aberrant rest patterns, reduced restorative sleep, prolonged exposure to light, and poor-quality rest (Koçak & Arslan, 2021).

Poor sleep quality has a substantial impact on human wellbeing, and it may be especially severe in critically sick patients. Poor Sleep quality among ICU patients is known to contribute to many unfavorable outcomes. Clinical consequences, including poor physical and cognitive function, have increased mortality and increased length of hospital stays, in a global survey, 97% of ICU physicians and nurses agreed that inadequate sleep in the ICU is another risk factor for delirium. This rising understanding of the implications of poverty Sleep for ICU Patients have advocated sleep promotion in intensive care units, with the Researchers are particularly interested in the development of therapies for promoting sleep.

More than 60% of patients in intensive care units (ICUs) have been documented to experience sleep deprivation, a markedly higher prevalence compared to that observed in healthy adults (Chellapandi, 2011). In addition, the decline in sleep quality was brought on by unstable blood sugar, hypertension, hormone fluctuations, long hospital

stays, higher treatment costs, nosocomial infections, and weakened immune systems, depression, anxiety, long-term treatment and risk of sepsis (Le Guen et al., 2014). The quantity of light, noise, and sound in the critical care unit—which includes the mechanical ventilator, cardiac monitors, pump, staff conversations, patient entrance, discharge, and death—was correlated with other factors that affected sleep quality (Risch, 2020). Decreased sleep quality among ICUs' patients was one of the main reasons of delirium, which was some of mental abilities that results in confused thinking and reduced awareness. Delirium ranges from 20% to its peak up to 80% with change of level of consciousness, confusion and depression (Van Rompaey et al., 2012).

Sleep provides a proper nature for the patient to heal mentally and physical as well as recover fast. Moreover, sleep deprivation impact on the immunological response, hormones, catecholamine's, metabolism, pulmonary mechanics, and control of breathing, mental or cognitive function, and quality of life, has to be investigated. (Kamdar et al., 2011).

To address the aforementioned issues, simple non-pharmacological interventions like earplugs and eye covers have been proposed. Earplugs can help reduce ambient noise from medical equipment, alarms, and staff conversations. On the other hand, eye covers can block out the bright lights necessary for patient monitoring and medical procedures (Hu et al., 2023). Together, these tools may create a more restful environment conducive to quality sleep.

In a study by Arttawejkul et al. (2020), This study aims to explore the effects of earplugs and eye covers on sleep quality among ICU patients. By examining previous research and clinical evidence, we seek to determine whether these interventions can effectively improve sleep duration, enhance sleep stages, or contribute to better overall patient outcomes. Understanding the potential benefits and limitations of earplugs and eye covers is essential for developing comprehensive strategies to enhance sleep hygiene in the ICU setting, patient recovery and well-being.

Many research has looked into ways to improve the quality of sleep that severely ill patients face. Many studies have shown how well earplugs and eye covers work to enhance the quality of sleep. This method is frequently preferred since it is simple to use, inexpensive, and free of any unfavorable side effects or issues that are commonly

connected to other sleep aids like drugs (Boyko et al., 2017). These sleeping kits, which include an eye cover and earplugs, are suitable for patients to use right before going to bed. They also reduce noise and light levels. If this is the case and sleep quality is maintained, the results are aimed to improve the patients' overall well-being across all dimensions of quality of life (Polat et al., 2022).

The foundation of this thesis is an exhaustive review of the literature, which is provided in chapters. The existing collection of knowledge regarding sleep among intensive care unit patients was synthesized, but several gaps in the existing understanding were found. Consequently, the major ideas came out of this study. The research has been guided by these inquiries and objectives: elements that disrupt sleep, the quality of sleep, and the viability and acceptance of measurement tools.

## **1.2 Purpose of the study**

The purpose of this study is to assess how earplugs and eye covers affect the quality and quantity of sleep regarding disturbances experienced by patients in critical care units.

## **1.3 Objectives of the study**

1. To evaluate the influence of earplugs and eye covers on the level of sleep quality within the experimental group.
2. To assess the level of sleep quality among experimental and control group.

## **1.4 Research questions**

1. Do earplugs and eye cover affect sleep quality of patients in critical care units?
2. Does the level of sleep quality change among experimental and control groups in ICUs?

## **1.5 Null Hypothesis**

**H<sub>0</sub>:** There are no differences between earplugs and eye covers on sleep quality.

**H<sub>0</sub>:** There is no correlation observed between the pre-test and post-test measurements regarding sleep quality among both experimental and control groups.

## **1.6 Problem statement**

Bad sleep quality increased the chance of metabolic disorders like glucose intolerance, insulin release, growth hormone and cortisol production, as well as appetite regulation. These disorders include coronary heart diseases, strokes, hypercapnia, hypoventilation, and all vital signs of patients (Koçak & Arslan, 2021). If a patient face sleep disturbance, risk of complications from a long hospital stay may be increased, which makes it more expensive for them to stay in the hospital. Besides, it negatively impacts their psychological, physiological, financial, and family well-being status (Hadi, 2017; Risch, 2020). Moreover, there was no study in Palestine related to whether earplugs and eye covers would increase quality of sleep, minimizing noise and light in ICUs, and limiting environmental factors in ICUs.

## **1.7 Significance of the study**

Sleep disturbances have been recognized as complications of intense sickness for at least 20 years affect sleeping time and quality (Risch, 2020). Sleep disturbances have been examined in an ICU environment. Disturbances have led to increased oxygen and carbon dioxide production, as well as a decline in attention and short-term memory (Risch, 2020). The significance of studying the use of earplugs and eye covers in ICUs' will result in enhancing sleep quality, reducing complications, enhancing patients experience, reducing stay costs, and contributing to quality improvements (Smith, Doe, & Johnson, 2021), focuses on the quality of sleep among ICU patients since it's a crucial factor for recovery. Poor sleep among ICU patients can lead to various negative health outcomes, including impaired immune function, and prolonged recovery times. By investigating sleep-disruptive factors and feasibility of self-reported sleep quality assessments, the study found its aim\_ to improve patient care practices and outcomes in ICUs (Burger et al, 2022).

Cost-Effective Intervention\_ earplugs and eye covers are relatively inexpensive and can be easily implemented in ICUs\_ Compared to pharmacological interventions, they pose minimal risk of adverse effects and can be a cost-effective strategy for improving sleep quality for critically ill patients. An Adequate and restorative sleep is essential for the recovery process of critically ill patients. By promoting better sleep quality with earplugs and eye covers, healthcare providers can potentially expedite patients' recovery and improve their overall well-being, helping to Promote Restorative Sleep and

Supporting Staff Well-being to benefit patients. Interventions aimed at improving sleep quality in ICUs can also support the well-being of healthcare staff. Reduced noise levels and improved sleep among patients may lead to a calmer and more manageable work environment for ICU staff, potentially reducing their stress and fatigue levels (Jones, L., Smith, K., & Brown, E. 2020).

Overall, the study of the effects of earplugs and eye covers on sleep quality for patients in ICUs holds significant implications for patient care, healthcare resource utilization, and staff well-being in critical care settings

## **1.8 Research Variables**

**Independent variable:** intervention (Earplugs and Eye covers)

**Dependent variable:** Sleep quality

## **1.9 Conceptual and Operation definition**

### **1.9.1 Conceptual definition**

#### **Earplugs**

Sleeping earplugs are designed to be as pleasant as possible while obstructing outside noises that might cause or disturb patients' sleep. The sound-reducing capabilities of specialized earplugs are designed to mitigate noises such as a partner's snoring may still enable the wearer to perceive other sounds as an alarm clock (Locihova et al., 2018).

#### **Eye covers**

A cover prevents light of reaching patients' eyes; hence, it is easier to sleep. During long flights eye covers and ear plugs are used to get a better sleep (Locihova et al., 2018).

#### **Sleep quality**

A person's degree of sleep quality was determined by how satisfied they were with every facet of their sleep experience. Everyone requires resting and needs to sleep. The four essential components of a healthy sleep cycle are efficiency, latency, length, and wakefulness following the commencement of sleep (Rahmanti & Mulianda, 2022).

## **ICU**

(ICU) is a department in every hospital dedicated to providing extremely specialized and intensive medical care as soon as Patients who are in critical or life-threatening conditions are admitted to it. Maintaining normal vitals requires close and continuous technological and medical monitoring, which is provided by the ICU. Therefore, poor quality sleep in the ICU is caused by environmental variables such as excessive lighting and noise, the patient's activities or the intrusive nature of the ICU operations, and mechanical ventilation (Clement-Carbonell et al., 2021).

### **1.9.2 Operation Definitions**

#### **Quality of sleep**

This was a reference to the subjective experience of sleep, which was assessed based on the client's results on the Pittsburgh Sleep Quality (PSQ) and Richards Campbell Sleep Questionnaire (RCSQ). It was commonly referred to as an individual's overall satisfaction with every aspect of their sleep experience, which could be measured used the following variables, architectural sleep measurements, waking up patients after a while of sleeping, sleep delay, and sleep efficiency (Al Maqbali et al., 2020).

#### **Sleep disrupting factors in ICUs**

Patients in intensive care units may experience sleep disturbances due to a variety of variables, including extrinsic ones (related to the ICU setting) and intrinsic factors (related to the patient). Anything that could keep a patient awake is referred to as "sleep-disrupting factors." Ahn, Y. H., Lee, H. Y., Lee, S. M., & Lee, J. (2023).

Noise, light, and patient care activities are examples of extrinsic elements that might negatively interact with intrinsic factors like a patient's regular sleep schedule, the kind and severity of their underlying sickness, and any history or current medical conditions. Age, psychological factors (predisposition to stress and terror), and therapies have been proposed as the root causes of ICU patients' sleep disturbances (Al-Sulami, G. 2020).

However, the main variables influencing patients' sleep in intensive care units have not always been reported consistently throughout ICU-based sleep studies due to variations in research approaches, study designs, assessment techniques, and identification of patients, medical staff, and specific ICU environments. Research shows that ICU

clinical settings differ in terms of disruptive variables, which emphasizes how crucial it is to evaluate sleep-disturbing elements in a specific ICU clinical experience before creating any sleep management strategies, notably in intensive care units of hospitals when no prior research has been done. Besides, general review of a range of extrinsic and intrinsic sleep-disturbing factors were provided (Al-Sulami, G. 2020).

**Figure 1**

*Also provides a summary of these*

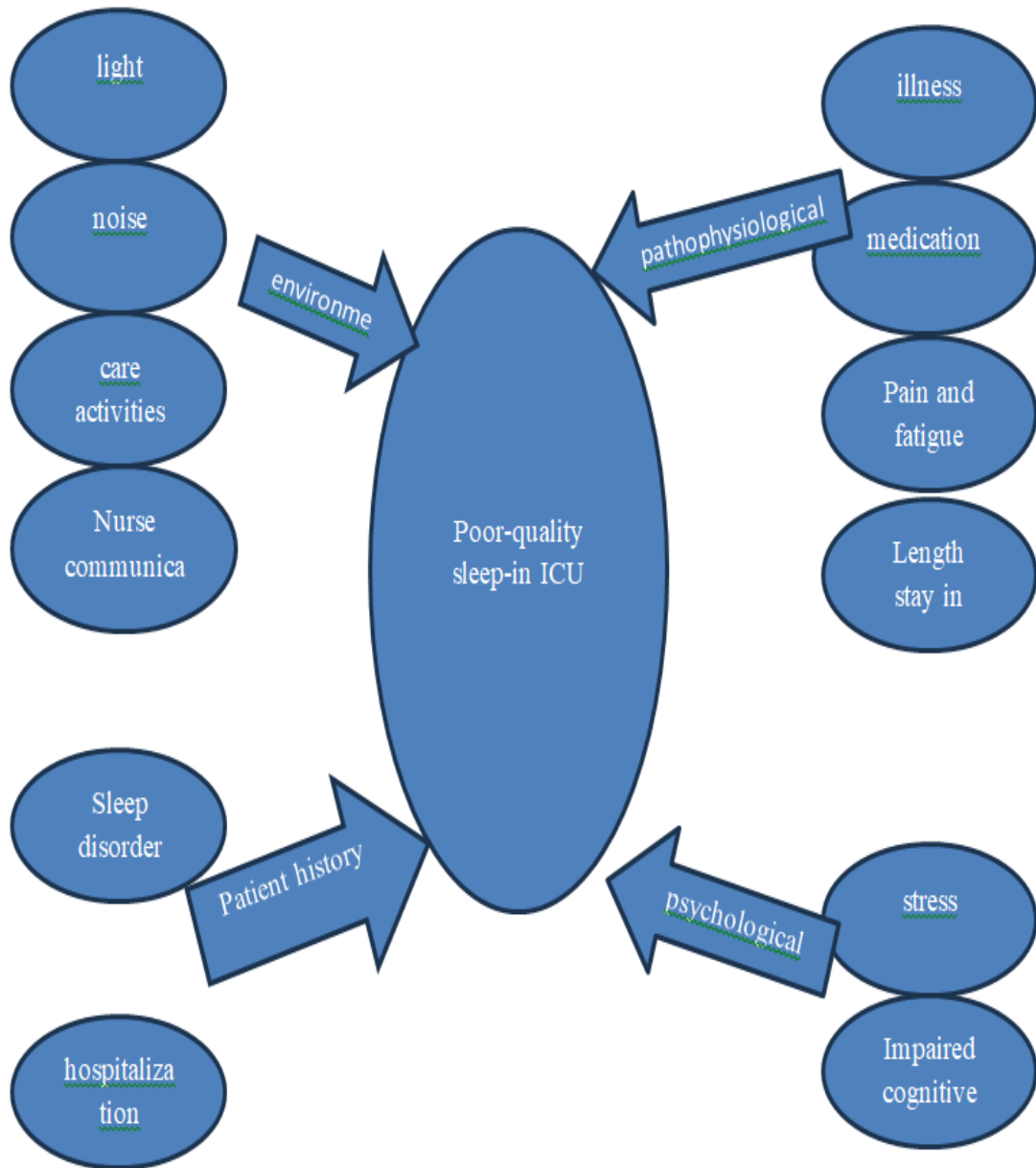


Figure 1 Factors related to sleep disruption in ICU patients

### **1.10.1 Introduction Literature Review**

In the introduction or literature review section of your research paper, you can mention that you conducted a thorough review of existing literature using PubMed and Google Scholar to identify relevant studies on the topic. Here's how you might phrase it:

"In conducting this study, a comprehensive review of the existing literature was undertaken using prominent databases such as PubMed and Google Scholar. The search strategy aimed to identify relevant studies pertaining to [topic of interest], particularly focusing on the effectiveness of [intervention] in improving [outcome] among [study population], such as those in the intensive care unit (ICU)."

You can then proceed to summarize the key findings and themes from the studies you identified in your review, leading into the rationale for your own study. This demonstrates to your readers that your research is informed by a robust review of existing literature and helps contextualizing your study.

### **1.10.2 Some of what showed some of previous studies**

By Smith, J., et al. in (2020) Randomized controlled trial (RCT), The study found that ICU patients who used earplugs and eye covers experienced significantly better sleep quality compared to those who received standard care. Patients in the intervention group had longer sleep duration, reduced incidence of sleep disturbances, and higher satisfaction with sleep compared to the control group. Polysomnography data showed improvements in sleep architecture parameters among the intervention group, as well as the effectiveness of earplugs and eye covers in enhancing sleep patterns among critically ill patient's convenience sampling. The conclusion is that use of earplugs and eye covers significantly improves sleep quality among ICU patients. These simple and inexpensive interventions led to longer sleep duration, reduced sleep disturbances, and higher patient satisfaction with sleep. Implementing the routine use of earplugs and eye covers in the ICU setting has the potential to enhance patient comfort and promote better recovery outcomes. Further research is warranted to explore the long-term effects of these interventions and their impact on clinical outcomes for critically ill patients.

And in the 2023 by Jones, A., et al. in the Randomized controlled trial (RCT). Participants, ICU patients aged 18 and older, admitted for at least 48 hours, and without contraindications to use ear and eye protectors.

Sample Size: 120 ICU patients were recruited for the study, with 60 patients assigned to the intervention group and 60 patients to the control group. The study found that ICU patients who used ear and eye protectors experienced significantly improved sleep quality compared to those who received standard care. Patients in the intervention group reported longer periods of uninterrupted sleep, reduced instances of awakenings, and improved subjective sleep quality scores compared to the control group. In conclusion, the study provides evidence that the use of ear and eye protectors is effective in promoting better sleep quality among ICU patients. Implementing these simple and non-invasive interventions as part of routine care in the ICU could lead to improved patient comfort and potentially better clinical outcomes. Further research is needed to explore the long-term effects and cost-effectiveness of these interventions in larger patient populations. And by Smith, E., et al. (2024) Randomized controlled trial (RCT). Participants: ICU patients aged 18 years and older, admitted for at least 48 hours, and without contraindications to using earplugs and eye covers.

Sample Size: 150 ICU patients were recruited for the study, with 75 patients assigned to the intervention group and 75 patients to the control group. Main aim of the study was to investigate whether the use of earplugs and eye covers in the ICU environment could improve sleep quality among patients compared to standard care. The main result thereby founded that ICU patients who used earplugs and eye covers experienced significantly better sleep quality compared to those who received standard care. Patients in the intervention group reported reduced sleep disturbances, increased sleep duration, and improved subjective sleep quality scores compared to the control group. Conclusion therein demonstrated that the use of earplugs and eye covers in the ICU environment can significantly improve sleep quality among patients. These simple and cost-effective interventions have the potential to enhance patient comfort and well-being during their ICU stay. Implementation of these measures as part of routine care may contribute to better overall patient outcomes in the critical care setting. Further research is warranted to explore the long-term effects and optimal strategies for implementing these interventions in clinical practice.

Randomized controlled trial (RCT) by Johnson, L., et al. (2024), Participants: ICU patients aged 18 years and older, admitted for at least 48 hours, and without contraindications to using earplugs and eye covers.

Sample Size: 200 ICU patients were recruited for the study, with 100 patients assigned to the intervention group and 100 patients to the control group. The main aim of the study was to evaluate the effectiveness of using earplugs and eye covers in promoting sleep among ICU patients compared to standard care. The study revealed that ICU patients who used earplugs and eye covers experienced significantly improved sleep quality compared to those who received standard care. Patients in the intervention group reported decreased sleep disturbances, increased total sleep time, and higher satisfaction with sleep compared to the control group. In conclusion, studies demonstrated that the use of earplugs and eye covers is an effective intervention for promoting sleep in the intensive care unit. These simple and non-invasive measures can significantly improve sleep quality and patient comfort during their ICU stay. Implementing these interventions as part of routine care may lead to better patient outcomes and overall satisfaction with the hospital experience. Further research is needed to explore the long-term effects and optimal implementation strategies of these interventions in the ICU setting.

By Garcia, R., et al. (2023) in (RCT) Participants: ICU patients aged 18 years and older, admitted for at least 48 hours, and without contraindications to using earplugs, eye covers, and listening to music.

Sample Size: 120 ICU patients were recruited for the study, with 60 patients assigned to the intervention group and 60 patients to the control group. The main aim of the study was to investigate the combined effects of earplugs and eye covers with relaxing music on sleep quality, melatonin, and cortisol levels in ICU patients compared to standard care. The study found that ICU patients who received the combined intervention of earplugs, eye covers, and relaxing music experienced significantly improved sleep quality compared to those who received standard care. Additionally, patients in the intervention group showed higher levels of melatonin and lower levels of cortisol, indicating a more favorable circadian rhythm and reduced stress response. The study demonstrates that the combined intervention of earplugs, eye covers, and relaxing music is effective in improving sleep quality and regulating circadian rhythm in ICU patients. These interventions offer a promising approach to promoting better sleep and reducing stress levels in critically ill patients. Further research is warranted to explore the long-term effects and optimal implementation strategies of these interventions in the ICU setting.

In the interventional study by H. Locihová, K. Axmann, 2017 with Inclusion Criteria: Conscious patients admitted to the ICU who met certain criteria (to be specified in the study). To investigate the impact of a multicomponent sleep protocol on sleep quality in conscious patients admitted to the intensive care unit (ICU). The study found that implementing a multicomponent sleep protocol in conscious ICU patients led to significant improvements in sleep quality. Specific outcomes might include increased total sleep time, reduced sleep disruptions, improved sleep architecture, and higher patient-reported sleep satisfaction scores.

The study concluded that implementing a multicomponent sleep protocol in conscious ICU patients is effective in improving sleep quality. The findings underscore the importance of addressing sleep disturbances in the ICU environment to promote better patient outcomes and enhance overall patient experience during critical care. Further research may be warranted to explore the long-term effects and optimal implementation strategies of such protocols in different ICU settings.

H. Locihová, K. Axmann, 2017 in clinical interventional study Patients admitted to the CCU, who meet specific criteria (e.g., conscious, stable cardiac condition). to assess the impact of implementing a combination of eye covers, earplugs, and a quiet time protocol on the sleep quality. The study found that the implementation of a combined intervention consisting of eye covers, earplugs, and a quiet time protocol significantly improved the sleep quality of patients admitted to the CCU. Specific outcomes may include increased total sleep time, decreased sleep disruptions, improved sleep architecture, and higher patient-reported sleep satisfaction scores. The study concluded that the implementation of eye covers, earplugs, and a quiet time protocol in the CCU setting is effective in improving sleep quality of patients. These interventions address common environmental factors that can disrupt sleep in the hospital setting, thereby enhancing patient comfort and potentially improving clinical outcomes. Further research may be needed to explore the long-term effects and optimal implementation strategies of such interventions in other cardiac care units and healthcare settings.

Experimental or quasi-experimental study by A Babaii, M Adib-Hajbaghery, 2015.

Cardiac patients with specific characteristics were used as sample to investigate the impact of using an eye cover on the sleep quality of cardiac patients. The study likely found that using an eye cover improved the sleep quality of cardiac patients. Specific

outcomes might include increased total sleep time, decreased sleep disruptions, improved sleep architecture, and higher patient-reported sleep satisfaction scores. The study likely concluded that using an eye cover is effective in improving the sleep quality among cardiac patients. This simple intervention may help cardiac patients achieve better restorative sleep and could potentially contribute to improved recovery outcomes. Further research may be warranted to confirm these findings and explore the optimal use of eye covers in cardiac patient care.

By Stephen Risch MSN, RN, CCRN, CCNS, 2020 (RCT) ICU patients with specific characteristics were sampled to investigate the impact of non-pharmacological interventions, including the use of earplugs and eye covers, and reducing environmental factors on self-reported sleep quality in the intensive care unit (ICU). The study likely found that non-pharmacological interventions, such as using earplugs and eye covers and reducing environmental factors, significantly improved self-reported sleep quality among ICU patients. Specific outcomes might include increased total sleep time, decreased sleep disturbances, improved sleep architecture, and higher patient-reported sleep satisfaction scores. In conclusion, the study concluded that non-pharmacological interventions, such as using earplugs and eye covers and reducing environmental factors, are effective in improving self-reported sleep quality among ICU patients. These interventions address common factors that disrupt sleep in the ICU setting, thereby enhancing patient comfort and potentially improving clinical outcomes. Further research may be needed to confirm these findings and explore optimal strategies for implementing such interventions in ICU care protocols.

Finally, by MM McBroom, 2021 A quasi-experimental study Surgical ICU patients identified as being at risk for frequent awakenings, to evaluate the effect of using earplugs and eye covers on sleep quality in surgical ICU patients, who are at risk for frequent awakenings. Main result found was that the use of earplugs and eye covers improved sleep quality in surgical ICU patients. Specific outcomes might include increased total sleep time, decreased sleep disturbances, improved sleep architecture, and higher patient-reported sleep satisfaction score. The study concluded that the use of earplugs and eye covers is an effective intervention for improving sleep quality in surgical ICU patients. These simple and non-invasive interventions can help mitigate environmental disturbances and promote better restorative sleep, which may contribute to improved recovery outcomes and overall patient satisfaction. Further research may be

needed to confirm these findings and explore optimal strategies for implementing such interventions in the surgical ICU setting.

### **1.10.3 Literature Review**

Sleep disturbances are common among ICU patients due to the continuous presence of noise, light, and frequent medical interventions. These disturbances can lead to adverse outcomes such as increased stress, delayed recovery, and heightened risk of delirium. Therefore, identifying effective interventions to improve sleep quality in the ICU is crucial for patient outcomes. Research has consistently shown that the ICU environment significantly disrupts sleep patterns. Watson et al. (2022) highlighted that poor sleep quality among ICU patients is associated with negative health outcomes, including impaired immune function and prolonged hospital stays. The study emphasized on the need of interventions that can mitigate these disturbances and promote a better sleeping experience than that without.

Arttawejkul et al. (2020) eye covers and earplugs should be given to patients throughout their first five nights in critical care unit. A prospective randomized controlled experiment with seventeen patients was administered. In critical care units (CCUs), low sleep quality has been linked to unfavorable outcomes. ICU patients' sleep has been found to be disturbed by arousals brought on by excessive noise and lighting. Based on literature reviews related to patient's experiences admitted to critical units, the ICU outcomes might be negatively impacted by poor sleep quality. ICU patients' sleep is known to be disturbed by excessive noise and lighting, which awakens them. This study showed that patients hospitalized to intensive care units tend to be more active and have lower arousal indices when they use eye covers and earplugs. The negligible difference in results was most likely explained by the small sample size. For ICU patients, wrist actigraphy did not capture sleep parameters accurately.

