Introducing Sleep Hygiene Protocol in an Inpatient Psychiatric Facility

Vivian Mbonifor

Touro University, Nevada

In partial fulfillment of the requirements for the Doctor of Nursing Practice

DNP Project Chair: Dr. Jessica Grimm

DNP Project Member: Dr. Johnston

Date of Submission: 02/19/2024

Table of Contents

Abstract **4**

Project I: Section 1 ..... **5**

Project Title Description 5

The Problem at the site 6

Significance of the Problem 7

Background 8

Project I: Section 2 ..... **10**

Search Method 10

Review of Methods 10

Review Synthesis 11

Literature Theme 15

Factors that Impact Sleep Hygiene among Mental Health Patients in In-patient Facilities *16*

The Prevalence of Sleep Deprivation in Psychiatric Units. *17*

Consequences of Sleep Deprivation *18*

Impact of improving sleep hygiene on mental health outcomes *19*

Interventions to Address Sleep Hygiene in Psychiatric Facilities *20*

Effects of Training Staffs on Sleep Hygiene *21*

Project I: Section 3 ..... **22**

The Aim and Objectives 22

Theoretical Model 23

Application of the Iowa Model 24

Project II: Section 1 ..... **28**

Project Population 28

Project Setting 28

Stakeholders 30

Project II: Section 2 ..... **30**

Interventions 30

Planning Project Team 30

Timeline 31

Resources and Tools 31

Sleep Hygiene Protocol *32*

Education Tools *32*
Posters and Reminders *33*
Richards-Campbell Sleep Questionnaire (RCSQ) *33*
Sleep Hygiene Observation Checklist *33*
Project II: Section 3 ..... **34**
Data Collection 34
Ethics/ Humans Protection 35
Data Analysis 35
Project III: Module 2 ..... **36**
Section 1: Data Analysis /Discussion 36
Results *36*
Summary *41*
Interpretation *42*
Section 2: Limitations, Conclusion, and Abstract 43
Limitations *43*
Conclusion *44*
References **46**
APPENDICES **52**
Appendix A: Letter of Approval 52
Appendix B: Iowa Model 53
Appendix C: Richards-Campbell Sleep Questionnaire (RCSQ) 54
Appendix D: Timeline Sheet 55
Appendix E: Sleep Hygiene Protocol 56
Appendix F: Sleep Hygiene Observation Checklist 57
Appendix G: SPSS Results 58

Abstract

The project aimed to introduce a Sleep Hygiene Protocol in an in-patient psychiatric facility to promote improved sleep quality, quantity, and hygiene by reducing hospital stays and delirium. Poor sleep hygiene is a prevalent healthcare issue in mental health facilities characterized by constant sleep disturbance and sleep deprivation (Horne et al., 2018). According to Alanazi et al. (2023), poor sleep practices among mental health patients triple the rate of depression, anxiety, and mania depending on the mental health condition that specific patients are struggling with. Patients at in-patient psychiatric facilities are more likely to experience poor sleep quality due to unique factors such as the mental health medications, noise, lighting, and mental health conditions symptoms (Delaney et al., 2018). A sleep hygiene protocol was implemented at a mental health facility over 5 weeks period. The sample was drawn from healthcare workers, including the CNAs, LPNs, RNs, and physicians who deliver direct patient care at the in-patient psychiatric facility and the patients at the facility. Following the implementation of the project, the prevalence of delirium was found to have reduced even though there were reported incidences in this period. The mean number of days of hospitalization and the excess stay due to delirium reduced. Generally, the Sleep Hygiene Protocol in the psychiatric facility reduced delirium and hospital stays, emphasizing the need to integrate it into mental health nursing practice. These findings also suggest policy implications, prompting further research for protocol refinement and policy development that guide sleep hygiene guidelines in all in-patient psychiatric facilities in the country.

Keywords: Sleep hygiene, Delirium, Hospital stays, Sleep quality and quantity, inpatient psychiatric facility, Sleep Hygiene Protocol, Sleep disturbance, and Quality improvement.

Project I: Section 1

Project Title Description

This Doctor of Nursing Practice (DNP) scholarly project aims to improve sleep hygiene at the project site. Evaluating the facility's current sleep hygiene reflects a need for improvement by introducing a Sleep Hygiene Optimization Protocol (SHOP) to ensure improved sleep quality among mental health patients. According to Delaney et al. (2018), sleep hygiene is associated with improved mental health, as poor sleep quality increases depression and anxiety symptoms. In addition, poor sleep quality and quantity increase the chances of developing suicidal thoughts among mental health patients placing them at risk of harming themselves and others (Delaney et al., 2018). Similarly, according to Talih et al. (2018), 67.4% of in-patients in psychiatric facilities experience insomnia due to various factors. The major factors the researchers mentioned included the hospital environment (lighting & noise), psychological disturbances (anxiety and stress), pain, physical factors like infections, and mental health medications resulting from insomnia as a side effect. Scott et al. (2021) note that 17% of mental health patients in in-patient psychiatric facilities experience major adverse effects associated with poor sleep hygiene. The researchers noted that most patients admitted to in-patient psychiatric facilities experience severe mental health issues like depression, anxiety, and suicidal thoughts, all attributed to sleep disturbance (Scott et al., 2021). The overall effect is prolonged hospital stay and increased cost of treating mental health issues. Based on these realizations, having a sleep hygiene improvement protocol in mental health in-patient facilities is key for improved health outcomes and reduced hospital stays.

Since there are numerous national sleep hygiene guidelines and protocols for inpatient facilities, this study will use the Joint Commission guidelines and recommendations on

improving sleep hygiene in hospital wards which are more applicable to acute medical settings such as surgical wards, long term care facilities, and mental health facilities. According to Joint Commission (2022), in-patient hospitals should create a restful sleep environment, establish a consistent sleep schedule, limit day napping, encourage physical activities, limit caffeine and alcohol intake, and provide relaxation techniques to encourage sleep among patients. The Joint Commission (2022) proposes that patients in in-patient facilities sleep for around 8 hours per night to enhance faster recovery and limit their hospital stay. Based on these guidelines, the project site does not meet the standard guidelines to ensure sleep hygiene. There is a need to develop a Sleep Hygiene Optimization Protocol that will guide the facility in ensuring improved sleep among mental health patients.

The Problem at the site

Sleep hygiene problem has been a significant challenge in numerous in-patient hospitals globally, especially in the United States. However, the condition is worse in mental health in-patient facilities (Talih et al., 2018). According to Delaney et al. (2018), patients in in-patient psychiatric facilities are likely to experience poor sleep quality and quantity due to the medication they take, increased noise as most patient's experience mania and excessive excitement, mental health symptoms where one of them is insomnia, and obstructive sleep apnea (Stewart & Arora, 2022). In the United States, significant challenges influencing poor sleep hygiene in mental health facilities include a lack of enough funds to implement measures and establish tools and equipment to improve sleep hygiene, lack of compliance with the set guidelines on sleep hygiene, and limited attention directed to the issue of sleep hygiene due to lack of knowledge on the significance it has on the mental health of patients (Stewart & Arora, 2022). The project site, an in-patient mental health facility, is one of the facilities experiencing

poor sleep hygiene problems resulting in extended mental health patient stays due to a reduced recovery process.

According to the project site's records and provided by the nurse manager, patients have been experiencing sleep disturbance impacting their treatment plan and prolonged hospital stays. The records reported that patients sleep an average of 5.5 hours per night, below the recommended time by the Joint Commission (2022). This is attributed to pain, mental health medications resulting from insomnia, physical factors like infections like anxiety, environmental factors like noise and poor lighting, and nursing rounds. In return, this results in patients waking up late and missing important therapy sessions, adversely impacting their recovery process. Specifically, it results in prolonged stays, with the records showing the average hospital stay is 38 days. Although there is no standard period for a hospital stay for mental health patients, an average of 38 days is high, considering the cost of treatment. Thus, there is a need to introduce a sleep hygiene protocol in the project site to reduce the average hospital stay and cost of medical care.

Significance of the Problem

Numerous research studies have been done and have proven that improved sleep quality and quantity among psychiatric patients in in-patient facilities is key to improving their mental health, enhancing their recovery process, limiting their stay in the hospital, and reducing medical and healthcare costs (Aboaja *et al*., 2021). As a result, to enhance sleep hygiene in in-patient healthcare facilities, especially psychiatric facilities, sleep hygiene guidelines and practices have been developed to ensure clear standards and practices on the quality and quantity of sleep patients in hospital wards experience (Aboaja et al., 2021). These guidelines define the number of hours' patients should sleep, the environmental conditions to be maintained to limit patient

sleep disturbance, activities for patients to improve their sleep, and practices that should be adopted to ensure improved sleep among hospitalized patients, key to their recovery process.

According to Joint Commission (2022), in-patient hospitals should create a restful sleep environment, establish a consistent sleep schedule, limit day napping, encourage physical activities, limit caffeine and alcohol intake, and provide relaxation techniques to encourage sleep among patients. The environment around the ward is the most critical factor influencing patients' sleep hygiene (Joint Commission, 2022). Joint Commission proposes eliminating disruptions within the wards and the general hospital environment. For example, nurses should limit their nightly rounds and provide care based on the specific patient's needs, limit noise in the facility, ensure deemed lighting, improve sleep, and provide earplugs and eye masks. Similarly, according to Aboaja et al. (2021) & Scott et al. (2021), mental health facilities should adopt internal sleep hygiene guidelines to ensure the creation of a conducive environment for patients limiting sleep disturbance which is one of the main contributing factors to mental health symptoms severity, and prolonged hospital stays for mental health patients. Adopting sleep hygiene protocol is thus key to improving mental health patients' outcomes and reducing the cost of health care.

Background

According to statistics, around 30% of people worldwide experience insomnia due to mental health. This population's lack of sleep increases mental health challenges and reduced concentration and productivity during the day (Fietze et al., 2021). Delaney et al. (2018) reported a general reduction of sleep quality, sleep duration, and prolonged sleep latency in in-patient mental health hospitals compared to home. In addition, the researchers reported that 41.6% of patients report that their sleep quality is very poor, 34.2% report they experienced fair sleep

quality, while only 24.2% experience good quality sleep. Factors attributed to poor sleep quality include medical interventions (34.3%) and environmental aspects like noise (32.1%). Delaney et al. (2018) conclude that hospital in-patients are exposed to numerous factors impacting their sleep quality, which can be modified by reconfiguring the clinical setting and behavior change.

The results from research studies correlate with the situation within the project site. The increased poor quality and quantity of sleep experienced by patients in the project site has deteriorated most patients' mental health, resulting in prolonged stays in the facility and increased medical bills. This has resulted in most families and relatives deciding to take their patients home instead of admitting them to the facility. As a result, there is a need to address the sleep hygiene problem in the facility to improve patients' mental health, improve their recovery process, reduce their stay in the facility, and improve their outcomes (Wesselius et al., 2018).

PICOT

Patients (P): Adult psychiatric in-patients

Interventions (I): Sleep Hygiene Protocol

Comparison (C): standard practice without protocol

Outcome (O): Increase sleep hygiene resulting in reduced delirium rates and reduced hospital stays.

Time (T): For five weeks (5 Weeks)

Project I: Section 2

Search Method

Comprehensive literature was conducted through multiple scholarly search engines, including PubMed, JBI EBP Database, CINAHL nursing database, and Cochrane Library. The Picot question guided the key search words for this research, and they included sleep hygiene protocol and guidelines, sleep quality and quantity mental health patients, best practices for promoting sleep hygiene, patients' sleep disturbance, sleep assessment tools for mental health patients, sleep hygiene interventions, sleep education programs, sleep latency for in-patient in psychiatric unit. The critical search terms resulted in 123 evidence-based research articles on sleep hygiene and mental health.

The inclusion criteria involved research articles that were scholarly and peer-reviewed, those published from 2018 onwards, those presented in English and related to nursing and healthcare, those addressing sleep hygiene among mental health in-patients, and those that brought out the correlation between sleep hygiene and mental health. The exclusion criterion, however, involved research articles that were not scholarly and peer-reviewed, those written in another language except English, those not addressing sleep hygiene, those published before 2018, and those not nursing related. Through the inclusion and exclusion criteria, 107 research articles were eliminated, and only 16 passed the criteria and thus were approved for use in the research literature review.