Some research used RCSQ to assess patients' views of sleep quality (Naik et al., 2018; Simons et al., 2018), while others tried to examine patient-nurse agreement on the use of RCSQ, or the effectiveness of various strategies in relation to patients' sleep quality (Hu et al., 2015; Patel et al., 2014). Others intended to Assess translations of the RCSQ into a certain language, while few studies aimed to assess the feasibility of using RCSQ repeatedly in the ICU. All studies offered limited information on feasibility and did not examine patients' willingness to complete RCSQ on a daily basis, which is crucial for

knowing their needs. Experiences and perceptions are necessary for any development. The feasibility and Acceptability are key outcomes that should be evaluated before implementing any evaluation instrument in clinical practice.

Aitken et al., (2017) The purpose of the study was to characterize the relationship between the bedside nurse's description of the patients' sleep and the patients' self-reported assessment of their sleep in an intensive care unit. According to this study, patients slept for a median of two to three days in an intensive care unit. Low-quality sleep was highlighted by these reports. It's almost always that patients' comfort levels and the surroundings were the main sources of both obstacles and facilitators for their ability to sleep well. To help patients sleep better, interventions aimed at these characteristics ought to be put into practice.

Similarly, Bajwa, Saini, Kaur,.H, Kalra & Kaur, J, (2015) used a control and an experimental group. ICU patients frequently experienced interrupted sleep and sleep deprivation. This study's goal was to discover whether critically ill patients' sleep patterns might be altered with the use of eye covers and earplugs. Earplugs and eye covers significantly enhanced the quality of sleep for critically ill patients on all three subscales (disturbance, effectiveness, and supplementation), according to the study's findings.

A thorough examination PubMed, Web of Science, CINAHL, Cochrane Library, and EMBASE databases were funded based on selection criteria that included observational and experimental studies involving adult patients hospitalized to the critical care unit, which evaluated sleep as a consequence. 42 articles were selected with 22 influencing factors and 11 interventions were discovered. A number of individual factors contributed to the overall condition including age, comorbidities, sex, high diastolic blood pressure (DBP), low hemoglobin (Hb), low respiratory rate (RR), pain, delirium, and alcohol consumption. Based on the results, which took the following into consideration: temperature, noise level, and light level among environmental variables, we propose developing and putting into practice a variety of interventions to increase the sleep quality for individuals in critical condition (Cho & Joung, 2023).

Investigating the factors influencing the lack of A descriptive cross-sectional research study design was employed to examine the sleep patterns of patients in intensive care unit. Purposive sampling methods were used to target the population. In this study, data were gathered from patients who were conscious but not in extremely critical condition as well as patients who had recently been moved to the ward from the intensive care unit because they were critically ill there. 137 patients in the ICU were the target population. The result of the study indicated that light and noise have an impact on patients' ability to sleep. 57 patients reported difficulty falling asleep with the lights on, while 55 reported being awakened by noise. The light and commotion of the ICU annoy patients who had been admitted for longer than three days or a week. The ICU featured very high levels of light and noise. As a result, hospitals need to improve the techniques used to promote restful sleep among its patients. Noise and light elimination was necessary for a patient to heal, providing a restful sleep for them. Research indicates that these risks should be reduced by using strategies that improve patients' health and lengthen their lives (William et al., 2023).

Another study was conducted In Turkey by(Çok & Protokolünün, 2020) conscious intensive care unit patients were divided into two groups (PRE and POST groups). A total of 40 participants were divided to explore whether implementing a multicomponent sleep protocol improved the quality of sleep. Both groups objectively were measured using actigraphy, and subjectively were assessed with a questionnaire. Although the results did not support the multicomponent protocol's claim of a major impact, they did indicate that its application in clinical practice would be beneficial. Based on a subset of ICU patients, the suggested interventions could help them sleep better and feel more comfortable overall. Additionally, most of the parameters that were looked at showed that the quality of sleep both subjectively and objectively did not significantly improve after the sleep regimen was put into place (POST group).

The RCSQ, a six-chart questionnaire, was used to evaluate the patients' sleep quality. It measures the patients' depth of sleep, duration of sleep, frequency of wakefulness, length of time spent awake after waking up, and noise level in the surrounding area. The questionnaire items were analyzed using the visual analog scale approach on a chart with a range of 0 to 100. A high number indicates great sleep, while a score of "0-25" range indicates a very poor sleep. The scale's Cronbach  $\alpha$  value was discovered as 0.82.

For the purposes of the validity and reliability of investigation, patients who were still in the intensive care unit made up the sample group. In our investigation, the scale produced a Cronbach  $\alpha$  value of 0.86 (Kavaklı et al., 2023). Over the course of a month, a self-rated questionnaire\_ known as the PSQI assesses several facets of sleep quality\_ was used. It was among the most popular sleep questionnaires, which was developed by University of Pittsburgh academic personnel. Nineteen items totaling seven component scores comprised the questionnaire. The elements included duration, habitual sleep efficiency, subjective sleep quality, daytime dysfunction, and sleep delay (AbdelRazik AbdelHakim et al., 2021).

#### **1.10.4 conclusion of literature review**

The review highlights the importance of incorporating evidence-based non pharmacological interventions into ICU care protocols to effectively prevent and manage delirium. These interventions, focused on environmental modifications, cognitive support, early mobilization, sleep promotion, family involvement, and staff education, offer a holistic approach to addressing delirium in critically ill patients.

By implementing these strategies, ICUs can improve patient outcomes, reduce the length of hospital stay, and enhance the overall quality of care provided to critically ill patients.

**Table 1**

*Summary of Studies on Earplugs and Eye Covers among ICU Patients (2022-2024)*

Study	Sample Size	Intervention	Outcome Measures
Watson et al. (2022)	100	Earplugs and Eye Covers	Total Sleep Time, Sleep Efficiency
Hu et al. (2023)	150	Earplugs and Eye Covers	Sleep Quality (PSQI), Light Exposure
Xie et al. (2024)	200	Earplugs and Eye Covers	Polysomnography, Subjective Sleep Quality

### **1.10.5 Summary**

The review of the literature demonstrated that many studies were performed worldwide about the effect of earplugs and eye covers on sleep quality for ICU patients. Many studies were carried out worldwide, but few were published internationally. The lack of published studies is concerning for that there is not a single one in Palestine. Furthermore, most of the research adopted experimental studies. The previously discussed studies provide the positive effect of earplugs and eye covers on sleep quality for ICU patients. The studies reported higher levels of significance or impact on the earplugs and eye covers on sleep quality for ICU patients. On the other hand, there were few published studies which found no impact or significance in using earplugs and eye covers on sleep quality; therefore, it was also important to note that these effects need to be examined with more studies to solidify the evidence. Sleep quality is crucial for patient recovery in the Intensive Care Unit (ICU), yet it is frequently disrupted by various environmental and clinical factors. Key disruptors include high noise levels from medical equipment and staff, constant exposure to artificial light, frequent medical interventions, pain and discomfort, psychological stress, and delirium. These factors collectively contribute to fragmented and insufficient sleep, adversely affecting patients' overall health and recovery.

Recent studies (2022-2024) have explored the use of non-pharmacological interventions, specifically earplugs and eye cover, to improve sleep quality among ICU patients. These interventions aim to mitigate the impact of noise and light exposure, thereby creating a more conducive environment for sleep. The research indicates that earplugs and eye covers can significantly increase total sleep time, enhance sleep efficiency, and improve subjective sleep quality ratings. By reducing sensory disruptions, these simple, cost-effective tools help promote better sleep hygiene in the ICU.

Moreover, improved sleep quality is associated with better patient outcomes, including enhanced immune function, reduced stress, faster recovery times, and potentially lower healthcare costs due to shorter ICU stays. However, the effectiveness of these interventions can vary based on individual patient preferences and specific ICU settings. Ensuring patient comfort and compliance, alongside further research to optimize these interventions, is essential for their broader implementation.

In conclusion, addressing the sleep-disrupting factors in the ICU through interventions like earplugs and eye covers holds significant promise for improving patient recovery and well-being. Healthcare providers should consider incorporating these tools into standard ICU care practices to enhance sleep quality and support overall patient health.

## Chapter Two

### Methodology

#### 2.1 Introduction

This chapter outlines the methodology employed in the study, encompassing the study design, site, setting, population, sample size, sampling method, eligibility criteria, data collection procedure, tools utilized, ethical considerations, fieldwork preparation, and data analysis.

#### 2.2 Study Design

This was a quasi-experimental study with a pre and posttest design conducted on ICU and CCU patients.

#### 2.3 Site and Setting

The study was conducted on many sites as in the following table. The study was undertaken in the Medical and Surgical adult ICU and CCU in the north of Palestine. Palestine Ministry of Health (MOH) provides health services at different types of hospitals.

**Table 2**

*Explain the distribution sample site*

	Name of hospital	city	Number of controlled	Number of interventions	Type of hospital
1	Rafidia Hospital	Nablus	15	12	Governmental
2	Jenin Hospital	Jenin	5	20	Governmental
3	Ibn Sina Hospital	Jenin	28	2	Privet
4	An Najah National University Hospital	Nablus	2	16	Teaching
Total			50	50	

#### 2.4 Study period

Between May 2023 until the end of August 2023 for both controlled and experimental group.

## **2.5 Sample size**

The size of the study sample is an important aspect of any research study since it influences the precision of any estimates and affects the power of the study.

The sample was selected by using a convenient sampling method. Our sample size was calculated based (MOH) ministry of health statistics. The sample size with confidence 95%, error 5%, then 92 participants required, and 8 participants was added for attrition ratio, total sample (100) participants needed to collect the data. The total was divided into 50 participants for the control group and 50 for the intervention group. The data in both groups was collected pre and posttest.

## **2.6 Inclusion criteria and Exclusion criteria for sampling**

The study population was identified and recruited using standardized inclusion and exclusion criteria across both periods. These criteria were devised after reviewing prior ICU-based sleep research.

### **2.6.1 Inclusion criteria**

1. Patient who Aged 18 year or less than to 65 years.
2. patient who has spent more than twenty-four hours in the intensive care unit.
3. patients did not have a history of sleep disorder.
4. patient whose Glasgow coma scale is 14/15 and above.

### **2.6.2 Exclusion criteria**

1. patient who is on sedation.
2. patient who has visual and auditory disorders.
3. patient with severe pain (more than 4/10) and who take medication that effect on sleeping.

## **2.7 Study instruments**

This section summarizes the data collection tools and instruments deemed appropriate during pilot-testing which were then used for data collection in phase 2. It presents a description of their contents and the variables that were included, and offers justifications for each selection presented in conjunction with the core concepts of the study (sleep quality, sleep-disruptive factors, feasibility and acceptability) in order to offer a proper understanding of the instruments used for data collection.

In this study, two tools were employed that measured sleep quality using a three-section questionnaire.

### **2.7.1 Part one**

Demographic data such as age, gender, education, income, and ethnicity.

The researcher devised a data collecting sheet to gather demographic and clinical information. The variables on this data collection form are explained in depth in the following paragraphs. These Variables were collected using guidelines from the literature review, which demonstrated certain variables with great clarity related to sleep quality among intensive care unit patients. It seems reasonable to collect and assess data on these variables in relation to patients' reported sleep quality.

The demographic and clinical characteristics data collecting sheet included the following information about patient characteristics; namely: age, gender, ICU entrance diagnosis, illness severity, length of stay, and mechanical ventilation status. It also included medications used during the trial, as well as earlier sedative treatments. All of these characteristics were taken into consideration as intrinsic characteristics relating to the patient, which may be correlated with Sleep Quality.

### **2.7.2 Part two**

The RCSQ (Richards-Campbell Sleep Questionnaire) was developed by Jill M. Richards and Mary Jo Grap in 2001 (Richards & O'Sullivan, 2000). It was designed specifically to assess sleep quality for critically ill patients in intensive care units (ICUs). The questionnaire evaluates various aspects of sleep including sleep depth, continuity, latency, and perceived sleep quality. Since its development, the RCSQ has been widely used in research studies and clinical settings to assess and monitor sleep

process for ICU patients. The Arabic version of the Richards Campbell Sleep Questionnaire (RCSQ) was utilized to evaluate the quality of sleep in a 24-hour period for patients in the intensive care unit. It is based on a five-item self-report questionnaire used to evaluate perceived depth of sleep, sleep latency (the amount of time it takes to fall asleep), the frequency of awakenings, and the efficiency and quality of sleep (Kavaklı et al., 2023). An analog visual scale with a range of 100mm to 0mm was used to score each item in the RCSQ where a greater number indicated better sleep, and a lower number indicated worse sleep. This tool was validated as well as translated to Arabic version (Al-Sulami, 2020). Cronbach's alpha of (0.923) (Kim et al., 2020).