Review of Methods

Reviewing the research methods of the 16 peer-reviewed research articles that met the inclusion criteria was to gain additional insights that could contribute to interpreting and synthesizing the literature for this DNP project. By examining the research methods employed in

the selected articles, it was possible to identify relevant themes that would benefit the project's completion. It was observed that some of the chosen articles utilized similar research methods despite variations in research designs, sample sizes, and populations.

They included survey-based studies, systematic review & meta-analysis, scoping review protocols, experimental studies, observational studies, quasi-experimental research, randomized controlled trials, mixed-methods, cross-sectional studies, exploratory qualitative studies, and interventional trials. In addition, regardless of the different research methods adopted in the literature selected, they report similar results about the correlation between mental health and sleep hygiene among mental health in-patients.

Review Synthesis

Promoting better sleep hygiene, characterized by improved sleep quality and quantity and reduced sleep latency, is an evidence-based practice addressing the consequence of sleep deprivation among patients in a mental health facility. Joint Commission provides sleep hygiene guidelines for patients in a general in-patient hospital environment (Joint Commission, 2022). Numerous studies on sleep hygiene and mental health show a close connection between poor sleep hygiene and increased mental health symptoms. The rate of various mental health facility adoption of best practices for sleep hygiene to ensure patient safety and delivery of quality care to promote better mental health outcomes varies among institutions (Kulpatcharapong *et al*., 2020). Researchers and medical practitioners have extensively carried out studies, research, quality improvement study, and project to identify the importance of maintaining good sleep hygiene at psychiatric facilities, the challenges, and barriers to sleep hygiene best practices, and the better interventions for improving sleep hygiene in mental health facility to improve mental health outcomes. According to the Joint Commission (2022), in-patient hospitals should create a

restful sleep environment, establish a consistent sleep schedule, limit day napping, encourage physical activities, limit caffeine and alcohol intake, and provide relaxation techniques to promote sleep among patients. According to Aboaja *et al*. (2021), some interventions to address sleep hygiene issues in an in-patient mental health facility are related to the external environment, medication, and non-compliance to the available guidelines and recommendations on sleep hygiene.

Conclusively, based on the research studies analyzed, some of the causes of sleep deprivation in in-patient psychiatric facilities have been identified to emanate within and outside the mental health environment. Delany *et al*. (2018) conducted an observational study in an Australian psychiatric facility to assess the sleep quality at the mental health center. The study's results led to the discovery that physical conditions, such as the presence and intensity of sound in and around the hospital facility, extreme lighting conditions, and harsh weather conditions, were the primary causes of sleep deprivation among the patients. These findings of the study were also confirmed through an evaluation study carried out by Horne *et al*. (2018) of sleep disturbance in in-patient psychiatric units in the UK. The study findings showed that the main issues associated with sleep deprivation problem include environmental factors like noise and ward lighting, medical-related factors, pain, nurse nightly rounds, and patients regularly visiting the toilet. Binte Arman et al. (2022) conducted an observation and cross-sectional study to assess the subjective sleep quality among hospitalized adult patients in Singapore. The study's results revealed that the routine process of doctors, such as when providing medication or checkups on patients at night, is also a significant cause of sleep disturbance for in-patients in psychiatric units. The noise emanating within or around the location of the mental facilities near urban centers, the routine interruptions of healthcare workers, the underlying symptoms of various

mental health illnesses, and the patient's behaviors were found to be the major causes of sleep disturbance and deprivation within the psychiatric unit.

The absence of sleep quality and quantity for patients in psychiatric units has multiple impacts on the care delivery process, their stay, and general mental health outcomes. Burger *et al*. (2020) systematically reviewed and conducted a mental analysis of recent sleep quality studies and research studies to assess the emerging trends, current issues, and the impact of sleep deprivation among mentally ill patients. The study results were that the average sleeping hours for patients in in-patient facilities was a record low at 5.1 hours compared to 7.1 hours for those at home. Patients also exhibited various behavioral characteristics that showed a lack of sleep deprivation, such as fatigue, falls, lack of concentration in therapy sessions, and insomnia which impacted the care delivery process and delayed the recovery of many patients. Kuzmik *et al*. (202) conducted a quality improvement study to assess the factors associated with sleep quality in hospitalized persons with dementia. The results indicated the impacts of sleep deprivation were worse on patients diagnosed with Alzheimer's and associated disorders that involved diagnosis of additional mental health symptoms such as anxiety and insomnia. The sleeping disorder was an additional illness that was found to be prevalent among patients admitted to various mental health facilities due to sleep deprivation, as discovered in a systematic review study by Perez (2020), who supported the implementation of a sleeping protocol to improve sleep quality for psychiatric unit patients. The effects of poor sleep quality and quantity among mental health in-patients include increased delirium, retarded recovery rate, inadequate rehabilitation, prolonged hospital stay, and increased medical costs (Binte Arman *et al*., 2022). Based on the evidence-based interventions addressed, the project site has not adopted the recommended sleep hygiene intervention to improve sleep quality among mental health patients.

The existence of barriers to the best practice in mental health facilities presents a research gap that can be utilized to address the current sleep hygiene issue at different psychiatric facilities.

The importance of improving sleep quality in various mental health facilities is shown through numerous studies that have discovered a correlation between sleep quality and better mental health outcomes. Through a systematic review and meta-analysis by Burger *et al*. (2022), the authors discovered a positive correlation between improved sleep quality for patients in psychiatric units with better mental health outcomes. The results indicated that enough sleep was a therapeutic medication for any underlying mental health symptoms since it led to better behavioral relaxation and mental stability. Ensuring the best sleep hygiene practices in psychiatric unit facilities is a way to improve patient care, safety, and health outcomes, which can significantly improve mental health outcomes. A systematic review was conducted by Briguglio *et al*. (2020) to assess the impact of healthy food, adequate exercise, and enough sleep as a non-medical treatment for various symptoms of mental illnesses. The study's results discovered that patients who had enough sleep time exhibited better control of their anxiety symptoms and more self-control of behaviors compared to those who reported sleep deprivation which also showed the importance of sleep quality in promoting positive mental health outcomes. Gardiner *et al*. (2022) give examples of some of these interventions, which include limiting nursing rounds at night to limit disturbance, ensuring appropriate lighting at night, engaging patients in physical exercises during the day, adopting relaxation techniques implemented on the patients, providing medication to address insomnia issues, and training and educating healthcare providers on best practices to improved sleep hygiene. Stewart & Arora's (2022) research results show that relaxation techniques increase sleep quality by 28%, removing

environmental factors like noise and poor light results by 7%, removal of daytime napping by 5%, and bright light therapy by 7%.

In conclusion, promoting sleep quality and quantity involves implementing and adopting the best sleep hygiene practices to impact patient care, safety, and mental health outcomes. Sleep hygiene is an identified evidence-based practice for promoting better mental health outcomes for patients in psychiatric units. The absence of better sleep hygiene in psychiatry hugely impacts the process and quality of care delivery and patient safety for mentally healthy patients. Reviewing past and current studies has led to discovering some trends, current issues, and challenges that can be considered to help address the existing gap across mental health facilities. Numerous evidence-based interventions can help address sleep hygiene challenges among mental health patients in in-patient psychiatric facilities. Some of the interventions provided to increase the sleep quality for in-patients in psychiatric units involve pharmacological and non-pharmacological and educating the medical staff on better interventions for addressing sleep disturbance or deprivation among admitted patients. The researchers also proposed pain management as another intervention that can help address poor sleep quality among mental health patients. These interventions relate to different researchers' recommendations for improving sleep hygiene in in-patient psychiatric in improving better mental health outcomes for mentally ill patients.

Literature Theme

The research identified five themes from the 16 selected and approved research articles to be included in the literature review. The themes will guide the literature review process, ensuring addressing all aspects of the research topic. The themes developed include factors that impact sleep hygiene among mental health patients in in-patient facilities; the prevalence of poor sleep

hygiene in psychiatric units; consequences of poor sleep hygiene; interventions to address sleep hygiene challenges in psychiatric units; and effects of training staff on sleep hygiene.

Factors that Impact Sleep Hygiene among Mental Health Patients in In-patient Facilities

The factors that impact sleep hygiene among mental health patients in a psychiatric originate within the physical characteristic of the healthcare environment, the nature of the disease the patients are diagnosed with, and the interruptions during care delivery by assigned medical staff. Aboaja *et al*. (2021) explain that poor sleep hygiene for psychiatric patients involves improper living conditions or arrangements causing discomfort to patients, un-hygienic sleeping conditions, lack of enough sleeping time, poor sleeping patterns, and disruption of sleeping time and patterns. Numerous factors may or may not intentionally result in sleep disturbance among mental health patients in in-patient psychiatric facilities. The main factors include physical factors, including the mental facility's location, disease severity, and routine at the facility (Kulpatcharapong *et al*., 2020). The physical location of the mental facility determines the rate or amount of external noise that impacts the sleep patterns or time of the patients, the type of weather in the selected location, and the light and sound disturbances from the structure of the sleeping halls or rooms. Kulpatcharapong *et al*. (2020) found other factors to originate from the interruptions from routine nursing practices, such as random checkups and doctor visitations for treatment and emergencies. Novak *et al*. (2020) & Horne *et al*. (2018) categorize the major factors resulting in poor sleep quality among patients in psychiatric facilities into physical factors, which include disease, pain, and diseases severity, environmental factors like noise and light, doctor's and nurses' interruptions, psychological factors like anxiety and stress, and medical factors like medications that result to insomnia as a side effect which results in poor sleep quality and quantity and increased sleep latency.

The Prevalence of Sleep Deprivation in Psychiatric Units.

Poor sleep hygiene is a prevalent healthcare issue in mental health facilities characterized by constant sleep disturbance and sleep deprivation. Horne *et al*. (2018) reported that 95% of mental health patients in in-patient psychiatric facilities reported poor sleep quality on the Pittsburgh Sleep Quality Index. Delaney *et al*. (2018) found that the sleeping hours for patients in mental health facilities averaged between 5.3 hours compared to 7.1 hours at home. Sleep disturbance is prevalent in in-patient mental health facilities and is characterized by factors or disruptions that limit a patient's ability to have quality and quantity of sleep (Kulpatcharapong *et al*., 2020). The prevalence of sleep disturbance and sleep deprivation among patients in in-patient psychiatric units can be diagnosed by observing behavioral changes or medical assessment. Van den Ende *et al*. (2022) found that some common characteristics of sleep deprivation are lack of attention, accidental falls leading to injuries, constant fatigue, reddish eyes, increased delirium, and memory loss.

The prevalence of sleep disturbance and deprivation among in-patients in psychiatric units can also be diagnosed through medical assessments. Horne *et al*. (2018) found that sleep disturbance results in obstructive sleep apnea, a form of poor sleep quality that accelerates the severity of any underlying mental health symptoms. According to Talih *et al*. (2018), approximately 67% of patients in in-patient mental health facilities have been diagnosed with insomnia and sleeping challenges related to constant sleep disturbance. The impact of sleep disturbance varies among patients depending on the characteristics of their underlying mental illness. Some patients are reported to have some mental illness that makes them highly responsive to any form of noise and requires a certain degree of silence to have regular sleep, which makes them the common victims of any form of sleep disturbance. For example,

Kuzmik *et al*. (2022, p. 254) report that a "prevalence of sleep disturbances of up to 67% have been found in in-patients with Alzheimer's disease, and sleep disturbances have been reported in up to 90% of patients with other dementias such as vascular and Lewy body dementia.". Therefore, the location of a mental health facility, the routine exercise of medical staff while attending to patients, and the patient's behaviors are the leading causes of sleep disturbances in a mental health facility.

Consequences of Sleep Deprivation

The causes and presence of poor sleep quality and quantity among patients in in-patient psychiatric facilities result in adverse consequences on patients and the facility by affecting the care delivery process, affecting the quality of care provided, impacting the patient's safety and healing process, and healthcare costs. According to Delaney *et al*. (2018), poor sleep hygiene can affect the care delivery process for patients since it can exacerbate symptoms of depression, anxiety, and increased suicidal ideations among patients. Sleep deprivation among mentally ill patients may impede clinical care provision as most patients may remain unresponsive to the diagnosis process. Sleep deprivation impacts and limits mental health patients' cognitive skills, attention, and learning and adversely impacts their memory (Van den Ende *et al*., 2022). This results in poor concentration on therapy sessions, increased delirium, and increased cases of falls and infections, which results in more injuries and severe infections.