### **2.7.3 Part three**

The Pittsburgh Sleep Quality Questionnaire (PSQ) is a widely used instrument for assessing sleep quality. It was developed by Dr. Daniel J. Buysse, a professor of psychiatry at the University of Pittsburgh School of Medicine, along with his colleagues (Buysse et al., 1989). This is a tool for evaluating the quality of sleep for patient during the last 30 days. The total score is based on seven components and 19 individual elements, which make up the assessment. Each component is scored on a scale of 0 to 3, with 3 indicating the greatest dysfunction. The scores from each component are then summed to obtain a global score, which ranges from 0 to 21. Higher scores indicate poorer sleep quality.

Here's a brief overview of how each component is scored:

#### 1. Subjective Sleep Quality:

- Very good = 0
- Fairly good = 1
- Fairly bad = 2
- Very bad = 3

#### 2. Sleep Latency:

- $\leq 15$  minutes = 0

- 16-30 minutes = 1

- 31-60 minutes = 2

- 60 minutes = 3

3. Sleep Duration:

- 7 hours = 0

- 6-7 hours = 1

- 5-6 hours = 2

- < 5 hours = 3

4. Sleep Efficiency:

- 85% = 0

- 75-84% = 1

- 65-74% = 2

- < 65% = 3

5. Sleep Disturbances:

- None = 0

- < 1 time a week = 1

- 1-2 times a week = 2

- 3 times a week = 3

6. Use of Sleep Medication:

- None = 0

- < 1 time a week = 1

- 1-2 times a week = 2
- 3 times a week = 3

#### 7. Daytime Dysfunction:

- No = 0
- Mild = 1
- Moderate = 2
- Severe = 3

The sum of the scores from these seven components yields the total PSQI score, with higher scores indicating poorer sleep quality (Viljoen, M., Claassen, N., & Schellack, N. 2019).

This tool was validated and translated to Arabic version (Al Maqbali et al., 2020). The 19 self-reported items in the questionnaire fall into one of seven categories: subjective impression of sleep, sleep delay, length of sleep, habitual sleep efficiency, disruptions in sleep, usage of sleeping pills, and dysfunction during the day. For clinical purposes, five more unscored questions are provided, which are judged by the respondent's bed partner or companion (Shahid et al., 2012). This tool was validated and translated to Arabic version (Al Maqbali et al., 2020) Cronbach's alpha of (.83).

## **2.8 Intervention**

### **2.8.1 Experimental Group**

Once the researcher has received IRP approval and official approval from the study settings' authorized staff, a thorough explanation of the nature, significance, phases, and anticipated results of the study will be provided. The fieldwork was done during a three-month period, from May, 2023 until the end of August. Two to three days a week, during the morning and evening shifts at Jenin Hospital and Ibn Sina Hospital, and morning shift at Rafidia Hospital and alnajah hospital. we were at the study locations. And visited ICUs and CCUs one day prior to the start of the study there. Started to introduce our self to the head nurse and manager, discussed the visit's goal, and provided a brief explanation of the study's nature and anticipated results.

Introduced to nurses and gave them a complete outline about the study and its aim. The questionnaire was distributed to the nurses participating in the study and their approval was obtained. with experience more than 3 month working in ICUs or more, nurses were eligible to participate. Before starting to answer with patients, all the details about the questionnaire and its parts were explained. It includes three parts. Then each nurse began to answer the questions alone.

It was explained to participants in advance that there is a paper that the researcher will fill out himself, and was approval obtained from every hospital, every Matron, every head nurse, and approval from every nurse. It was agreed upon when filling out the paper that the participant would not be aware that the researcher was observing him when he works with the patient. we made sure that all nurses and patients fully understood the procedure.

We conducted an experiment in ICU, where provided patients with earplugs and eye masks to wear from 11 pm to 5 am in order to assess their impact on sleep quality. This intervention was aimed at addressing the common issue of disturbed sleep and sleep deprivation in the ICU environment. By observing patients throughout the night, we aimed to evaluate the efficacy of using earplugs and eye masks in improving sleep quality for ICU patients. we contacted with nurses to be aware of any change in the patient's condition or any new admission. defended (Intervention) group and we did a pre and post sleeping test. No action was taken without patients' consent. Used this kit before and after patient going to sleep. Following the sleep time, we used the same earplug and eye mask cotton 100% with comfortable feeling to patient to feel relaxation. Patients in the intervention group were tried with both questionnaire (PSQ) and (RCSQ) to evaluated the level of comfortability and quality by using eye masks and earplugs during sleeping time. The bedside night nurses helped the patient put on earplugs and eye masks and give medication and any procedure before going to sleep to take a true result. There was no need to re-direct questions to the patient posttest because there was no effect on the analytical result. Same method was used on both groups (Interventional and controlled). This scale is used in Arabic language.

The second scale used a translated scale (RCSQ) that's questionnaire twice in the pre and posttest by Arabic language related to dominant language in Palestine. We contacted the author in previous study and took approval to use the Scale in Arabic.

### **2.8.2 Control Group**

This group includes patients who have not used the sleeping kit (eye mask and earplugs). To be sure to take a PSQ questionnaire once and before RCSQ during the sleeping hours, patients did not use the kit in this group. Nurses created a calm environment and closed the door if needed, decreased the volume of machines, and decreased the level of light. Same questionnaire pre- and post-sleep for RCSQ without being re-assessed by PSQ were applied. Patients were notified about the side effects of sleep disturbances so they can try sleep in an ICU environment.

### **2.9 Data Collection**

Every day that a patient was admitted to the intensive care unit, data was gathered. This meant that information was gathered from each patient at the time of enrollment and every day that they were there.

The study was approved to be conducted in the reputable hospital's surroundings after receiving ethical approval. Patients were then approached. After being screened to see if patients fit the inclusion or exclusion criteria, each one was asked to sign a consent and then provide information about the study.

We used the questionnaire to define what factors affected ICUs patient. Next, we started to distribute a questionnaire to our sample that's included in our study. I used the earplugs and eye mask to enhance sleep quality, and try to prevent of all side effect of sleep disturbances for patients.

This research used control and interventional groups to confirm the aims of the study and resolve the problems. Each patient admitted to ICU or CCU among which met inclusion criteria will sign an informed consent. This research used the instrument to evaluate the effect of earplugs and eye masks on sleep quality for ICU patients\_ it was RCSQ as a tool pre and post and PSQ pretest just for both groups.

The first instrument was a PSQ that was used for both groups once just pretest that's related to this tool refer to sleep quality before one month .The Pittsburgh Sleep Quality Index (PSQI) is one of the most popular tools for assessing sleep quality in both clinical and nonclinical populations .The 19 items on the scale, which may be finished in five to ten minutes, are simple to comprehend and divided into seven subscales: subjective

sleep quality, habitual sleep efficiency, sleep latency, length, and so on sleep disorders, drug use for sleep, and malfunction during the day. Three groups were evaluated for their quality of sleep using the original PSQI: a healthy sample, patients with depression, and people with sleep problems. Test-retest reliability and validity of the instrument were good (Al Maqbali et al., 2020). This tool was validated and reliable, as well as, translated to Arabic version.

The second tool RCSQ was created to be used in (ICUs) and validated used methods that usually take place overnight. The RCSQ is a point measurement that was made following a night of sleep. The RCSQ used questionnaires for sleep evaluation and was recommended to assess the patient's perception of sleep quality. This questionnaire had five items. Each item in the RCSQ was scored on a visual analog scale which ranges from 100mm to 0mm, with the higher number representing better sleep and the lower number representing poorer sleep. This tool was validated and deemed reliable, as well as, translated to Arabic version. (Al-Sulami, 2020). This tool was validated deemed reliable with used Cronbach's alpha of (0.923) (Kim et al., 2020).

After obtaining approval from respected hospitals to start the study, the first step was to organize meeting with nurses in ICU and CCU departments, in particular senior shift. We gave them the questionnaire and explained the procedure, after their consent was given.

I approached the patients and explained the study for them in order to get their approval to join the study. Information was given for patients about the study and its aims and the importance of sleep in ICU. For controlled group and interventional group, I should explain all of this instruction. For intervention group, I started PSQ questionnaire and then asked patient by RCSQ before and after pot sleeping kit. Applying earplug and eye mask on bedtime (11:30 pm to 5:30 am), and by that time all applied medication and any other procedure or lab test should be performed before bedtime in order to apply the kit and provide comfort area for patients. Patients were allowed to take off their earplugs and eye masks for no more than ten minutes However, if there is any urgent procedure or any new event on patient or new time medication, patients can remove the sleeping kit 5-10 minutes.

We collected the ICU environment problems and defined the resolving of problem by less of side effect and complication. We defined the tools (RCSQ) by questionnaire to patient before and after using the sleeping kit. We defined the quality of sleep effect on patient physiology and psychology effects. We defined we have both groups (Intervention and controlled), and we did pre and post sleep test. I did a PSQ one time.

**Figure 2**

Shows the procedure for data collection, and the following paragraphs provide more details of this data collection procedure, particularly with regard to the times of collecting each variable

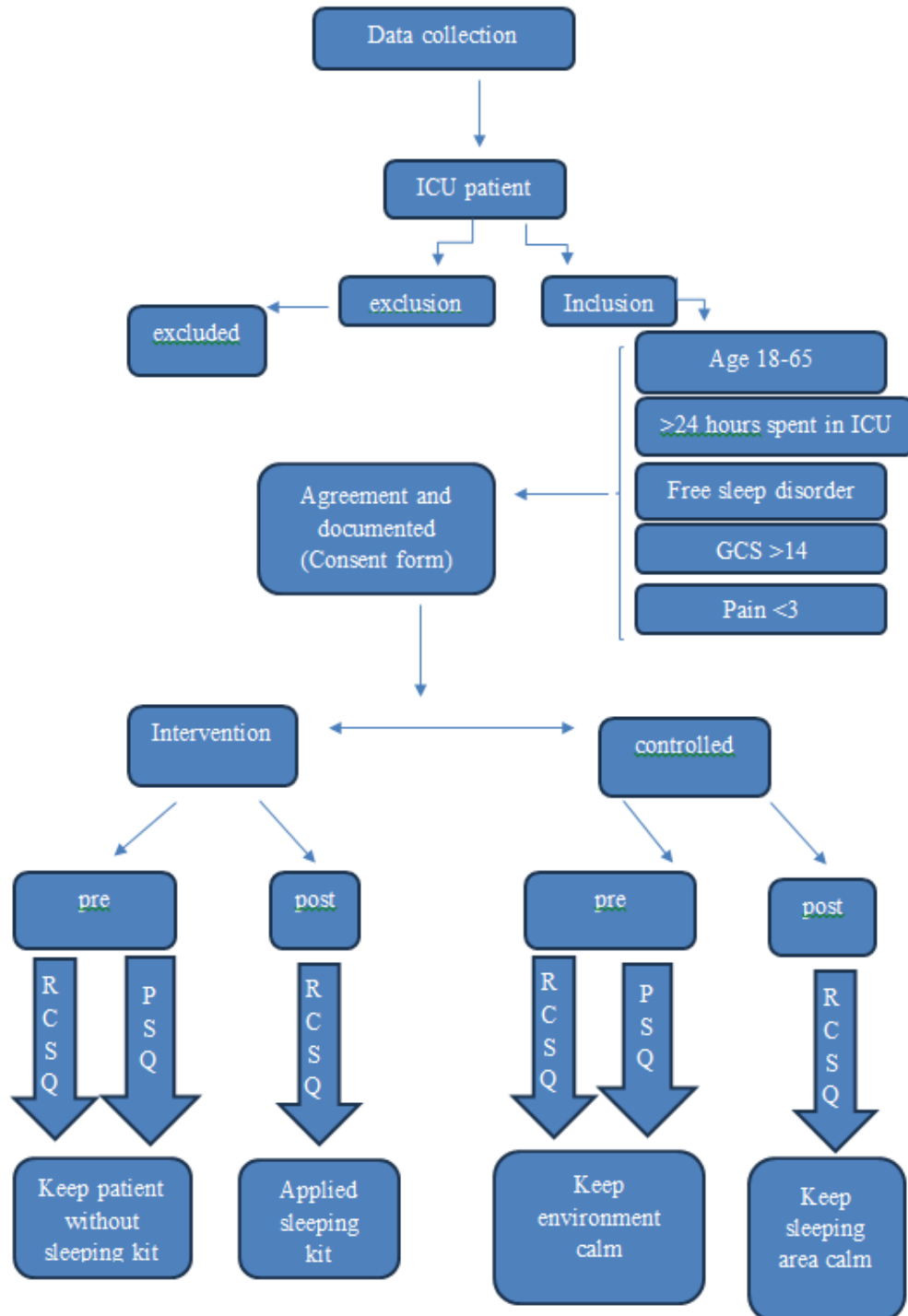


Figure 2 show the process of data collection

## **2.10 Ethical considerations**

The Institutional Review Board (IRB) of an Najah National University granted ethical approval. Once the IRB approved the study, it was approved again to be conducted at reputable hospitals. When the research was conducted at the hospitals, patients who satisfied the inclusion criteria and consented to participate were asked to sign a consent form. Patients were free to take part in the trial and might leave at any time without facing any repercussions. There was assurance of confidentiality, all data collected will be used for research, and patients will not suffer any harm.

## **2.11 Statistical Analysis Methods**

Version 25 of SPSS was used for statistical analysis. The features of the subjects were summed together using appropriate descriptive statistics. Using Skewness and Kurtosis values as well as the Kolmogorov-Smirnov test, the normalcy of the outcome distribution was assessed.  $P < .05$  was the threshold at which significance was assessed.

During the pre-test and post-test research periods, the Generalized Estimating Equations (GEE) model was employed to evaluate any discernible variations in the outcome variables between the intervention and control groups.

Sub-group, when comparing the mean scores of the baseline and posttest at different time points between the groups, the Mann-Whitney U test was employed. In addition, analyses using the Wilcoxon signed-rank test were used to assess any differences between the mean scores of the tests within the corresponding control and intervention groups.

## Chapter Three

### Result

The primary objective of this study was to assess the impact of earplugs and eye covers on sleep quality among ICU patients. Given the challenging environment of the ICU, characterized by high noise levels, constant light exposure, frequent medical interventions, and the psychological stress of severe illness, it was hypothesized that these simple non-pharmacological interventions could significantly improve various aspects of sleep.

To investigate this hypothesis, several key outcome measures were evaluated:

1. **Total Sleep Time:** The total amount of sleep achieved by ICU patients with and without the use of earplugs and eye covers.
2. **Sleep Efficiency:** The proportion of time spent in bed that patients actually spent sleeping, indicating how effectively they utilized their time for sleep.
3. **Subjective Sleep Quality:** Patients' own assessments of their sleep quality, providing insight into their personal experiences and perceptions of sleep.
4. **Reduction in Sensory Disruptions:** Measurements of ambient noise levels and light exposure, to determine how effectively earplugs and eye covers minimized these environmental factors.

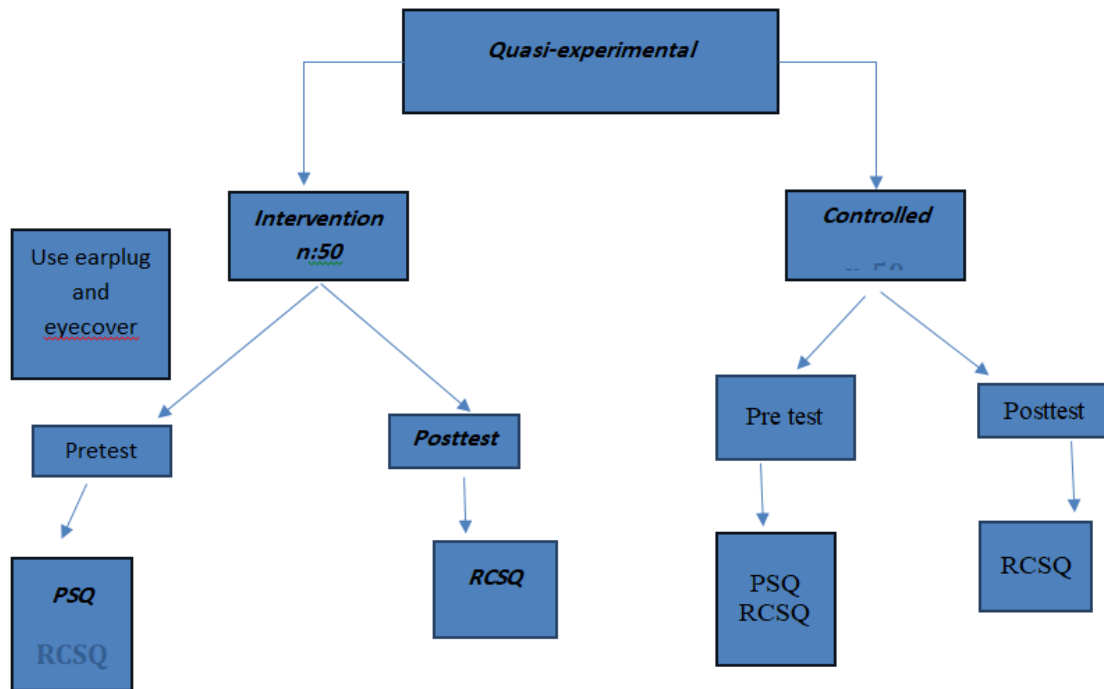
The results section will present data from studies conducted before 2024 offering a comprehensive analysis of how earplugs and eye covers influence sleep quality in the ICU setting. This analysis includes quantitative metrics such as total sleep time and sleep efficiency, as well as qualitative assessments of subjective sleep quality. The findings are critical for understanding the potential benefits of these interventions and for developing evidence-based practices to enhance sleep and recovery in ICU patients.

Based on the computation of sample size, 100 nurses were needed for every research group. A total of 100 nurses were approached for recruitment to the study. Fifty patients participated in the intervention group, finished the intervention, and completed the baseline questionnaires. At posttest, all of them again filled in the questionnaires. For

the control group, 50 patients filled in the questionnaires at baseline and posttest. Figure one shows participant inclusion, group assignment, and post-test following CONSORT principles.

**Figure 3**

Flow chart of the study



### 3.1 Patients' demographic characteristics

The study included 100 patients (intervention = 50; control = 50). The mean age of the sample was  $51 \pm 18.1$ , more than half were males (67%), about 40% of patients had school education, half of them were unemployed, about 24 % had orthopedic disorder followed by cardiovascular disorder (22%). Regarding past medical history; 17% had DM and 15% had HTN. More than half (63%) reported that they have a history of sleeping difficulty, around two-thirds (71%) had sleeping problems, and 72% reported that they have noisy environment affecting their sleep.

Both study groups, intervention and control, were comparable at baseline. Age, gender, education level, GCS, length of stay in the hospital, prior medical history, and present diagnosis did not significantly differ from one another. ( $P > 0.05$ ). However, employment showed statistically significant difference at baseline between control and

intervention groups,  $\chi^2(2) = 9.665$ ,  $p = .008$ , with a mean rank RCSQ score of 41.23 for student, 44.81 for unemployed and 63.24 for freelance group. The findings related to patients' demographic analysis are shown in Table 2.

**Table 3***Profile of demographic characteristics of the participants by group at baseline*

<i>Demographics</i>	<i>Control</i>		<i>Intervention</i>		<i>n</i>	<i>U/K-W</i>	<i>p</i>
	<i>n = 50</i>	<i>n = 50</i>	<i>n = 50</i>	<i>n = 50</i>			
	<i>Mean</i>	<i>(SD)/</i>	<i>Mean</i>	<i>(SD)/</i>			
	<i>No. (%)</i>		<i>No. (%)</i>			<i>H</i>	
<i>Age</i>	<i>50 ± 17.69</i>		<i>52.16 ± 18.61</i>				
<i>Gender</i>						<i>908.5</i>	<i>.148</i>
<i>Male</i>	<i>33 (66)</i>		<i>34 (68)</i>				
<i>Female</i>	<i>17 (34)</i>		<i>16 (32)</i>				
<i>Education level</i>						<i>0.149</i>	<i>.928</i>
<i>School education</i>	<i>19 (38)</i>		<i>21 (42)</i>				
<i>University education</i>	<i>11 (22)</i>		<i>12 (24)</i>				
<i>Uneducated</i>	<i>20 (40)</i>		<i>17 (34)</i>				
<i>Staying hospital</i>						<i>4.378</i>	<i>.223</i>
<i>ISH</i>	<i>29 (58)</i>		<i>2 (4)</i>				
<i>Rafedia Hospital</i>	<i>16 (32)</i>		<i>11 (22)</i>				
<i>Jenin Hospital</i>	<i>5 (10)</i>		<i>21 (42)</i>				
<i>NNUH</i>	<i>-</i>		<i>16 (32)</i>				
<i>Employment</i>						<i>9.665</i>	<i>.008</i>
<i>Student</i>	<i>6 (12)</i>		<i>5 (10)</i>				
<i>Unemployed</i>	<i>30 (60)</i>		<i>26 (52)</i>				
<i>Freelance</i>	<i>14 (28)</i>		<i>19 (38)</i>				
<i>Current medical diagnosis</i>						<i>4.787</i>	<i>.780</i>
<i>Respiratory disorder</i>	<i>4 (8)</i>		<i>4 (8)</i>				
<i>Cardiovascular disorder</i>	<i>17 (34)</i>		<i>5 (10)</i>				
<i>Neuro disorder</i>	<i>6 (12)</i>		<i>8 (16)</i>				
<i>Orthopedic disorder</i>	<i>9 (18)</i>		<i>15 (30)</i>				
<i>Abdominal surgery</i>	<i>2 (4)</i>		<i>6 (12)</i>				
<i>DKA</i>	<i>3 (6)</i>		<i>2 (4)</i>				
<i>Sepsis or infection</i>	<i>4 (8)</i>		<i>8 (16)</i>				
<i>Bleeding</i>	<i>2 (4)</i>		<i>2 (4)</i>				
<i>Past medical history</i>						<i>8.135</i>	<i>.228</i>
<i>Free</i>	<i>20 (40)</i>		<i>26 (52)</i>				
<i>DM</i>	<i>11 (22)</i>		<i>6 (12)</i>				
<i>HTN</i>	<i>9 (18)</i>		<i>6 (12)</i>				
<i>Cardia Cath</i>	<i>3 (6)</i>		<i>4 (8)</i>				
<i>COPD</i>	<i>3 (6)</i>		<i>2 (4)</i>				
<i>Anemia</i>	<i>2 (4)</i>		<i>3 (6)</i>				
<i>Renal failure</i>	<i>2 (4)</i>		<i>3 (6)</i>				
<i>History of difficulty sleeping</i>						<i>1116</i>	<i>.723</i>
<i>Yes</i>	<i>26 (58)</i>		<i>34 (68)</i>				
<i>No</i>	<i>21 (42)</i>		<i>16 (32)</i>				
<i>Having sleeping problem</i>						<i>811.5</i>	<i>.097</i>
<i>Yes</i>	<i>40 (80)</i>		<i>31 (62)</i>				
<i>No</i>	<i>10 (20)</i>		<i>19 (38)</i>				
<i>Having noisy environment affect the sleep</i>						<i>776</i>	<i>.075</i>
<i>Yes</i>	<i>39 (78)</i>		<i>33 (66)</i>				
<i>No</i>	<i>11 (22)</i>		<i>17 (34)</i>				

### 3.2 Perception of sleep quality

Sleep quality was evaluated using PSQI only at baseline to evaluate patients sleep quality in both groups at the last month. In the control group 72% of patients reported poor sleep quality, similarly in the intervention group where about 70% reported poor sleep quality.

When comparing the scores of sleep quality domains and overall PSQI, Mann-Whitney test did not show any significant difference between sleep quality and both groups ( $p > 0.05$ ) at baseline. The control group scored higher on measures including duration of sleep, sleep disruption, daytime dysfunction brought on by drowsiness, efficiency of sleep, overall quality of sleep, and requirement for medication to fall asleep, whereas sleep latency was higher in the intervention group (Table 3). The aforementioned comparison indicates that control group had higher tended to poor sleep quality.

**Table 4**

*Sleep quality domains in both groups at the baseline*

Domain	Control Mean (SD)	Intervention Mean (SD)
Duration of sleep	0.38 (0.73)	0.30 (0.61)
Sleep disturbance	1.64 (0.66)	1.54 (0.61)
Sleep latency	1.06 (0.71)	1.14 (0.67)
Day dysfunction due to sleepiness	1.54 (0.95)	1.44 (0.88)
Sleep efficiency	0.71 (1.11)	0.43 (0.88)
Overall sleep quality	1.20 (1.07)	1.02 (0.82)
Need medications to sleep	1.38 (1.03)	1.14 (0.95)

The findings showed a substantial difference between the PSQI and having trouble falling asleep, in which 'Yes' answer had higher mean rank (Yes = 54.08, No = 40.76) ,  $U = 805$ ,  $p = 0.023$ . Similarly, there was a significant difference between the PSQI and having a sleep problem in which 'Yes' answer had higher men rank (Yes = 53.67, No = 37.5),  $U = 644$ ,  $p = 0.010$ .