Sleep deprivation is a form of poor sleep hygiene that significantly undermine the reliability and essence of cognitive and psychological therapy practices, such as the psychiatrist's recommendation for patients to have the physical strength and mental stability. Delaney *et al*. (2018) found that poor sleep hygiene, quality, or condition significantly disrupts the healing process of many mentally ill patients. The presence of poor sleep hygiene in a psychiatric facility

may affect the healing process of patients by prolonging their stay at the facilities or causing the spread of healthcare infections among patients, which may require medical attention, causing additional healthcare costs for the patient's family and the healthcare organization (Scott et al., 2021). In conclusion, there is a need for sleep hygiene interventions that are associated with improved sleep quality and quantity and reduced sleep latency in addressing the consequence of poor sleeping hygiene, such as prolonged hospital stays, disruption of patients' healing process, lack of patient safety, and additional healthcare costs.

Impact of improving sleep hygiene on mental health outcomes

Improving sleep hygiene significantly impacts the mental health capacity and treatment outcomes of patients administered in psychiatric units. The ability of patients diagnosed with various mental health illnesses to have a peaceful and healthy or sound sleep is considered a treatment for numerous underlying symptoms of various mental illnesses. According to Briguglio *et al*. (2020), quality sleep reduces or prevents mental health symptoms, including depression, anxiety, stress, mania, psychosis, and paranoia, worsening existing mental health symptoms and suicidal ideations. Improving sleep quality and quantity is also associated with other mental health outcomes and practices, such as decreased in-patient hospital stay for patients admitted and reduced healthcare costs (Scott *et al*., 2021). Indeed, mental health patients admitted to in-patient psychiatric facilities take longer to recover than mental health outpatients due to the issue of sleep disturbance in in-patient psychiatric facilities (Delaney *et al*., 2018). Owed to the more extended stay of mental health patients, ensuring the provision of better sleep quality and quantity is a way of ensuring they have a healthy stay at the facility and also to speed their recovery process while ensuring their safety and not contracting other healthcare infections. Therefore, there is a great need to ensure the implementation and adoption of the best sleep

hygiene practices to impact patient care, safety, and health outcomes, which can significantly improve mental health outcomes such as reducing mental health symptoms among patients, speed-recovery of patients, reducing patient's hospital stays, and healthcare costs.

Interventions to Address Sleep Hygiene in Psychiatric Facilities

There are tested and verified interventions within the clinical practice that can successfully address the issue of poor sleep hygiene in psychiatric units to help achieve better sleep quality and ensure patient safety. Aboaja *et al*. (2021) & Herscher *et al*. (2021) conducted a systematic review of various interventions that can be adopted in in-patient psychiatric facilities to improve patient sleep quality and quantity and reduce sleep latency. A quality improvement project by Aboaja et al. (2021) that involved pharmacological interventions, such as the recommended use of melatonin medication to improve sleep hygiene, resulted in a 26.7% increase in sleep quality for two months. The use of the drug as an intervention to promote sleep quality is highly recommended for clinical use due to its limited side effects on patients that do not impact the health or safety of patients.

The other identified clinical intervention to improve the sleep quality for patients in psychiatric units involved non-pharmacological strategies that involved combined therapy and physical change of the patient's sleeping environment. Ritmala-Castren et al. (2021) & Stewart & Arora (2022) successfully conducted and verified various non-pharmacological interventions, such as therapy and improving general physical hygiene in the sleeping environment, effectively promoting sleep hygiene in psychiatric units. The non-pharmacological interventions include providing patients with eye masks, ear plugs, relaxation therapy, sleep-inducing music, massage, regular physical exercises, acupressure, aromatherapy, and foot bath. A quality improvement study by Stewart & Arora (2022) that involved the use of non-pharmacological interventions

showed that relaxation techniques increase sleep quality by 28%, removing environmental factors like noise and poor light results by 7%, remove daytime napping by 5%, and bright light therapy by 7%. Other additional interventions include the provision of pain assistance intervention for patients to help address poor sleep quality among mental health patients. The identified pharmacological and non-pharmacological interventions can be successfully used separately or to educate staff on the importance of sleep hygiene to help implement best practices aligned with available sleep hygiene guidelines and protocol.

Effects of Training Staffs on Sleep Hygiene

The process of training medical staff on the process and importance of proper sleep hygiene can lead to the improvement of better sleep hygiene for patients in a psychiatric unit. According to Scott et al. (2021), healthcare providers, especially nurses, are in a better position to introduce and implement sleep hygiene interventions and practices as strategies for improving the clinical practice of ensuring patient safety. Successful training for healthcare providers on the importance of sleep hygiene is a better strategy to eliminate sleep disturbances and improve sleep quality and quantity among mental health patients (Briguglio et al., 2020). The process requires introducing a sleep hygiene protocol in in-patient psychiatric facilities which includes training and educating nurses and other healthcare providers on the issue and incorporating interventions sort from the nurses as they are the ones who spend much time with patients. According to Perez (2020), training nurses and adopting a nurse-driven sleep hygiene protocol in in-patient mental health facilities to ensure that the cause of poor sleep hygiene, such as the patients surrounding physical conditions and the quality of the clinical practices, are improved to increase the sleep quality to remain above 90%. Training healthcare staff on the process and importance of

maintaining better sleep hygiene can promote the successful implementation of sleep protocol that promotes better sleep quality among mental health patients to ensure patient safety.

Project I: Section 3

The Aim and Objectives

This DNP project aims to ensure the successful implementation of Sleep hygiene protocol in an inpatient psychiatric unit as an evidence-based practice intended to improve clinical practice to promote better mental health outcomes. The specific purpose is to improve sleep quality and quantity to address the causes and impacts of sleep disturbance and deprivation for inpatients at the facility. The project's primary aim is to introduce and implement the Sleep hygiene protocol in an inpatient psychiatric unit to help reduce delirium and hospital stays. The secondary aim is to assess the impact of implementing the Sleep hygiene protocol on the rate of reported cases of delirium and hospital stays of inpatients at the project before and after the intervention period. In the timeframe of the DNP project, the following objectives will be met.

- Implement a Sleep hygiene protocol at the project site.
- Reduce delirium rates in hospitalized psychiatric patients who participate in Sleep hygiene protocol when comparing overall rates 4 weeks before and 4 weeks after the intervention.
- Reduce hospital stays rates for hospitalized psychiatric patients who participate in Sleep hygiene protocol when comparing overall rates 4 weeks before and 4 weeks after the intervention
- Improve the provider compliance with Sleep hygiene measures as determined through chart audits 4 weeks before and 4 weeks after the implementation.

Theoretical Model

The DNP project will adopt the Iowa Model to implement the Sleep Hygiene Protocol at the selected inpatient psychiatric unit project site. Falkenberg-Olson (2019) found that the Iowa Model of Evidence-Based Practice to Promote Quality Care was created and introduced into clinical practice by the nurses at the University of Iowa Hospital and faculty from the University of Iowa College of Nursing in 1990 to provide a pathway for the adoption of EBP by nurses in improving patient care and safety. The conceptual framework was created to enable healthcare practitioners and providers to successfully incorporate evidence-based practice (EBP) into clinical practice to solve the daily healthcare issues arising within clinical settings. According to Kurian (2020), Marita G. Titler, Ph.D., RN, FAAN, headed the team of nursing leaders at the University of Iowa Hospitals and Clinics and was a key leader in guiding and providing necessary efforts for the model translation and implementation of tested and approved research into practice. The translating efforts of the nursing team made the Iowa Model an easy conceptual framework to understand and incorporate into research since it provides an easy-to-follow plan on how to use various interventions and strategies to provide solutions to clinical problems that can positively impact the outcome of clinical practice of proving quality care and ensuring patients safety. Since its creation, the application and impact of the Iowa Model in promoting the adoption of evidence-based practice and research have been reviewed and revised to assert its usefulness in promoting better clinical outcomes (Hanrahan *et al*. 2019). Nursing leaders and professionals in nursing continue to recommend using the Iowa Model in ensuring the successful implementation of EBP and quality improvement initiatives in clinical settings to improve patient safety and clinical outcomes.

This DNP project involves implementing and improving sleep hygiene in the inpatient psychiatric unit as an evidence-based practice intended to improve mental health outcomes by reducing delirium and hospital stays. The project will adopt the IOWA model to ensure the successful implementation of Sleep hygiene protocol in inpatient psychiatric units to promote better mental health outcomes. Improved sleep hygiene in the mental health center is an evidence-based practice for improving mental health outcomes which justifies the application of the Iowa Model in this quality improvement initiative (Nikles *et al*., 2020). The selected conceptual framework identifies barriers to implementing the best strategies for sleep hygiene in the inpatient psychiatric units, designing better interventions and strategies for addressing the barriers to implementing the Sleep hygiene protocol. Application of the Iowa Model can provide more insights into understanding the source of sleep disturbances in inpatient psychiatric units and introduce better interventions for addressing them to promote better sleep quality and quantity.

Application of the Iowa Model

The Iowa Model has a theoretical framework that makes its application in quality improvement projects or the introduction of evidence-based practices into a clinical setting more efficient and possible. The Iowa model framework application in this quality improvement project will be made in different phases to accomplish the general and specific objectives. The first stage of the conceptual framework application will involve identifying triggering issues and opportunities at the selected healthcare organization to conduct the quality improvement initiative of promoting sleep hygiene protocol. Identifying triggering issues and opportunities involves assessing a project site (healthcare setting) that requires a quality improvement initiative to improve compliance with the Sleep hygiene protocol. In this case, a SWOT analysis was

conducted at the project site, which led to identifying a quality clinical practice in providing compliance with the provided Sleep hygiene protocols and guidelines.

The second phase of the framework requires the validation of the priority of the selected opportunity in clinical practice, deriving the research question, and stating the purpose of the quality improvement project. Sleep hygiene is an evidence-based practice for various healthcare settings in improving patients' outcome. Improving sleep hygiene is crucial in providing a safe healing environment for patients. Sleep hygiene is even more critical in psychiatric units to create a healthy environment and promote better mental health outcomes. The derived research purpose will be "Does the implementation of Sleep hygiene protocol in an inpatient psychiatric unit help reduce delirium and hospital stays." The third step involves validating the priority of the research. Yes! The selected quality improvement project is a priority because it helps improve the clinical practice of providing care to mentally diagnosed patients. Enhanced sleep quality is associated with better mental health outcomes.

The fourth stage of the model require the selection and formation of a team to help implement and measure the outcome of the project. The team will be comprised of nursing leaders, unit professors, or trained educators in various sleep hygiene aspects to ensure the quality improvement initiative's credibility, reliability, and validity. The role of the team is to help develop, implement, observe, measure, and the outcome of the quality improvement initiative. The project manager (DNP student) plays the active role of designating responsibilities for the project team members to ensure the success of the quality improvement initiative. The team can comprise nursing leaders at the chosen project site to help with implementation, unit professors to help assess the project outcomes, other nurses to assist in data collection, or trained professionals to help educate healthcare workers.

The fifth stage of implementing the Iowa Model requires selecting, gathering, appraising, and synthesis of various scholarly evidence on the topic under study. This literature review aims to provide more understanding of the issues surrounding sleep hygiene in psychiatry. This step involves using adequate and proper search methods and search engines to identify articles that can provide enough information on the issue under study. Peer-reviewed and recent articles should be given priority. Some sources of evidence that can be reviewed include government policy on sleep hygiene, surveys, and statistical data on the research topic. The literature review process involves an analysis of current trends, issues, patterns, and challenges affecting sleep quality in various medical settings in psychiatric units. The research synthesis allows the identification of the best strategies for sleep hygiene and the identification of research gaps from previous studies. A literature review requires synthesis and critique of various pieces of evidence, such as theoretical frameworks, case reports, expert opinions, current statistics, and scientific principles.