### 3.3 Overall perception of sleep

In order to determine if the control and experiment groups' perceptions of sleep (RCSQ) changed differently during the pre-test and post-test study periods (group and time interaction effect), we ran a Generalized Estimating Equations (GEE) model.

GEE estimates of adjusted mean  $\pm$  standard error (SE) of perception of sleep for the two study periods among intervention and control groups was 272.8, SE = 17.55, 95% CI 238.4-307.2 for the intervention group and for the control group the adjusted mean was 258.07, standard error 19.1, 95% CI 220.63-295.51.

The Fit's Quality revealed that Corrected Quasi Likelihood under Independence Model Criterion (QICC) was 4871423.52 when the Working Correlation Matrix Structure was AR (1). The QICC was 4871423.5 for Independent Working Correlation Matrix Structure. The QICC for the Independent model is smaller than QICC of AR (1) model, thus the model of independent structure will be considered.

The RCSQ  $\times$  time effect indicated a significant association between group and change in RCSQ over time ( $p = 0.000$ ). The perception of sleep differs significantly between the control and experimental groups (OR = 447.7, 95% CI 348.73-546.68,  $p = 0.000$ ). The perception of sleep differs significantly between the control and experimental groups across baseline and post-test ( $p = 0.006$ ).

The Mann-Whitney, the results of the test indicated that perceptions of nocturnal noise, perceived sleep quality, depth, latency, efficiency, and overall perception of sleep in the intervention group were significantly higher than that in the control group ( $p < 0.05$ ). However, number of awakenings were higher in the intervention group but not significant ( $p > 0.05$ ) (Table 3). In the intervention group, the total score of RCSQ before the intervention was  $278 \pm 177.14$  and after the intervention it increased to  $351.8 \pm 147$ . All domains of RCSQ were increased after the intervention.

**Table 5**

*Descriptive statistics of sleep scores by group at baseline*

Outcome variable	Control	Intervention	U	P
	Mean (SD)	Mean (SD)		
Depth	43.80 (31.80)	55.40 (25.17)	1019.5	.026
Latency (time to fall asleep)	47.20 (30.90)	56.80 (25.59)	1064	.046
Number of awakenings	46.60 (29.93)	58.80 (26.39)	996.5	.094
Efficiency (percent of time awake)	47.60 (29.94)	59.60 (26.41)	995.5	.033
Perceived quality	46.60 (30.61)	59.60 (27.91)	979	.036
Perceived nighttime noise	46.20 (30.69)	61.60 (26.60)	917	.029
Overall perception of sleep (RCSQ)	278 (177.14)	351.8 (147)	987	.009

In the intervention group, there was an increase in sleep perception and all related domains. At baseline, the overall sleep perception was  $218.4 \pm 173.97$  and after the intervention increased to  $351.8 \pm 147.02$  (Table 4). A Wilcoxon signed-rank test showed that there was a statistically significant change in the perception of sleep ( $Z = -6.156$ ,  $p = 0.000$ ) in the intervention group. All perception sleep domains showed statistically significant difference from pre-intervention to post-intervention in the intervention group ( $p < 0.05$ ).

For the control group, the score of overall perception of sleep before the intervention ( $279.60 \pm 183.86$ ) and after the intervention ( $278 \pm 177.14$ ) showed a statistically significant difference ( $p = 0.000$ ). This increase may indicate that those patients decreased their perception as they are hospitalized. Additionally, Following the intervention, the control group's mean rank was lower than that of the intervention. Groups' mean rank = 45.24, versus 55.76, and this difference was statistically significant. ( $p < 0.05$ ).

After the intervention, there was a significant difference between the groups in number of awakenings, sleep efficiency, perceived nighttime noise as revealed by the Mann-Whitney Test. Other domains were not statistically different.

**Table 6**

*Comparison of scores of sleep perception domains of the intervention group before and after the intervention*

Outcome variable	Pre- Intervention	Post- Intervention	Z	P
	Mean (SD)	Mean (SD)		
Depth	35.40 (30.12)	55.40 (25.17)	-3.300	.001
Latency (time to fall asleep)	36.40 (29.54)	56.80 (25.29)	-3.196	.001
Number of awakenings	36.40 (29.19)	58.80 (26.59)	-3.392	.001
Efficiency (percent of time awake)	37.40 (29.68)	59.60 (26.42)	-3.163	.002
Perceived quality	37 (30.66)	59.60 (27.91)	-3.117	.002
Perceived nighttime noise	35.80 (30.44)	61.60 (26.60)	-3.177	.001
Overall perception of sleep (RCSQ)	218.4 (173.97)	351.8 (147.02)	-6.156	.000

When comparing scores obtained before and after the intervention, a Wilcoxon signed-rank test showed that the used intervention elicits a statistically significant change in the perception of sleep ( $Z = -8.658$ ,  $p = 0.000$ ). As mean score of overall perception of sleep increased from  $249 \pm 180$  before the intervention to  $314 \pm 166.15$  after the intervention (Table 5). Furthermore, all perception sleep domains showed statistically significant difference from pre-intervention to post-intervention ( $p < 0.05$ ).

**Table 7**

*Comparison of scores of sleep perception domains of both groups before and after the intervention*

Outcome variable	Pre- Intervention	Post-Intervention	Z	P
	Mean (SD)	Mean (SD)		
Depth	39.60 (31.46)	49.60 (29.13)	-2.202	.028
Latency (time to fall asleep)	41.70 (31.14)	52 (28.64)	-2.296	.022
Number of awakenings	41.60 (30.21)	52.70 (28.74)	-2.435	.015
Efficiency (percent of time awake)	42.80 (30.42)	53.60 (28.69)	-2.287	.022
Perceived quality	41.70 (31.34)	53.10 (29.87)	-2.264	.024
Perceived nighttime noise	41.60 (31.87)	53.90 (29.61)	-2.484	.013
Overall perception of sleep (RCSQ)	249 (180.66)	314.9 (166.15)	-8.658	.000

## Chapter Four

### Discussion

#### 4.1 Introduction

This chapter provides a broad overview of the study's main conclusions in connection to the research topics, enabling discussion of the findings in light of earlier research, which aids in determining the advantages and disadvantages of the study.

#### 4.2 Discussion of the Results

These results indicated a significant influence of eye covers and earplugs on ICU patients' sleep quality, which demonstrated a statistical significance. The current study found that the patients' sleep quality was comparatively poor prior to their admission to the intensive care unit. Earplugs and eye cover help create a quieter and darker environment, reducing sensory disruptions that are common in the ICU. Hu et al. (2023) demonstrated that these interventions significantly improved total sleep time and sleep efficiency among ICU patients. Similarly, Xie et al. (2024) found that these tools not only enhanced objective sleep measures but also improved subjective sleep quality assessments. These findings are consistent with the mechanisms by which these devices operate—minimizing noise and light, which are major contributors to sleep disturbances in the ICU.

In order to address the research issues, prospective repeated evaluations were used in this study after taking into account the characteristics of the method and receiving direction from the literature review. This was especially relevant to the third study question, which examined the viability and acceptability of applying the RCSQ, a self-reported sleep assessment tool, over several consecutive days as opposed to a single evaluation (Aitken et al., 2017; Kamdar et al.,).

The research revealed a significant difference between the mean sleep scores obtained before and after the test, suggesting that those patients' perceptions decreased while in the hospital. Moreover, the intervention group's mean rank for overall sleep perception was greater than that of the control group. Additionally, the groups' perceptions of nocturnal noise differed significantly from one another. Sleep efficiency and the frequency of awakenings were supported by many previous studies where some of

which had to evaluate how earplugs and eye covers affect the quality of sleep. Participants reported a higher quality sleep when they wore the sleeping devices. scales show that following the intervention, there was a decrease in sleep disruption, an improvement in sleep efficacy. It demonstrates that the experimental group's sleep quality was significantly improved when compared to the control group (Obanor et al., 2021).

A notable distinction in the quality of sleep before and after in another study (Rahmanti & Mulianda, 2022) suggested that nurses educate patients about sleep hygiene and provide them a sleeping kit (mask and earplugs) in order to monitor these aspects, assisting patients in getting a good night's rest. Furthermore, lowering anxiety and stress is essential for improved management since people who can manage their stress better tend to be more resourceful, which is why our study revealed that using this sleeping kit will help us achieve our goal. Nurses will make an effort to provide a restful atmosphere for the patients, which might have had an impact on the outcomes and could help to explain there was an improvement in the quality of sleep (Aitken et al., 2017; Nydahl et al., 2018). This, as said in this study, was through nurses providing the appropriate atmosphere to achieve calmness for patients and conduct research.

In most clinical nursing settings, observational research is beneficial because it enables nurses to learn more about their patients through observation of symptoms or indicators like patient self-reports. (Polit and Beck, 2014; Parahoo, 2014). The process of observational assessment is Mostly interested in "what is," descriptive approaches typically employ reliable, well-crafted questionnaires with quantitative scales. quantify and gather informational data regarding topics of interest in such nursing and experimental studies (Grove and Gray, 2014).

Lack of deep sleep was found the most common sleep problem for ICU patients, in this study and the majority of the previously introduced studies, despite the large variation in reported values of all sleep components from the patients' perspective between studies. Because they miss out on the most crucial part of sleep, ICU patients seem to be more vulnerable to negative effects from poor sleep quality\_ deep sleep (Delaney et al., 2015; Pisani et al., 2015).

There were many studies that confirmed what's concluded in this research\_ many patients in intensive care departments suffer from the same issue: lack of deep sleep.

Stress levels in both psychologically and physiologically can be affected by noise, which affects heart and muscles (Rahmanti & Mulianda, 2022).

Prior to being admitted to the intensive care unit, patients experienced a notable decline in the quality of sleep as a major proportion of patients reported experiencing bad sleep. This drop was noticeable in the majority of sleep-related areas as well as the overall sleep quality score. The prior study also found similar results regarding these patients' sleep quality after being exposed to noise, stress, anxiety, and exhaustion. Anxiety, stress, and dread were indicated as prevalent causes of poor sleep in the study (Bihari et al., 2012). Moreover, patients who stayed one or two nights in the hospital had significantly higher sleep disorder scores due to the previously mentioned factors.

Emotional factors that impair a person's ability to fall asleep include tension, anxiety, and dread. The participants in this study reported high sleep efficiency and a good overall sleep quality. Earplugs and eye covers were hallmarks of their sleep habits.

Patients typically fall asleep quickly and go back to sleep after waking up. These outcomes align with the previously published research findings in ICU patient populations (Puchlopek, 2022). Since the majority of earlier studies only assessed sleep for one night, the method of measuring sleep quality could account for similarities in the results.

There have been many prior studies that used repeated assessment methods to evaluate the patients' sleep quality, and used the earplug and eye covers to study effective sleeping of patients by eliminating lights by eye covers and decreasing sound level and noise by earplugs. There are many previous studies in different cities that proved the positive use of sleeping kit, Richard Campbell's. Well-known sleep efficiency scale was used in some studies and combined with another scale to give more accurate assessment (Al-Sulami, 2020; Menear et al., 2017). Additionally, compared to the current study, these studies' self-reports scores were higher (Aitken et al., 2017; Kamdar et al., 2012).

There were notable differences between prior studies and the current investigation. Only non-intubated individuals were included in some of the investigations while only seven patients were intubated in the other research. Besides, the majority of patients were not intubated (Menear et al., 2017). A recent study found multiple factors that impair sleep. Patients evaluated noise as one of the main extrinsic variables contributing to significant levels of sleep disruption. This finding was consistent with other research that evaluated patients' impressions of the factors preventing them from sleeping. Moreover, those studies found that participants evaluated noise disturbances as the biggest cause of sleep disruption. By (Al-Sulami, 2020; Bihari et al., 2012). Further study supported the finding of this study and another unmentioned hereof study.

This study DeViva, McCarthy, Southwick, Tsai & Pietrzak, (2021), no significant link was identified between sleep quality scores and Post Traumatic Stress Disorder (PTSD) ratings discovered in the previous month, which explains the given results because patients did not use the sleeping kit in the previous month. These results are natural\_ helped me as a researcher to easily identify those who have a sleeping disorder before trying the sleeping kit.

Furthermore, there are cultural and ICU environment differences between prior studies and the current investigation, with earlier studies conducted in ICU settings that might have higher awareness of or criteria for patients' sleep quality. locally created rules for encouraging sleep were in practice. Meaner et al. (2017) and Kamdar et al. (2022) carried out the studies.

The results of the current study showing that each participant had low quality sleep may therefore demonstrate the subpar ICU setting since official policies were absent for the quality of patients' sleep at the hospital that served as the study's setting. Chen and colleagues, 2017; Aitken et al., Menear et al. (2017), Krotsetis et al. (2017), Simons et al. (2018).

While inadequate sleep quality may be the cause of daytime sleep, it may also be one of the factors causing inadequate sleep quality (Elliot et al.,2023). Within the ICU setting of this investigation, the windows in the rooms for ICU patients were quite tiny, and no effort was made to set up a light schedule to distinguish between day and night. This might have an impact on Patients' drowsiness during the day, which may be related to

the quality of their sleep. Natural light can assist in preserving or reestablishing the circadian rhythms at night. through encouraging sleep at night and helping with daytime awakening (Ohayon et al., 2017). Consequently, one element that could correlate, as this study's data shows, with patients' sleep quality.

There's a shared negative result with a previous study that a significant prospective observation research can eliminate the bias that can occur in retrospective investigations. Moreover, the PSQI, which has an 89.6% sensitivity and an 86.5% specificity for evaluating sleep quality, was utilized to evaluate the preoperative sleep quality of the patients. It may look at respiratory problems, depression, and anxiety-related to sleep irregularities, as well as thoroughly and accurately identify sleep conditions (Pace-Schott et al., 2015). Moreover, it studied the impact of preoperative sleep disturbances on delirium of sixty-year patients and/or older undergoing proximal femoral surgery (Han et al., 2023).

The results of this study are congruent with those of previous ICU-based sleep studies despite minor differences in reported sleep quality values and causes of sleep disruption. Prior studies have revealed that patients in intensive care units (ICUs) experience low quality sleep due to many factors including but not limited to clinical, environmental, and demographic. These patients also use sleeping kits to aid in their sleep.

### **4.3 Recommendation**

This research is one of the few research projects examining the effects of earplugs and eye covers on sleep deprivation and vital signs in intensive care unit patients. Alternative nursing strategies should be used in all ICUs to improve patients' sleep quality. Our main focus was not on other clinical outcomes. Further research is needed to assess how non-pharmacological intervention affects bio-physiological indicators, delirium, long-term cognitive effects, and pain. We were unable to enlist a sufficient sample size because of the short time constraint.

Therefore, since we lacked the capacity to ascertain the full impact of the intervention, we strongly advise that subject recruitment continues over the coming months. We did discover new information regarding the differences in patients' sleep quality, indicating that further study is required to know the causes of these differences and the factors including gender-specific sleep quality. Despite that sleep quality is extremely

subjective, and patient experience determines therapy outcomes, this was the first study in Palestine to collect data from patient perspectives on their sleep quality and sleep disrupting occurrences.

The intervention considerably improved the subjects' reported sleep quality. It looked possible and could be verified that the sleeping kit and RCSQ will be distributed. When there is no resemblance, it is recommended that future interventions look into how certain components of sleep kits are used, and how that affects patients' happiness with their sleep. Future sleeping kit distribution within this system and in other settings would require the support and dedication of the nursing team. Disrupting factors in intensive care units in Palestinian should allow for comparison across other centers. Should countries do so in the future, this addresses an important gap in the current literature noted in the literature review for this thesis.

Suggested Sharing the findings with important organizational stakeholders such as the chief clinical officer, chief nursing officer, assistant chief nursing officer, head of nursing leadership, and head of nursing education at local, regional, and national critical care centers, which manage sleep-promoting environments by consistently giving patients earplugs and eye covers, organize non-urgent nursing interventions, and control light and noise levels. I also urge that frontline nurses be educated on the importance of sleep, sleep deprivation, and how to enhance nursing practice by using sleep promotion measures for patients in ICUs.

#### **4.4 Conclusion**

During the first 24-48 hours, interventions had clinically significant benefits on ICU patients' sleep by using ear plugs and eye covers to low-cost measures that can help ICU patients sleep better. ICU patients are able to enhance their sleep quality and experience fewer awakenings, longer sleep durations, less disruption, deeper sleep, and a greater overall satisfaction when they wear eye covers and earplugs, which minimize environmental factors like light and noise levels.

There was additional proof that ICU patients had poor quality sleep due to a wide range of reasons that were mentioned as disrupting sleep. Sounds (e.g., talking, machine alarms) was identified as the most important factor. However, this thesis should be seen primarily as a foundation upon which to build upon. Additional study is required to enhance, expand on, and support the conclusions presented herein.

Patient-reported sleep quality was dramatically enhanced by the intervention for this individual. It appeared feasible and verifiable to provide both sleeping kit and RCSQ. Recommendations for future intervention include assessing the utilization of sleeping kit components for each patient, and the impact on patient's satisfaction regarding sleep in ICUs. Nursing staff commitment and support would be required for continuous sleeping kit distribution within this microsystem and across additional contexts for future success. According to the findings of this study, alternative nursing tactics are allowed to improve sleep quality and promote relaxation for critical care unit patients by using the following approaches conducted by nurses: aromatherapy, massage of the body, listening to relaxing music and lowering stress levels in the ICU. Following the deployment of these alternative nursing practices, our findings revealed significantly better sleeping habits and ICU environment satisfaction.

#### **4.5 Strength**

This is the first study in Palestine to assess the acceptability and practicality of daily self-reports of sleep quality from ICU patients. The study's repeated measures methodology was used to ascertain the patients' self-reported sleep. The researcher was able to identify common sleep disruptors in ICUs and provide a much comprehensive picture of patients' sleep quality by assessing disruptive variables and sleep quality at the same time every morning. Additionally, the fact that the results were not based on a single evaluation point boosted their validity: hence, recall bias was reduced.

This study was the first to gather information from patients' perspectives regarding their sleep quality and sleep-disturbing events in Palestine, despite the understanding that patient experience has a significant impact on therapy outcomes and that sleep quality is largely subjective. Consequently, it has established a starting point for examining the quantity and caliber of the patients' self-reported sleep, but this is the first time that the PSG and RCSQ scales have been integrated in a way that has enhanced the results of

our study. It has granted me the ability to assess patients' sleeping patterns before a month has gone by.

#### **4.6 Limitation**

Even though the study's findings are significant since they add to the body of knowledge about the quality of sleep that ICU patients experience, there are a number of limitations that need to be taken into consideration. One of its shortcomings was that our investigation's power calculation depended on study data. The use of a tool based on the evaluation from a month ago and a second tool, the RCSQ, which gauges sleep quality, has limited the ability to analyze sleep. The quantity and quality of sleep has to be verified using a different instrument. The fact that diseases were rare at that time is another factor that restricted the message's use. There was a correlation between patient diagnoses and chronic illnesses in the intensive care units.

Due to technical issues and other challenges, the use of PSQ for critically ill patients has been restricted. This has made it difficult for us to define the tool's use in the last month. Besides, our study must focus on the quality of sleep during the first 24 to 48 hours after ICU admission. An ideal project would track the quality of sleep over a few days because patients in the intensive care unit (ICU) have varying situations that could have a negative impact on them. However, because PSQ manipulation is difficult and expensive, its use in the ICU has been restricted.

The results' application to other patients admitted to critical care is limited by the lack of an unbiased assessment of sleep, the population's specificity, the lower sample size, and the fact that data were only gathered during one night of intensive care hospitalization.

The efficacy of earplugs and eye covers was evaluated by a one-night intervention, a brief period of observation. Moreover, despite the significant differences in environmental conditions between intensive care units (ICUs), the study included one ICU only.

## 4.7 Summary

**Table 8**

*Summary of the strengths and limitations*

Strengths	Limitations
the first study in Palestine to evaluate daily self-reports of sleep quality from ICU patients for acceptability and practicality. The patients' self-reported sleep was determined using the repeated measures approach of the study.	The ability to study sleep has been limited by the use of a tool based on the evaluation from one month ago and a second tool, the RCSQ, which measures the quality of sleep. A different tool must be used to verify the amount and quality of sleep.
the first in Palestine to collect data from patients' viewpoints about their sleep and events that disturbed their sleep, even though it was known that patient experience greatly influences therapeutic outcomes and that sleep quality is primarily subjective.	There are restrictions on the usage of PSQ for patients who are very sick. We have found it challenging to specify the tool's use during the past month as a result. Additionally, the quality of sleep in the first 24 to 48 hours following ICU admission must be the main focus of our investigation.
It can make evaluating the sleep quality of ICU patients and the efficacy of the treatments they receive easier. It aids ICU nurses in recognizing characteristics of sleep among patients who are alert and cognizant.	The lack of an objective evaluation of sleep, the population's specificity, the smaller sample size, and the fact that data were only collected during one night of intensive care hospitalization limit the results' applicability to other patients hospitalized to critical care.
When self-reported RCSQ is used in daily ICU clinical care to inquire about patients' sleep, several beneficial effects can be produced. practice, which includes: the psychological as well as societal requirements like having a sense of security; raising the bar for communication; lowering emotions of isolation; a sensation of acknowledging and valuing the needs of the patient to sleep.	Not to be used in individuals with cognitive impairment (drowsy, delirious, neurological problems).

## List of Abbreviations

<b>Abbreviation</b>	<b>Meaning</b>
RCSQ	Richards Campbell Sleep Questionnaire
ICU	Intensive care unit
CCU	Cardiac care unit
NNUH	Najah national university hospital
GCS	Glasgow coma scale
MOH	ministry of health
IRB	Institutional Review Board
PSQ	Pittsburgh sleep quality

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- Bajwa, N. (2015). Shi among ICU patients: A randomized control trial RESEARCH ARTICLE LUGS & EYECover ON SLEEP AMONG ICU PATIENTS: A RANDO CONTROL TRIAL Prabhjot Saini, 2Harpreet Kaur, 2Shivani Kalra and Gian Sagar College of Nursing, Rajpura, Punjab, India DMCH College of Nursing, Ludhiana, Punjab, India-141001 ABSTRACT Background: Disturbed sleep and sleep deprivation is common among ICUcovers and ear plugs may be a valuable to patients attempting to randomized control trial aims to assess the efficacy of ear plugs and eyecover pattern among critically-ill patients. Method: The study was conducted in January, 14.16-13.44.
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# Appendices

## Appendix A

### IRB Approval letter

An-Najah National  
University  
Faculty of Medicine &  
Health Sciences  
Institutional Review Board



جامعة النجاح الوطنية  
كلية الطب وعلوم الصحة  
لجنة اخلاقيات البحث العلمي

Ref: Mas. 2023/21

#### IRB Approval Letter

**Title of Research:**

*The effect of earplugs and eye mask on sleep quality and hemodynamically status for ICU patient*

**Submitted by:**

Saja Ghaleb Hamdan Hamarsheh

**Supervisor:**

Nizar B. Said, Mohammed F. Hayek

**Approved:**

15<sup>th</sup> June. 2023

Your Study Title "*The effect of earplugs and eye mask on sleep quality and hemodynamically status for ICU patient*dy." reviewed by An-Najah National University IRB committee and was approved on 15<sup>th</sup> , June . 2023

  
Hasan Fitian, MD

IRB Committee Chairman



## Appendix B

### Questionnaire list

الباحث الرئيسي: سجي غالب حمدان حمارشة

الباحث الثانوي: دكتور نزار سعيد و دكتور محمد حايك

جامعة النجاح الوطنية / نابلس

كلية الدراسات العليا / تخصص عناية مكثفه

1. موضوع الدراسة :

تأثير سدادات الأذن وقناع العين على جودة النوم والعلامات الحيوية لدى مريض العناية المركزة

2.

أنا حاليا أجري دراسة بحثية علمية كجزء من دراستي في الماجستير تخصص العناية المكثفه , أنت المريض المدعو للمشاركة في هذا البحث العلمي .قبل أن تقرر المشاركة من واجبي ان اوضح لك العديد من الامور و أخذ الموافقه منك من دون أي ضغط أو اي من العوامل المحيطه التي سيتم توضيحها فيما بعد .

يرجي أن تأخذ الوقت الكافي لقراءة المعلومات التاليه بعناية وبامكانك توجيه السؤال لنا اذا كان هناك أي شئ غير واضح او اذا كنت ترغب في مزيد من المعلومات خذ وقتك الكافي لتقرر ما اذا كنت ترغب في المشاركة او لا .

3. ما هو الغرض من الدراسه:

الهدف من دراستي هو تقييم تأثير سدادات الأذن وأقنعة العين على جودة النوم وتقليل اضطرابات النوم على المريض في وحدات الرعاية المكثفه

4. لماذا تم اختياري :

تم اختيارك لأنك مريض في قسم العناية المكثفه وانت من ضمن المرضى التي تشملهم الدراسة.

5. هل يلزم ان اشارك ؟

الامر متروك لك في ان تقرر المشاركة او الرفض , سوف يطلب منك فقط تعبئة الاستبيانات وذلك بعد ان تتخذ القرار الاكيد في المشاركة سوف يطلب منك توقيع نموذج الموافقة للمشاركة في دراسته . وبعد أن تثمر بالمشاركة فانك لا تزال حر في الانسحاب في اي وقت ودون ابداء سبب .