The sixth stage of the conceptual framework is implementing the pilot change. In this stage, Sleep hygiene protocol and best practices are implemented at the project site. The other identified intervention and strategies for improving sleep hygiene quality at the psychiatric unit are enforced project team. The selected project team members introduce and implements various aspects of Sleep hygiene protocols for the facility medical facility and management to implement and comply with to promote better sleep quality and quantity. The Sleep Hygiene Optimization Protocol (SHOP) at the inpatient psychiatric unit is enforced in this stage. The best practices for sleep hygiene are implemented in this phase. Various medical staff at the facility, such as nursing leaders at the hospital, are primarily engaged during the piloting phase. Before the pilot changes, there is a need to consider some of the barriers to implementing the intervention for the quality

improvement initiative, ensure the availability of the necessary resources, and develop a better protocol for enforcing the project. Secondly, there is a need to cross-check the requirements, such as the implementation plan and procedure, setting facilitator, measurement instruments, evaluation plan, and identifying possible solutions for the identified barriers to the pilot change. The final exercise in the sixth stage is adopting various interventions and strategies to ensure the successful implementation of the Sleep hygiene protocols at the project site, which may involve offering education and training to healthcare workers and reviewing existing sleep hygiene policies and patterns at the facility. The conclusion of the pilot change involves collecting the post-invention period data after the five weeks for comparison and analysis. Evaluating the quality improvement initiative intervention will require assessing the accomplishment of the research objectives.

The last phase of the Iowa Model for the DNP quality improvement initiative requires assessing the positive outcome of the project in improving mental health outcomes in an inpatient psychiatric unit. The step involves the evaluation of the quality improvement initiative outcome by the nursing leadership in charge, in this case, the unit professors. The role of the unit professor is to assess the credibility, reliability, and viability of the project and evaluate its application or adoption in daily clinical practice. The dissemination stage of the Iowa Model is only done if the project successfully achieves its intended aim and objectives. It involves getting feedback from the project assessment team and deciding if the project should be recommended to the actual clinical practice or if it involves more improvement before being accepted in a clinical setting to promote patient care and safety.

Project II: Section 1

Project Population

Two different population samples would be targeted for the completion of the proposed project that involves the implementation of the SHP. The direct population of interest will be the healthcare workers including the CNAs, LPNs, RNs and physicians who deliver direct patient care at the in-patient psychiatric facility. The inclusion criteria will include those involved in direct patient care, employed on a full or part-time basis, and any trained healthcare workers available at the institution during the timeframe of implementation. The exclusion criteria for the direct population will be per diem medical staff and those who are not involved in the direct care of patients.

The second group targeted and included in the project will involve the indirect population comprising mentally ill admitted patients at the selected mental health facility who the project will impact. Most of the data that will be collected and evaluated will be obtained from the indirect population to assess the impact of the provided interventions. No definite number of patients will be targeted by the project from the site as long as they meet the inclusion criteria. The inclusion criteria for the indirect population will be: admitted mentally ill patients for long-term care and those admitted from the onset of the project. The exclusion criteria for the indirect population will be patients are placed under confinement or seclusion because of the risk they pose to their fellows, such as violent behaviors or attempted suicides.

Project Setting

The project site is an in-patient mental health facility located in the U.S. The institution is a public specialist and an operational psychiatric unit funded and operated by a State Healthcare Department. The operations of the mental health facility were accredited by the Joint

Commission and certified by the Healthcare Finance Administration. The mental institutions provide mental health services for in-patient and outpatient at different levels and categories. The county and state governments primarily use the project site to promote forensic mental health services to ensure rehabilitation and social integration of individuals found or charged with mentally associated criminal offenses. The first group of mentally ill patients admitted at the facility include offenders who are found to have a mental health illness or disorder by the state judicial system, Individuals found incompetent to stand trial, the individuals who are found not guilty by the judicial system due to underlying mental instability or disorder, and the patients found to fit the Conservatorship Lanterman-Petris-Short (LPS) Act. The Conservatorship Lanterman-Petris-Short (LPS) Act refers to the judicial system directive for an individual to involuntarily seek mental health treatment to cure or reduce the severity of underlying mental health until they are able to accept third-party assistance (Enos, 2020). Being a State-operated facility attached to the judicial system, the facility does not accept voluntary admissions. Patients who qualify or are admitted for treatment at the facility can be treated, discharged, diagnosed, and admitted for a much more extended period.

The facility's current staff is estimated to be 1530, of which 67% are women and 33% are men. The mental health facility has a bed capacity of up to 826 beds. The treatment program at the psychiatric facility combines occupational and rehabilitation therapies, individual and group therapy, and financial and social problems management to enhance better mental health outcomes and successful social reintegration of the admitted patients back into society. Some of the primary treatments offered at the facility include psychology, psychiatry, rehabilitation, nursing, medical, therapies, pharmacy, dietary, and social services, among others.

Stakeholders

The primary stakeholders for the project are the organization's board of management, the employees at the project sites, the patients, and the project team whose cooperation are crucial for the success of the project. The administration of the mental health institution granted permission to conduct this DNP project (Appendix A). The project facility through its board of management has already assured the project manager of the intended cooperation and collaboration of the its administration, healthcare workers, and the patients in ensuring the successful implementation of the Sleep hygiene guidelines. The healthcare workers will play a crucial role in the data collection process and also acting as the link between the project team and the indirect population. The cooperation of all the stakeholders that encompass members at the project site and the project team is crucial in ensuring the project success.

Project II: Section 2

Interventions

The interventions are designed to promote sleep hygiene in the inpatient psychiatric unit. A prepared Sleep Hygiene Protocol (SHP) has been derived to help improve the sleep hygiene quality and quantity at the project site to improve patient's mental health outcomes and reduce hospital stays (Appendix E). Using validated resources and tools, the project manager will collaboratively implement the Sleep Hygiene Protocol as a quality improvement initiative at the facility within the provided timeline.

Planning Project Team

The project manager (DNP Student) will planning, implementing the identified interventions, and compiling the findings of the quality improvement project interventions. The project manager oversees the completion of the quality improvement project by planning and

attending vital meetings with the project team members to mobilize resources. The other project team members are the project instructor, project manager, and project site representative, whose key roles are to guide the project manager's efforts and strategies in accomplishing the quality project and evaluate the project's outcome.

Timeline

The project will be done in three stages: pre-intervention, intervention, and post-intervention. The implementation of the Sleep Hygiene Protocol at the selected project site will be done in November and will last for five weeks, as shown in (Appendix D). The Sleeping Hygiene Protocol addresses changes and improvements in key sleep hygiene areas, such as educating healthcare workers on new sleep hygiene guidelines, improving sleep schedules, introducing environmental changes, evaluating individual and institutional sleep plans, promoting better exercise plans, and offering alternative nutrition plans (Gardiner *et al*., 2022). The Sleep Hygiene Protocol for the quality improvement project has been derived through collaborative efforts with principal project team members and a review of peer-reviewed sleep guidelines by the Joint Commission and CDC. The established timeline will guide the project manager's efforts in implementing the SHP and ensuring the completion of the quality improvement project within the given timeframe (Appendix E).

Resources and Tools

There are vital resources, such as adequate reminder posters, that are crucial for implementing the developed Sleep Hygiene Protocol to complete the quality improvement project at the selected project site. The chosen tools have been tested and successfully used for quality improvement projects. The project manager will derive other resources for education and reminders.

Sleep Hygiene Protocol

The project manager developed the Sleep Hygiene Protocol, which the project mentor approved to aid in the quality improvement project implementation exercise. According to Herscher et al. (2021), a Sleep Hygiene Protocol (SHP) is a set of instructions or guidelines describing a process to be followed to ensure better sleep quality and quantity for patients. The components of a Sleep hygiene protocol vary across different facilities depending on the characteristics of the needs of the target population. The project manager derived the SHP for this quality improvement project following an outcome visit to the project site, desk research, and review of related scholarly evidence. The SHP (Appendix E) was prepared to address sleep deprivation and disturbances challenges in an inpatient psychiatric facility by introducing practices and habits that promote sleep quality. The critical areas interventions captured in the SHP encompass vital areas of sleep hygiene, sleep environment, physical activity, nutrition, and staff training. The SHP captures key sleep hygiene variables that can be measured to evaluate if the objectives of the quality improvement project are accomplished.

Education Tools

The education tools are vital for improving the healthcare workers' knowledge, attitude, and behavior towards adhering to the introduced sleep hygiene protocols. The education tools will include a hard and soft copy of the prepared Sleep hygiene protocol and sample videos of other inpatient psychiatric institution that has successfully implemented similar SHPs. The training will emphasize the four pillars of better sleep hygiene: depth, duration, continuity, and regularity. Written charts will also be used to enhance the education and training of the healthcare workers.

Posters and Reminders

The established Sleep Hygiene Protocol will be printed and posted in strategic areas at the project site, such as staff departments and the patient's wards. The facility notice board will also be used to write daily reminders in bold letters urging the target population to comply with the provided Sleep Hygiene Protocol and render feedback. Written charts explaining the advantages of adhering to the SHP will also be posted on the notice board.

Richards-Campbell Sleep Questionnaire (RCSQ)

After introducing the Sleeping Hygiene protocol, healthcare workers will use the RCSQ instrument to evaluate and assess the nature and quality of the patient's sleep. According to Perez (2020), the RCSQ is a simple and validated research questionnaire instrument that nurses can use to measure the sleep quality of patients in acute care settings. However, despite the wide use of the RCSQ instrument to measure the sleep quality of patients by nurses, its interrater reliability and agreement are yet to be fully assessed. As shown in (Appendix C), the evaluation instrument has five questions as indicators for evaluating sleep depth, sleep latency, awakenings, returning to sleep, and sleep quality using a 100-mm visual analogue scale where a higher score signals more positive results compared to lower scores.

Sleep Hygiene Observation Checklist

After implementing the Sleep Hygiene Protocol, the project manager will derive a sleep hygiene observation checklist for the project site to assess and measure the target population's compliance. The Sleep hygiene observation will capture the sleep infrastructure and system change that the facility would have improved by the beginning of the project implementation in November, following previous recommendations by the project manager. The derived sleep

observation checklist will capture data on crucial Sleep Hygiene variables, such as sleep quantity, quality, continuity, and regularity.

Project II: Section 3

Data Collection

The project manager will collect data to evaluate the impact of the quality improvement project of implementing a Sleep Hygiene protocol in an inpatient psychiatric unit to improve mental health outcomes. Data will be collected and analyzed on key objectives of the quality improvement project. A random sample of 100 medical charts for patients admitted to the facility will be selected to record hospital stays and delirium rates. The first process would involve conducting a chart review for admitted patients to measure hospital stay rates for patients within the first week for the previous five weeks and the last week of the implementation. The exercise will compare the number of patients across the facility who have had their hospital stays extended due to sleep hygiene-related factors for the previous month and the month of implementation. The process will involve abstracting diagnosed cases of delirium from the medications section of the patient's medical charts. Secondly, data will be collected to measure the delirium rates of patients participating in the SHP. The data will be collected through chart review for patients participating in the exercise within the first week for the previous 5 weeks and reviewed weekly with a plan to analyze them after the 5-week implementation period. The International Classification of Diseases (ICD) codes 10 and 11 for delirium, as listed by the WHO under the range of behavioral, mental, and neurodevelopment disorders, will be manually reviewed to denote the prevalence of related cases at the facility. Delirium in ICD code 10 represents delirium and relevant symptoms, and ICD 11 encompasses disturbance of behavior and emotion and may also involve impairment in multiple cognitive domains (Kuo *et al*., 2019).

Finally, data will be collected using an established sleep hygiene observation checklist to evaluate the provider's compliance with the implemented sleep hygiene measures. A sleep observation checklist will be derived from the Sleep Hygiene Protocol that will involve ticking Yes or No to the organization's adoption of the 12 provided sleep hygiene interventions. The provider compliance data with the introduced sleep hygiene guidelines will be collected on the last week of implementation.

Ethics/ Humans Protection

Zaccagnini & Pechacek (2019) found that it is essential for researchers to uphold ethical standards while implementing quality improvement projects to protect the welfare of research participants. The Touro University of Nevada does not require an institutional review board (IRB) for a quality improvement project. The practicum site granted permission to carry out the quality improvement project at the facility. Ethical standards for performing a healthcare quality improvement project will be complied with throughout the project. The process will require keeping the collected data from the participants confidential by limiting access, use, or publication. The patient data obtained through chart reviews will have no patient identifier or private information in fulfillment of the Insurance Accountability Act (HIPPA) (Williams & Colomb, 2020).