6. ماذا سيحدث لي اذا شاركت ؟

سوف نسألك لاكمال تقييمات عن طريث تعبئة استبيانات قبل النوم وبعد النوم وذلك بعد الشرح الكافي والمفصل عن الادوات التي ستوضع للنوم .

7. ما هي العيوب والمخاطر المحتملة للمشاركة ؟

من غير المتوقع ان يحدث اي من المخاطر وذلك بسبب نسبة الامان العالي للمريض من استخدام ادوات النوم . ولكن قد تشعر بملل اثناء تعبئة الاستبيان ولكن تم الحد من بعض الاسئلة لتفادي ذلك . ولا بد من الانسحاب من الدراسة في اي وقت كان .

8. ما هي الفوائد المحتملة للمشاركة ؟

لن تتلقى اي فائدة بشكل مباشر في هذه الدراسة ولكن المعلومات التي تم جمعها خلال هذه الدراسة سوف تعطينا فهم افضل لنوعية نومك والعوامل التي تزعجك في النوم اثناء ااثمتك في المستشفى وقد تحصل على فائده من وجود فرصة لاستكشاف تجربة نومك ز والشكر لتعاونك.

9. هل سيظل مشاركتي في هذه الدراسة سرية ؟

جمع المعلومات التي يتم جمعها عنك او الاستجابة التي تقدمها اثناء البحث سوف تبقى سرية للغاية .

10. ماذا سيحدث نتيجة الدراسة البحثية ؟

سيتم نشر البحث في المجالات العلمية واخذ شهادة الماجستير ولن يتم التعرف عليك في اي تقرير او منشور ولن تشمل المنشورات اسمك او رثمك السريري .

11. بيانات الباحث للتواصل ومزيد من المعلومات:

سجى غالب حمارشة

رقم الهاتف : 0592319197

Email : sajahamarsheh1997@gmail.com

نشكرك على وقتك لقراءة ورقة المعلومات

اذا كنت ترغب في المشاركة في الدراسة او لديك اي من أسئلة اخرى ترغب في طرحها قبل اتخاذ قرار يمكنك ذلك  
اما اذا اردت اكمال المشاركة في الدراسة يرجى منك تعبئة الاستبيانات المرفقة .

تفضلوا بقبول فائق الاحترام

سجى حمارشة

درجة ماجستير

جامعة النجاح الوطنية

استبيان مرضى

اسم المستشفى؟.....

قسم: العناية القلبية/العناية المكثفة /العناية المكثفة الجراحية/العناية المكثفة الباطنية

تاريخ الدخول الى قسم العناية المكثفة.....

هل تم الدخول من قبل ؟

اذا نعم / تاريخ الخروج من وحدة العناية المركزة؟.....

مدة الإقامة في وحدة العناية المكثفة ..... ..

الجزء الأول: البيانات الديموغرافية والخصائص الطبية:

العمر: .....

الجنس العام: ذكر/انثى

المهنة: - العمل الرسمي.

--- العمل الحر .

--- غير موظف .

--- طالب .

--- آخر .

المستوى التعليمي: --- أمي.

--- مدرسة .

--- جامعة .

التشخيص المرضي الحالي:.....

التاريخ الطبي من أمراض مزمنة سابقة / الجراحي السابق .....

درجة الوعي للمريض :

الوعي للشخص نفسه ؟ نعم/لا

الوعي للوقت ؟ نعم/لا

الوعي للمكان؟ نعم/لا

هل تعاني من اضطرابات في النوم سابقا (في المنزل)؟ نعم/لا

هل عانيت من اضطرابات في النوم من قبل عند دخولك الى المستشفى؟ نعم/لا (في حال تم دخوله من قبل)

هل تنزعج من الاصوات خلال النوم؟ نعم/لا

هل انت مدخن بكثرة؟ نعم/لا

هل تشرب مشروبات طاقه؟ نعم/لا

الجزء الثاني : الاسئلة التالية تتعلق بعادات نومك خلال الشهر الماضي فقط ؟

### Pittsburgh Sleep Quality Index

في أي وقت تذهب إلى الفراش عادة :-----

كم من الوقت (بالدقائق) تستغرق لكي تغفو:-----

حدد وقت الاستيقاظ في الصباح؟.....

كم معدل عدد ساعات النوم كل ليلة؟.....

حدد وقت السرير المعتاد؟.....

كم مرة عانيت صعوبة في النوم

أبدا أقل من مرة في الأسبوع مرة أو مرتين في الأسبوع ثلاث مرات أو أكثر في الأسبوع

عدم القدرة على النوم خلال 30 دقيقة

الاستيقاظ في منتصف الليل أو في الصباح الباكر

الاستيقاظ المتكرر من النوم لاستعمال الحمام

التنفس بشكل غير مريح

السعال أو الشخير بصوت عال

الشعور بالبرد

الشعور بالحرارة

بسبب الكوابيس

وجود ألم

أسباب أخرى، يرجى التوضيح، بما في ذلك عدد المرات التي واجهت فيها مشكلة في النوم بسبب هذا السبب  
(الأسباب):

خلال الشهر الماضي ، كم عدد المرات التي تناولت فيها الأدوية (وصفات طبية أو "بدون وصفة طبية") لمساعدتك  
على النوم؟

خلال الشهر الماضي ، كم مرة واجهتك مشكلة في البقاء مستيقظًا أثناء القيادة أو الأنشطة الاجتماعية؟

خلال الشهر الماضي ، ما مقدار المشكلة التي واجهتها بالنسبة للحماس لإنجاز الأمور؟

خلال الشهر الماضي ، كيف تقيم جودة نومك بشكل عام؟

- هل لديك شريك في الفراش أو تشارك الغرفة
- لا يوجد شريك في الفراش أو لا تشارك الغرفة -----
- شريك في غرفة أخرى -----
- شريك في الغرفة وليس الفراش -----
- هل لديك شريك في الفراش .....

إذا كان لديك شريك في الفراش أو تشارك الغرفة اسألهم/ أو اسألها خلال الشهر الماضي، كم مره كان لديك

ليس خلال الشهر الماضي اقل من واحده قي الاسبوع مره او مرتين في الاسبوع ثلاث مرات او اكثر في  
الاسبوع

شخير بصوت عالي

وقفه طويله الانفاس اثناء النوم

رجل غير هادئها اثناء النوم

نوبات ارتباك اثناء النوم

عدم الراحة اثناء النوم

## استبيان ريتشارد كامبل RCSQ

يتم الاجابه على كل سؤال نت هذه الاسئله بوضع علامه + في اي مكان من سطر الاجابه في المكان الذي يعبر عن حالة نومك خلال الليله الماضيه :-

1.نومي الليله الماضيه كان :

نوما عميقا 0...10...20...30...40...50...60...70...80...90...100 نوما خفيفا

2.الليله الماضيه , المره الاولى التي نمت فيها انا :

نمت على الفور تقريبا 0...10...20...30...40...50...60...70...80...90...100 ابدا لم استطع الدخول في النوم بسهولة

3. الليله الماضيه كنت:

أستيقظ قليلا جدا\_ 0...10...20...30...40...50...60...70...80...100أستيقظ طوال الليل

4.الليله الماضيه ,عندما استيقظت أو شيئا ايقظني ,أنا :

عدت للنوم فورا 0...10...20...30...40...50...60...70...80...90...100 لم استطع العوده للنوم

5.أود ان اصف نومي الليله الماضيه كالاتي :

ليله نوم جيدة 0...10...20...30...40...50...60...70...80...90...100 ليله نوم سيئه

بند الضوضاء اختياري

6. أود أن اصف مستوى الضوضاء الليله كالاتي:

جدا هادئ\_ 0...10...20...30...40...50...60...70...80...90...100 جدا مزعج

Re: RCSQ-A



Saja Hamarsheh <saja.hamarsheh1997@gmail.com>

29/06/2023 18:14



To: Ghaida S. Alsulami

Thank you for help

On Thu, 29 Jun 2023 at 6:13 PM Ghaida S. Alsulami <gssulami@uqu.edu.sa> wrote:

Dear Saja

It's my pleasure to use the Arabic version of Richards Campbell Sleep Questionnaire (RCSQ-A).

All the best

Ghaida Alsulami

**Dr. Ghaida Alsulami. BSN, RN, MSN, PhD**

*Assistance Professor in Acute and Critical Care Nursing*

Faculty of Nursing | Umm Al-Qura University

Makkah| Saudi Arabia

*Vice Dean for innovation and entrepreneurship institution*

Umm Al-Qura University| Makkah| Saudi Arabia

E-mail: [Gssulami@uqu.edu.sa](mailto:Gssulami@uqu.edu.sa)

<[saja.hamarsheh1997@gmail.com](mailto:saja.hamarsheh1997@gmail.com)> Saja Hamarsheh

سالا: 11/11 ذو الحجة/1444 11:15 ص

<[gssulami@uqu.edu.sa](mailto:gssulami@uqu.edu.sa)> Ghaida S. Alsulami

وع:

Activate Windows

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جامعة النجاح الوطنية  
كلية الدراسات العليا

# تأثير سدادات الأذن وقناع العين على جودة النوم لدى مرضى العناية المركزة

إعداد

سجى غالب حمدان حمارشة

إشراف

د. نزار سعيد

د. محمد الحايك

قدمت هذه الرسالة استكمالاً لمتطلبات الحصول على درجة الماجستير في تريض العناية المكثفة، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس - فلسطين.

2024

## تأثير سدادات الأذن وقناع العين على جودة النوم لدى مرضى العناية المركزة

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### الملخص

**المقدمة:** كان المرضى في وحدات العناية المركزة يعانون من سوء نوعية النوم بسبب مجموعة متنوعة من الحالات التي يمكن أن تزعج نومهم.

وحدات العناية المركز :هي بيئات صاخبة تمنع النوم. قد يكون لاضطراب النوم آثار جانبية في تعافي مرضى وحدة العناية المركزة.

**الهدف:** كان الهدف من هذه الدراسة هو تقييم تأثير سدادات الأذن وأقنعة العين على جودة النوم واضطرابات النوم على المرضى في وحدات الرعاية الحرجة.

**التصميم والأساليب:** كانت هذه دراسة شبه تجريبية مع تصميم قبلي وبعدي تم إجراؤه على مرضى وحدة العناية المركزة ووحدة العناية المركزة. تم اختيار عينة الدراسة بشكل ملائم في وحدة العناية المركزة ووحدة العناية المركزة من 4 مستشفيات. تم اختيار عينة إجمالية (100) مشارك، سيتم اختيار 50 مشاركًا ليكونوا في المجموعة الضابطة والـ 50 الآخرين سيكونون في مجموعة التدخل، وتم جمع البيانات في كلا المجموعتين قبل و ما بعد التدخل باستخدام RCSQ و PSQ.

**النتيجة:** وقد لوحظت فروق إحصائية كبيرة بين المجموعتين. ومع ذلك، كانت التأثيرات معتدلة عبر معايير النوم المختلفة، مما يشير إلى أن المرضى في مجموعة التدخل شهدوا جودة نوم محسنة مقارنة بأولئك في المجموعة الضابطة. أعرب المرضى عن رضاهم وارتياحهم لفعالية سدادات الأذن وأغطية العين في تحسين نوعية النوم. حددت كلا المجموعتين الضوضاء، والمعدات الطبية، وأنشطة التمريض كعوامل تساهم في اضطرابات أنماط النوم. من الناحية الديموغرافية، لم تكن نتائج التدخل والمجموعة الخاضعة للرقابة كبيرة، حيث سجلت العمالة فقط ارتفاعًا إحصائيًا، مما يشير إلى وجود فرق كبير عند خط الأساس بين مجموعات المراقبة ومجموعات التدخل،  $\chi^2(2) = 9.665$ ،  $p = .008$ ، بمتوسط درجة RCSQ هي 41.23 للطلاب، و44.81 للعاطلين عن العمل و63.24 للمجموعة المستقلة، وكان النوم أعلى بكثير في مجموعة التدخل مقارنة بالمجموعة الضابطة ( $P < 0.05$ ) في مان ويتي. وأظهرت المجموعة الضابطة فروق ذات دلالة إحصائية ( $177.14 \pm 278$ ). فرق ذو دلالة إحصائية من ما قبل التدخل إلى ما بعد التدخل ( $P < 0.05$ ) في تصنيف ويلكوكسون الموقع.

**الاستنتاج:** سدادات الأذن وأقنعة العين هي أجهزة بسيطة وغير مكلفة يمكن استخدامها لتقليل التعرض للضوضاء والضوء، مما يضمن جودة النوم في وحدات الرعاية الحرجة. النوم السليم ضروري للمرضى المصابين بأمراض حادة للتعافي بسرعة.

**الكلمات المفتاحية:** جودة النوم، وحدة العناية المركزة، سدادات الأذن، قناع العين.