Data Analysis

Data analysis will be completed using a Microsoft Excel spreadsheet and Statistical Package for Social Science (SPSS) for Windows (Version 28.00). The data will be stored in Microsoft Excel to be organized and sorted before being exported to SPSS software for subsequent statistical analysis to measure the objectives. A descriptive statistics analysis will be carried out to evaluate the rate of hospital stays by using key measures of central tendency such

as mean, median, and mode appropriately to compare data before and after implementation. According to Mishra *et al*. (2019), the primary purpose of a descriptive analysis is to summarize the characteristics of a given data set that meets the basic assumptions of linearity, normality, equality, and variance. A confidence interval (CI) of 95% will be used for the descriptive analysis of patient's hospital stays and cases of delirium rates of patients (Normality). The second descriptive analysis will measure the delirium rates among patients before and after the implementation period using mean, median, and mode metrics. Finally, descriptive statistics will show the mean, median, and mode of the provider's compliance and non-compliance rates with every introduced sleep hygiene intervention at the facility. Subsequent compliance and non-compliance of percentage rates will be obtained to substantiate the success rate of the providers' adoption of the SHP in achieving the quality improvement project's primary purpose. The analysis will adopt the assumption of equality of variance where variances in hospital stay rates and delirium rates will be assumed to roughly equal across different groups and time periods. Finally, linearity assumption will also apply where changes in hospital stay rates and delirium rates will be assumed to exhibit a linear relationship with the introduction of the SHP.

Project III: Module 2

Section 1: Data Analysis /Discussion

Results

A sample of 100 long-term care patients was obtained for the sleep hygiene intervention project, carried out over a five-week period. There was no missing data since the data was extracted from patient charts. Of the 100 participants included in the pre-intervention, 32 (32%) participants were diagnosed with delirium, and 68 (68%) did not suffer from delirium. In the

post-intervention period, of the 100 participants, 11(11%) were diagnosed with delirium, and 89 (89%) did not suffer delirium. The results are shown in table 1 below.

Table 1: Delirium occurrence

	Category	N	Percentage	Test Prop.	p-value
Pre-intervention delirium	Yes	32	32%	0.50	0.000
	No	68	68%		
Post-intervention-delirium	No	89	89%	0.50	0.000
	Yes	11	11%		

The duration of hospital stay before the project was, on average, longer (M = 35.3, SD = 9.4, 95% C.I [33.487, 37.173]) than the in the post-intervention sample (M = 21.5, SD = 2.1, 95% c.i [19.55, 23.35]). Figures 1 and 2 show this result. The mean excess stay duration in days was also higher for the pre-intervention sample (M = 5.8, SD = 4.4, 95% c.i [4.91, 6.63]) than the post-intervention period (M = 2.1, SD = 1.6, 95% c.i [1.80, 2.4]). Table 2 shows these results. The differences in means between hospital stay pre-intervention and post-intervention were statistically significant (M = 13.9, SD, 95% c.i [11,16.8], p <.001), as were the differences in means between hospital stays extension pre-intervention and post-intervention (M = 3.66, SD, 95% c.i[2.73,4.59], p < .001), as shown in Table 3. see appendix G for full results.

Figure 1: Delirium and hospital stay before intervention

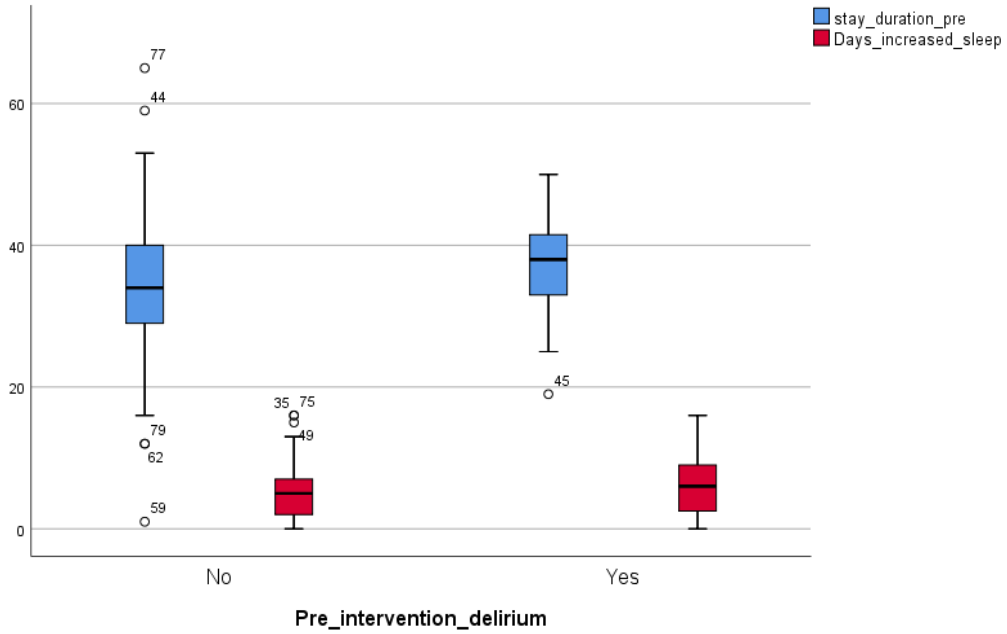


Figure 2: Post-intervention delirium and hospital stay

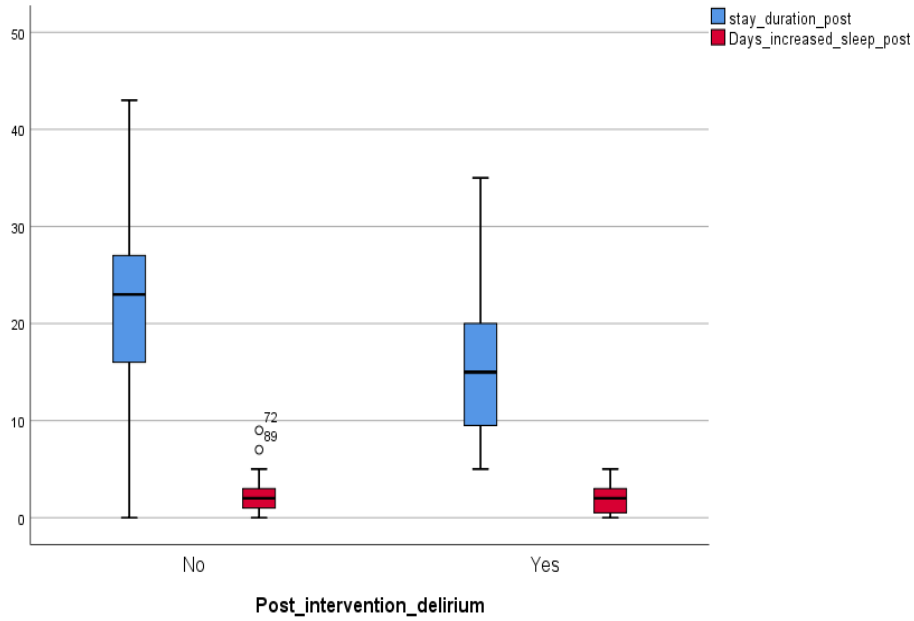


Table 2: Hospital stay

	Minimum	Maximum	Mean	Std. Deviation	Variance	95% c. i
Hospital stays pre-Intervention	1	65	35.33	9.403	88.425	(33.49, 37.17)
Stay increased [delirium] pre-intervention	0	16	5.77	4.383	19.209	(4.91, 6.63)
Hospital stays post-Intervention	0	43	21.45	9.695	93.987	(19.55, 23.35)
Stay increased [delirium] post-intervention	0	9	2.11	1.601	2.564	(1.796, 2.424)

Table 3: Hospital stay differences

Pair	Mean diff.	Std. Deviation	S.E Mean	95% Confidence Interval of the Difference		P value
stay duration and stay duration post	13.88	14.576	1.458	10.988	16.772	0.00
Days increased delirium pre- and Days increased delirium post	3.66	4.667	0.467	2.734	4.586	0.00

The relative risk was 65.63 with an attributable risk of -0.11, as shown in table 4 below.

Table 4: Disease Contingency Table

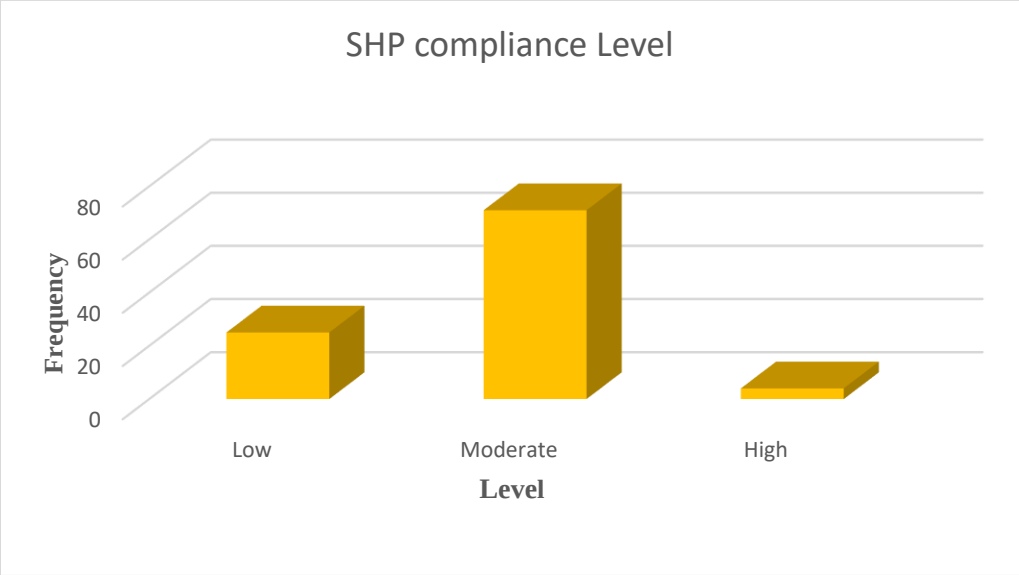
	Disease	No disease	Total
Intervention	21	79	100
Control	32	68	100
Total	53	147	200
Relative Risk	0.65625		
Attributable Risk	-0.11		

The facility's compliance level was measured using the Sleep Hygiene Observation Checklist administered to each of the patients in the project implementation. The checklist, appendix F, was abstracted to 3 levels: low, moderate and high. Compliance with 3 or less of the checklist items was regarded as low, between 4 and 7, and moderate and above 8 as high. The majority of the patients 71% recorded a moderate level of compliance to the interventions, while only 4% had a high level of compliance to the sleep hygiene program's interventions as shown in Table 5 and figure 3 below.

Table 5: Sleep Hygiene Observation Compliance

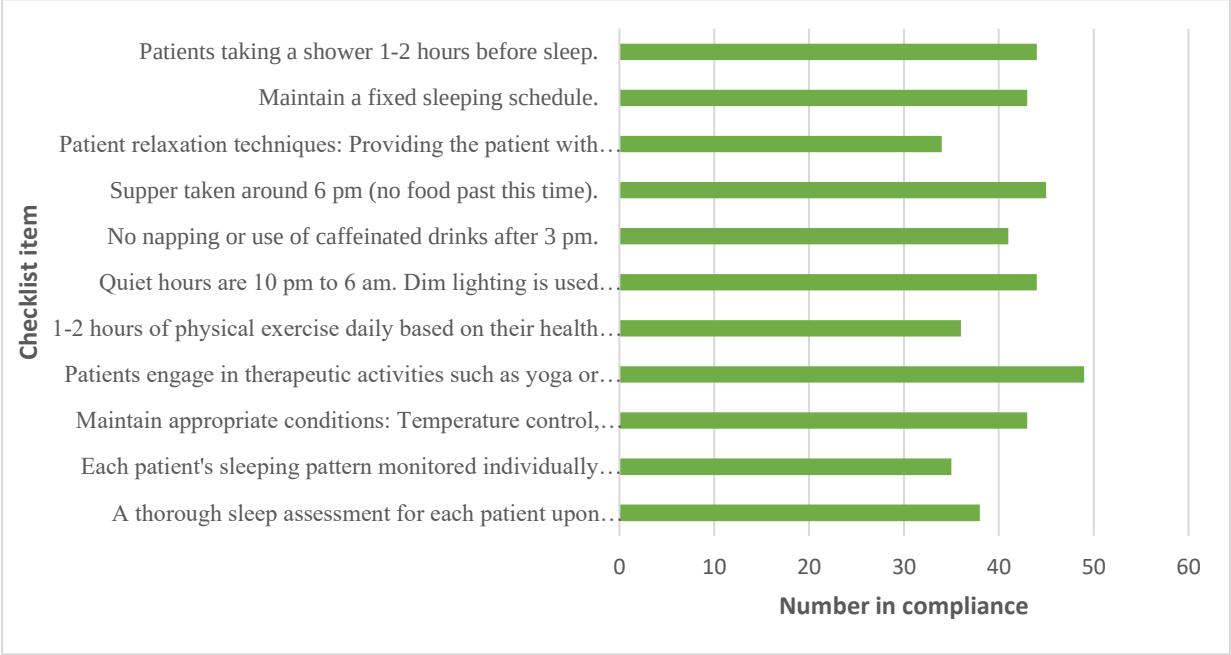
Compliance level Level	Frequency	Percentage
Low	25	25.0
Moderate	71	71.0
High	4	4.0

Figure 3:Compliance level



Engaging in therapeutic activities such as yoga was the most adhered to, 49% whereas sleep monitoring, 35% and relaxation techniques, 34% were the least complied to. The compliance to individual sleep hygiene protocol items is shown in figure 4 below.

Figure 4: compliance to individual SHP interventions.



Summary

This project sought to reduce delirium rates as well as hospital stay rates for hospitalized psychiatric patients who participated in the sleep hygiene protocol by comparing the overall rates 5 weeks before and 5 weeks after the intervention. Additionally, it aimed to improve the providers' compliance with sleep hygiene measures as determined through chart audits during the same period. Following the implementation of the project, the delirium rates were found to reduce significantly even though there were reported incidences in this period. Participating in the sleep hygiene protocol project reduced the risk of delirium by 34.4%. The mean number of days of hospitalization reduced significantly by 13 days following the implementation of the sleep hygiene protocol, while the excess stay duration due to delirium was also reduced by 3

days. However, it is not adequately determined to what degree are these attributable to the project.

The project had, to its strengths, an increased objectivity and minimal risk of ethical violations since it used secondary data collected as part of the facility's normal operations. Secondly, the sample size drawn was sufficient to address the project questions, and the use of descriptive statistics yielded results that were easier to understand. Despite the aforementioned strengths, the project had limitations, such as the fact that the project design did not control for confounding factors arising alongside the intervention's implementation, thus the risk of overestimating the effectiveness of the interventions. The intervention was only made in one facility, so the findings may not generalize well to other institutions. Furthermore, using only descriptive analysis makes it difficult to determine causation accurately.

Interpretation

This project finds that by improving sleep hygiene and thus sleep quality, hospital stays are reduced among in-patient mental health facility patients, a finding that is in line with Scott et al. (2021) as well as Aboaja et al. (2021) and Herscher et al. (2021), who drew a similar conclusion. Furthermore, improving sleep hygiene has been found to reduce the length of excess hospital stays due to delirium, similar to Binte Arman et al. (2022). Training the facility medical staff on the process and importance of proper sleep hygiene positively impacted the success of the intervention as evaluated by the overall facility compliance, which was high for most evaluated metrics.

The findings, however, did slightly deviate from the anticipated results. At the start of the project, it was anticipated that the sleep hygiene protocol would eliminate the incidence of delirium, which has not been realized. Moreover, the intervention prioritized non-pharmaceutical

methods such as yoga and relaxation, which have been shown to be effective in previous studies. However, due to constraints at the facility, implementing some of these methods was not feasible, undermining the effectiveness of the intervention. As a strategic trade-off, the project used a pre-post analysis approach, and in so doing, it traded off scientific robustness for simplicity, cost-effectiveness, and real-world applicability.

Section 2: Limitations, Conclusion, and Abstract

Limitations

The project design did not control for confounding factors, such as the facility's interventions, which may have been carried out in parallel with the intervention's implementation, raising the risk of overestimating the effectiveness of the interventions. In other words, although limited, the in-patient psychiatric facility had some approaches to promote sleep. Thus, the results of the quality improvement initiative cannot only be attributed to the project's interventions. In addition, the interventions were only implemented in a single facility, specifically an in-patient psychiatric facility. Therefore, the generalization of the project to other institutions of different types might be a challenge. Generalizability in nursing-related initiatives is critical as it determines the project results' usefulness for a broader population group (Kreiter & Zaidi, 2020). Another limitation is that the project was only implemented for 5 weeks, which might be a minimal timeline for implementing and assessing the introduced interventions. The interventions' implementation should be done for an extended timeline to obtain more reliable results. Finally, there was a chance of selection bias in the data collection process as the data was only collected from in-patients in the psychiatric facility. Selection bias occurs when the selection process for participants in a study systematically favors certain characteristics, leading to a non-representative sample and potentially distorting the study's results (Reeves et al., 2022).

To minimize the effects of this type of bias, the participants were randomly selected using the hospital records. In addition, using descriptive statistics to analyze the data minimized the need to control for confounders statistically.

Conclusion

The main objective of the quality improvement project was to promote sleep hygiene to reduce hospital stays and delirium by establishing and implementing a Sleep Hygiene Protocol within an in-patient mental health facility. Based on the project results, improving sleep hygiene in in-patient mental health facilities reduces hospital stays, demonstrating a positive impact on patient outcomes, as evidenced by a comparison of delirium rates before and after the implementation of the project. Similarly, improving sleep hygiene has been found to reduce the length of extended hospital stays due to delirium. In general, the interventions introduced by the project are highly sustainable; despite this, as identified at the site, some aspects are not as viable, especially in the long run, such as having patients engage in relaxation activities like yoga, providing 1 to 2 hours of exercise daily, and monitoring each patient's sleep pattern individually. Staffing and financial constraints were identified as significant hindrances to the sustained implementation of these interventions in the long term. The project outcomes show that more emphasis needs to be put on sleep hygiene to lower the risk of the onset of delirium. For nursing practice, the project underlines the significance of prioritizing sleep hygiene to enhance patient outcomes in mental health facilities while acknowledging resource limitations and promoting more feasible interventions. In terms of policy, there is a need to consider and address staffing and financial constraints to support sustainable implementation of sleep hygiene interventions, emphasizing integrating evidence-based practices into mental health facility policies to optimize patient care. Further analysis is required to investigate the causative

association between sleep hygiene and the reduction in delirium incidence in mental health facilities.

References

Aboaja, A., Perry, A. E., Steele, R., Dewa, L. H., Carey, J. F., Clarbour, J., Shah, S., & Cairney, S. A. (2021). Sleep interventions for adults admitted to psychiatric in-patient settings. JBI Evidence Synthesis, Publish Ahead of Print. https://doi.org/10.11124/jbisrir-d-19-00419

Alanazi, E. M., Alanazi, A. M., Albuhairy, A. H., & Alanazi, A. A. (2023). Sleep hygiene practices and its impact on mental health and functional performance among adults in Tabuk city: A cross-sectional study. *Cureus*. https://doi.org/10.7759/cureus.36221

Babbie, E., Wagner III, W. E., & Zaino, J. (2022). *Adventures in social research: Data analysis using IBM SPSS statistics*. Sage Publications.

Binte Arman, S. N., Lee, Y. H., Lopez, V., & Lim, S. H. (2022). Subjective sleep quality among hospitalized adult patients: An observational, cross-sectional study. *Proceedings of Singapore Healthcare*, *31*, 201010582211116. https://doi.org/10.1177/20101058221111664

Briguglio, M., Vitale, J., Galentino, R., Banfi, G., Zanaboni Dina, C., Bona, A., Panzica, G., Porta, M., Dell'Osso, B., & Glick, I. (2020). Healthy eating, physical activity, and sleep hygiene (HEPAS) as the winning triad for sustaining physical and mental health in patients at risk for or with neuropsychiatric disorders: Considerations for clinical Practice. *Neuropsychiatric Disease and Treatment*, *16*, 55-70. https://doi.org/10.2147/ndt.s229206

Burger, P., Van den Ende, E. S., Lukman, W., Burchell, G. L., Steur, L. M., Merten, H., Nanayakkara, P. W., & Gemke, R. J. (2022). Sleep in hospitalized pediatric and adult

patients – A systematic review and meta-analysis. *Sleep Medicine: X, 4, 100059*. https://doi.org/10.1016/j.sleepx.2022.100059

California, S. of. (n.d.). *Department of State Hospitals (DSH) - metropolitan: Home*. Organization Title. https://www.dsh.ca.gov/Metropolitan/

Delaney, L. J., Currie, M. J., Huang, H. C., Lopez, V., & Van Haren, F. (2018). "They can rest at home": An observational study of patients' quality of sleep in an Australian hospital. *BMC Health Services Research, 18(1)*. https://doi.org/10.1186/s12913-018-3201-z

Enos, G. (2020). Audit of forced care in California fuels discussion of flaws in law. *Mental Health Weekly*, *30*(31), 1-8.

Falkenberg-Olson, A. C. (2019). Research translation and the evolving PhD and DNP practice roles: A collaborative call for nurse practitioners. *Journal of the American Association of Nurse Practitioners, 31(8), 447-453.*

Fietze, I., Laharnar, N., Koellner, V., & Penzel, T. (2021). The different faces of insomnia. *Frontiers in Psychiatry, 12*. https://doi.org/10.3389/fpsyt.2021.683943

Gardiner, P. M., Kinnafick, F., Breen, K. C., Girardi, A., & Hartescu, I. (2022). Behavioural, medical & environmental interventions to improve sleep quality for mental health inpatients in secure settings: A systematic review & meta-analysis. *The Journal of Forensic Psychiatry & Psychology*, *33*(5), 745-779. https://doi.org/10.1080/14789949.2022.2111320

Hanrahan, K., Fowler, C., & McCarthy, A. M. (2019). Iowa model revised: Research and evidence-based practice application. *Journal of pediatric nursing, 48,* 121-122.

Herscher, M., Mikhaylov, D., Barazani, S., Sastow, D., Yeo, I., Dunn, A. S., & Cho, H. J. (2021). A sleep hygiene intervention to improve sleep quality for hospitalized patients. *The Joint Commission Journal on Quality and Patient Safety, 47(6), 343-346.* https://doi.org/10.1016/j.jcjq.2021.02.003

Horne, S., Hay, K., Watson, S., & Anderson, K. N. (2018). An evaluation of sleep disturbance on in-patient psychiatric units in the UK. *BJPsych Bulletin, 42(5), 193-197.* https://doi.org/10.1192/bjb.2018.42

Joint Commission. (2022). Sleep hygiene intervention improves sleep for hospital patients. *A Trusted Partner in Patient Care | The Joint Commission*. https://www.jointcommission.org/resources/news-and-multimedia/news/2021/05/sleep-hygiene-intervention-improves-sleep-for-hospital-patients/#.ZGKAtHZBzIU

Kreiter, C., & Zaidi, N. B. (2020). Generalizability theory's role in validity research: Innovative applications in health science education. *Health Professions Education*, *6*(2), 282-290. https://doi.org/10.1016/j.hpe.2020.02.002

Kulpatcharapong, S., Chewcharat, P., Ruxrungtham, K., Gonlachanvit, S., Patcharatrakul, T., Chaitusaney, B., Muntham, D., Reutrakul, S., & Chirakalwasan, N. (2020). Sleep quality of hospitalized patients, contributing factors, and prevalence of associated disorders. *Sleep Disorders, 2020, 1-7.* https://doi.org/10.1155/2020/8518396

Kuo, C. L., Pilling, L. C., Atkins, J. L., Fortinsky, R. H., Kuchel, G. A., & Melzer, D. (2022). APOE e4 genotypes increase risk of delirium during COVID-19-related hospitalizations: evidence from a large UK Cohort. *The Journals of Gerontology: Series A*, *77*(4), 879-880.

Kurian, B. (2020). *Fall Risk Assessment and Utilization of Fall Prevention Strategies for Older Adults in Primary Care Setting*. Oklahoma City University.

Kuzmik, A., Boltz, M., BeLue, R., Galvin, J. E., Arendacs, R., & Resnick, B. (2022). Factors associated with sleep quality in hospitalized persons with dementia. *Alzheimer Disease & Associated Disorders*, *36*(3), 253-258. https://doi.org/10.1097/wad.0000000000000502

Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of cardiac anaesthesia*, *22*(1), 67.

Nikles, J., Mitchell, G. K., de Miranda Araújo, R., Harris, T., Heussler, H. S., Punja, S., ... & Senior, H. E. J. (2020). A systematic review of the effectiveness of sleep hygiene in children with ADHD. *Psychology, Health & Medicine*, *25*(4), 497-518.

Nittari, G., Khuman, R., Baldoni, S., Pallotta, G., Battineni, G., Sirignano, A., ... & Ricci, G. (2020). Telemedicine practice: review of the current ethical and legal challenges. *Telemedicine and e-Health*, *26*(12), 1427-1437.

Novak, C., Packer, E., Paterson, A., Roshi, A., Locke, R., Keown, P., Watson, S., & Anderson, K. N. (2020). Feasibility and utility of enhanced sleep management on in-patient psychiatry wards. *BJPsych Bulletin, 44(6), 255-260.* https://doi.org/10.1192/bjb.2020.30

Perez, M. (2020). Supporting Adequate Sleep in Patients Hospitalized with Psychiatric Illness Through a Nurse-Driven Protocol.

Reeves, A., Elliott, M. R., Lewis, T. T., Karvonen-Gutierrez, C. A., Herman, W. H., & Harlow, S. D. (2022). Study selection bias and racial or ethnic disparities in estimated

age at onset of Cardiometabolic disease among midlife women in the US. *JAMA Network Open*, *5*(11), e2240665. https://doi.org/10.1001/jamanetworkopen.2022.40665

Ritmala-Castren, M., Salanterä, S., Holm, A., Heino, M., Lundgrén-Laine, H., & Koivunen, M. (2021). Sleep improvement intervention and its effect on patients' sleep on the ward. *Journal of Clinical Nursing, 31(1-2), 275-282.* https://doi.org/10.1111/jocn.15906

Scott, A. J., Webb, T. L., James, M. M., Rowse, G., & Weich, S. (2021). Improving sleep quality leads to better mental health: A meta-analysis of randomised controlled trials. https://doi.org/10.31234/osf.io/t2efb

Stewart, N. H., & Arora, V. M. (2022). Sleep in hospitalized older adults. *Sleep Medicine Clinics, 17(2), 223-232.* https://doi.org/10.1016/j.jsmc.2022.02.002

Stewart, N. H., Walters, R. W., Mokhlesi, B., Lauderdale, D. S., & Arora, V. M. (2020). Sleep in hospitalized patients with chronic obstructive pulmonary disease: An observational study. *Journal of Clinical Sleep Medicine, 16*(10), 1693-1699. https://doi.org/10.5664/jcsm.8646

Talih, F., Ajaltouni, J., Ghandour, H., Abu-Mohammad, A. S., & Kobeissy, F. (2018). Insomnia in hospitalized psychiatric patients: Prevalence and associated factors. *Neuropsychiatric Disease and Treatment, 14, 969-975.* https://doi.org/10.2147/ndt.s160742

Van den Ende, E. S., Burger, P., Keesenberg, M., Merten, H., Gemke, R. J., & Nanayakkara, P. W. (2022). Patient-nurse agreement on in-patient sleep and sleep disturbing factors. *Sleep Medicine: X, 4*, 100047. https://doi.org/10.1016/j.sleepx.2022.100047

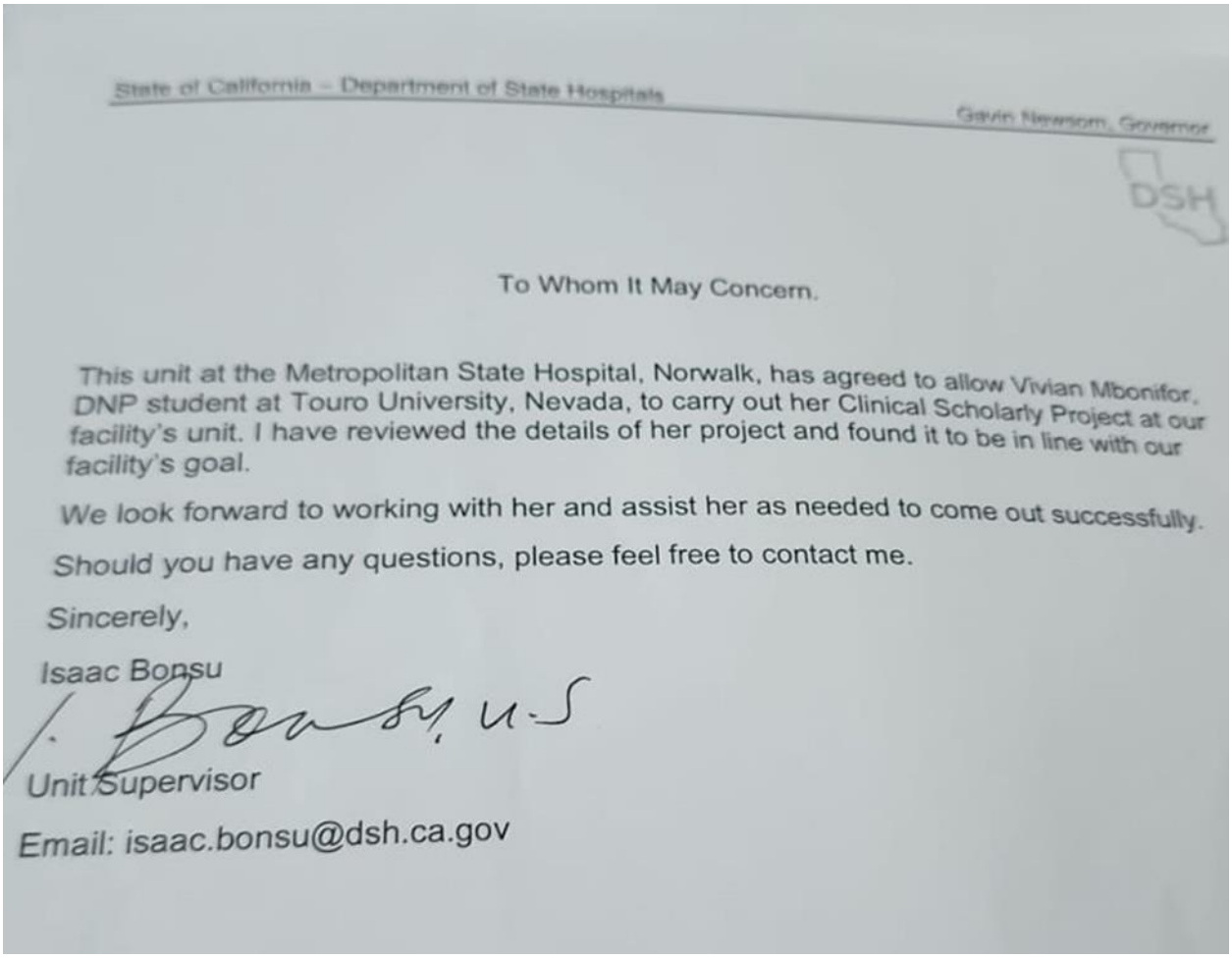
Wesselius, H. M., Van Den Ende, E. S., Alsma, J., Ter Maaten, J. C., Schuit, S. C., Stassen, P. M., ... & Nanayakkara, P. W. (2018). Quality and quantity of sleep and factors associated with sleep disturbance in hospitalized patients. *JAMA internal medicine, 178(9), 1201-1208.*

Williams, K., & Colomb, P. (2020). Important considerations for the institutional review board when granting health insurance portability and accountability act authorization waivers. *Ochsner Journal, 20(1), 95-97*

Zaccagnini, M., & Pechacek, J. M. (2019). *The doctor of nursing practice essentials: A new model for advanced practice nursing*. Jones & Bartlett Learning.

APPENDICES

Appendix A: Letter of Approval



State of California – Department of State Hospitals

Gavin Newsom, Governor

DSH

To Whom It May Concern.

This unit at the Metropolitan State Hospital, Norwalk, has agreed to allow Vivian Mbonifor, DNP student at Touro University, Nevada, to carry out her Clinical Scholarly Project at our facility's unit. I have reviewed the details of her project and found it to be in line with our facility's goal.

We look forward to working with her and assist her as needed to come out successfully.

Should you have any questions, please feel free to contact me.

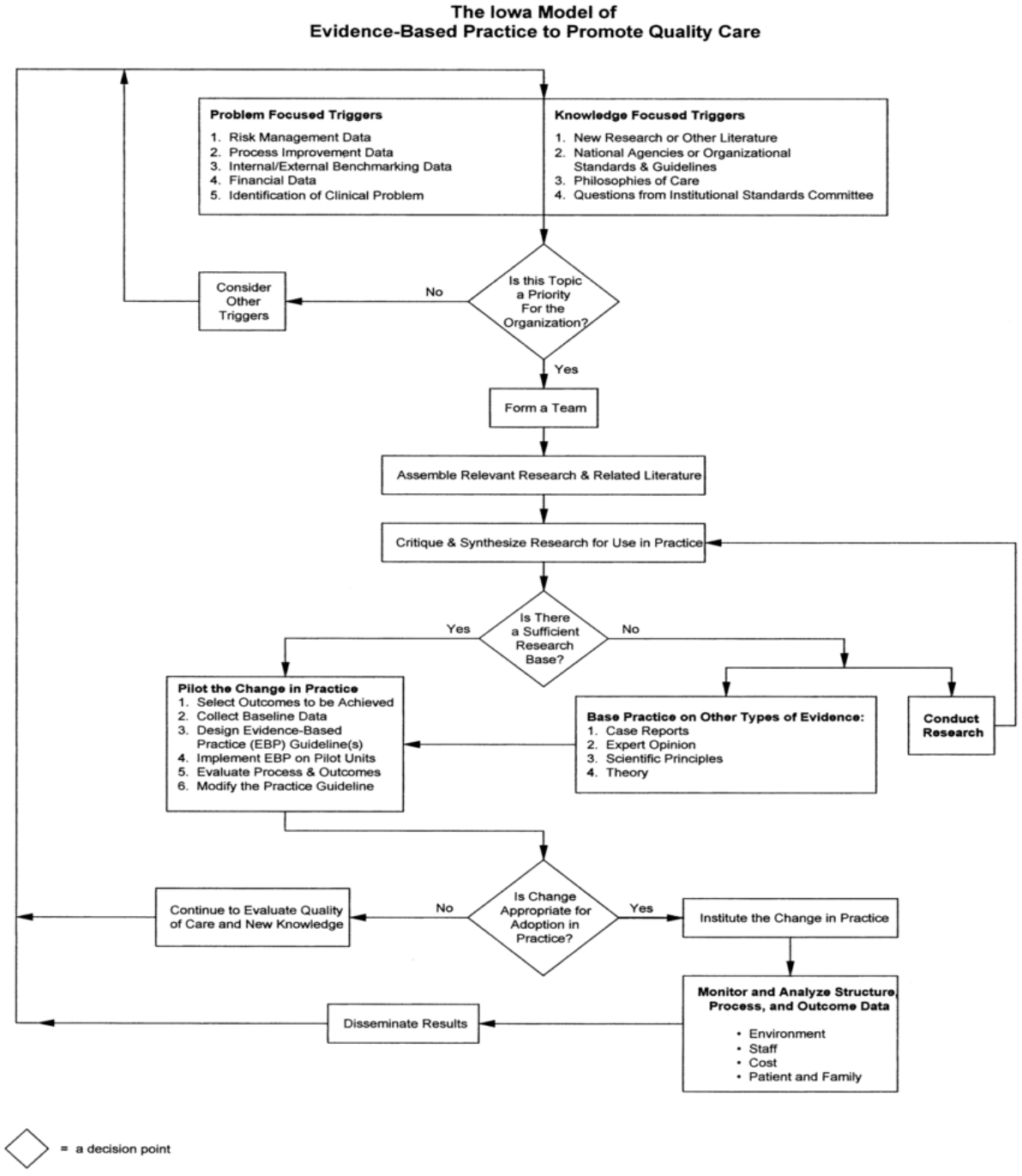
Sincerely,

Isaac Bonsu

Unit Supervisor

Email: isaac.bonsu@dsh.ca.gov

Appendix B: Iowa Model



Appendix C: Richards-Campbell Sleep Questionnaire (RCSQ)

You are now ready to begin to answer the questions. Place your "X" **anywhere** on the answer line that you feel **best** describes your sleep last night.

1. My sleep last night was:

Deep Sleep	_____	Light Sleep

2. Last night, the first time I got to sleep, I:

Fell Asleep Almost Immediately	_____	Just Never Could Fall Asleep

3. Last night I was:

Awake Very Little	_____	Awake All Night Long

4. Last night, when I woke up or was awakened, I:

Got Back To Sleep Immediately	_____	Couldn't Get Back To Sleep

5. I would describe my sleep last night as:

A Good Night's Sleep	_____	A Bad Night's Sleep

Richards Campbell Sleep Questionnaire

Scoring Directions

1. Scores may range from 0 (indicating the worst possible sleep) to 100 (indicating the best sleep).

100	_____	0

2. A score for each question is given based on the length of the line in millimeters from the 0 point to the cross of the patient's "X".

3. The Total Sleep Score is derived by adding the individual scores for each question and dividing by five.

Appendix D: Timeline Sheet

Introduction	
Project Site	Metropolitan State Hospital, Norwalk
Project Mentor	
Project Purpose	The (DNP project) is a quality improvement initiative aimed at introducing a Sleep Hygiene Protocol in an inpatient psychiatric facility to promote better mental health outcomes and reduce hospital stays.
Project Question	Does the implementation of better Sleep Hygiene Protocol in an inpatient psychiatric facility help promote better mental health outcomes, help reduce delirium, and hospital stays.
Project Timeline	
Plan out the activities you will be performing each week during the implementation phase of Project III. Clearly delineate the time needed to carry out interventions, collect data, and evaluate the project. Set concrete dates for all implementation activities (e.g., trainings/education, interventions, data collection and analysis) and include them in the appropriate weeks below. **Dates for implementation are posted in the Project II course announcements. Week 1 should correlate with the first week of DNP Project III, unless permission is granted to implement early.**	
Week 1 **1st Nov- 7th Nov**	**The quality improvement project baseline data will be collected within the first week. The project manager will review reported cases of delirium and delayed hospital stays due to symptoms associated with poor sleep hygiene practices and conditions at the facility by checking patient's charts for the previous month. The project manager will also review the administrative effort to improve the sleep infrastructure based on previously made observations to develop a Sleep observation checklist. The other will also involve educating the healthcare workers on implementing and complying with the Sleep Hygiene Protocol.**
Week 2 **8th Nov- 14th Nov**	**To collaborate with the target population in implementing the Sleep Hygiene Protocol. During this week, there will be newly introduced policy, introduced sleep infrastructure by the facility, and environmental improved changes.**
Week 3 **15th Nov – 21st Nov**	**Promote monitoring and surveillance of the target population's response and compliance with the introduced sleep hygiene protocol. The activity will use a derived sleep hygiene observation checklist from the first week that captures the project site's target population's Sleep hygiene patterns and resources.**
Week 4 **22nd Nov -28th Nov**	**Improve the Sleep Hygiene Protocols based on the challenges noticed through monitoring and received feedback from the project site. Use posters and written or printed notices on the importance of adhering to the implemented sleep hygiene protocol as reminders to adhere to the SHP.**
Week 5 **29th Nov -5th Dec**	**Collect and analyze post-intervention data to measure the outcomes of the quality improvement project and evaluate if the objectives were achieved. Data will be collected on the patient's new cases of delirium and extended hospitals related to poor sleep**

	hygiene within the past four weeks. Data will also be collected on the number of patients discharged within the project implementation period and admitted using the *Richards-Campbell Sleep Questionnaire (RCSQ).*

Appendix E: Sleep Hygiene Protocol

Objective: To improve sleep quality and quantity among the mental health patients in the inpatient psychiatric facility.

Interventions

1. A thorough sleep assessment for each patient upon admission conducted *[Use Richards-Campbell Sleep Questionnaire (RCSQ)]*.
2. Each patient's sleeping pattern monitored individually based on their characteristics and condition.
3. Maintain appropriate conditions: T*emperature control*, *Noise reduction measures, comfortable bedding, and ear plugs and eye masks.*
4. Quiet hours 10pm to 6am, dim lighting during this time *[Use dim lighting and using quiet alarms in case of emergencies]*.
5. No napping or use of caffeinated drinks after 3p.m.
6. Supper taken around 6 p.m. (no food past this time).
7. Patient relaxation techniques*: Providing the patient with lavender oil to smell to help relax]*.
8. Patients engage in therapeutic activities such as yoga or mindfulness-based exercise to manage stress and anxiety [4 times a week].

9. 1-2 hours of physical exercises during the day based on their health and ability to exercise [3 times a week].
10. Maintain a fixed sleeping schedule.
11. Patients taking a shower 1-2 hours before sleep.

Appendix F: Sleep Hygiene Observation Checklist

	Were the Interventions implemented and adopted?	
Interventions	**✓ yes**	**No X**
A thorough sleep assessment for each patient upon admission conducted *[Use Richards-Campbell Sleep Questionnaire (RCSQ)]*.	✓	
Each patient's sleeping pattern monitored individually based on their characteristics and condition.	✓	
Maintain appropriate conditions: T*emperature control*, *Noise reduction measures, comfortable bedding, and ear plugs and eye masks.*	✓	
Patients engage in therapeutic activities such as yoga or mindfulness-based exercise to manage stress and anxiety [4 times a week].		X
1-2 hours of physical exercise daily based on their health and ability to exercise [3 times a week].	✓	

Quiet hours are 10 pm to 6 am. Dim lighting is used during this time *[Use dim lighting and quiet alarms in emergencies]*.	✓	
No napping or use of caffeinated drinks after 3 pm.	✓	
Supper taken around 6 pm (no food past this time).	✓	
Patient relaxation techniques*: Providing the patient with lavender oil to smell to help relax]*.		X
Maintain a fixed sleeping schedule.	✓	
Patients taking a shower 1-2 hours before sleep.		X

Appendix G: SPSS Results

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Pre_intervention_delirium	100	.32	.469	0	1
Post_intervention_delirium	100	.11	.314	0	1

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Pre_intervention_delirium	Group 1	Yes	32	.32	.50	.000
	Group 2	No	68	.68		
	Total		100	1.00		
Post_intervention_delirium	Group 1	No	89	.89	.50	.000

	Group 2	Yes	11	.11		
	Total		100	1.00		

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
stay_duration_pre	100	1	65	35.33	9.403
Days_increased_sleep	100	0	16	5.77	4.383
stay_duration_post	100	0	43	21.45	9.695
Days_increased_sleep_post	100	0	9	2.11	1.601
Valid N (listwise)	100				

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Pre_intervention_delirium	100	.32	.469	0	1
Post_intervention_delirium	100	.11	.314	0	1

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Pre_intervention_delirium	Group 1	<= 1	100	1.00	.50	.000
	Total		100	1.00		
Post_intervention_delirium	Group 1	<= 1	100	1.00	.50	.000
	Total		100	1.00		

Descriptive

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
stay_duration_pre	100	1	65	35.33	9.403	88.425
Days_increased_sleep	100	0	16	5.77	4.383	19.209
stay_duration_post	100	0	43	21.45	9.695	93.987
Days_increased_sleep_post	100	0	9	2.11	1.601	2.564
Valid N (listwise)	100					

T-Test

Group Statistics

	Pre_intervention_delirium	N	Mean	Std. Deviation	Std. Error Mean
stay_duration_pre	No	68	34.66	10.314	1.251
	Yes	32	36.75	7.030	1.243

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
stay_duration_pre	Equal variances assumed	2.060	.154	-1.036	98	.303	-2.088	2.015	-6.087	1.911
	Equal variances are not assumed.			-1.184	85.175	.240	-2.088	1.763	-5.594	1.417

T-Test

Group Statistics

	Pre_intervention_delirium	N	Mean	Std. Deviation	Std. Error Mean
Days_increased_sleep	No	68	5.32	4.039	.490
	Yes	32	6.72	4.972	.879

Independent Samples Test

	Levene's Test for Equality of Variances	t-test for Equality of Means

		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Days_increased_sleep	Equal variances assumed	2.738	.101	-1.494	98	.138	-1.395	.934	-3.248	.458
	Equal variances are not assumed.			-1.387	50.964	.172	-1.395	1.006	-3.415	.625

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	stay_duration_pre	35.33	100	9.403	.940
	stay_duration_post	21.45	100	9.695	.969
Pair 2	Days_increased_sleep	5.77	100	4.383	.438
	Days_increased_sleep_post	2.11	100	1.601	.160

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	stay_duration_pre & stay_duration_post	100	-.165	.101
Pair 2	Days_increased_sleep & Days_increased_sleep_post	100	-.001	.995

T-Test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	stay_duration_pre	35.33	100	9.403	.940
	stay_duration_post	21.45	100	9.695	.969

Paired Samples Correlations

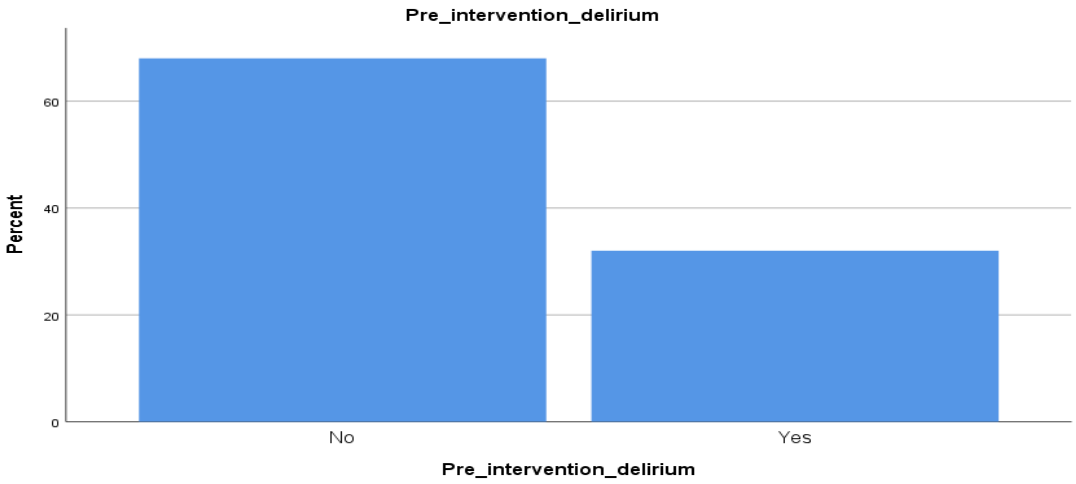
		N	Correlation	Sig.

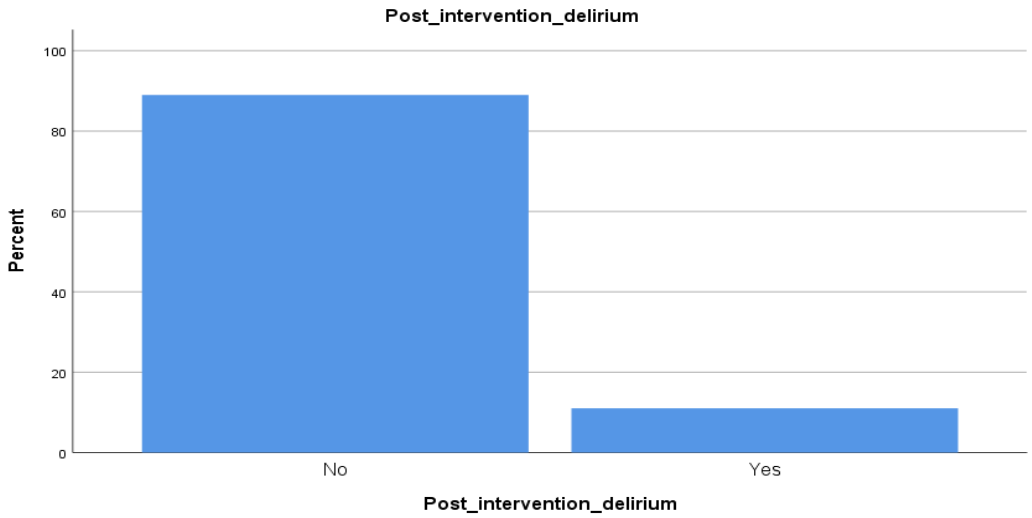
Pair 1	stay_duration_pre & stay_duration_post	100	-.165	.101

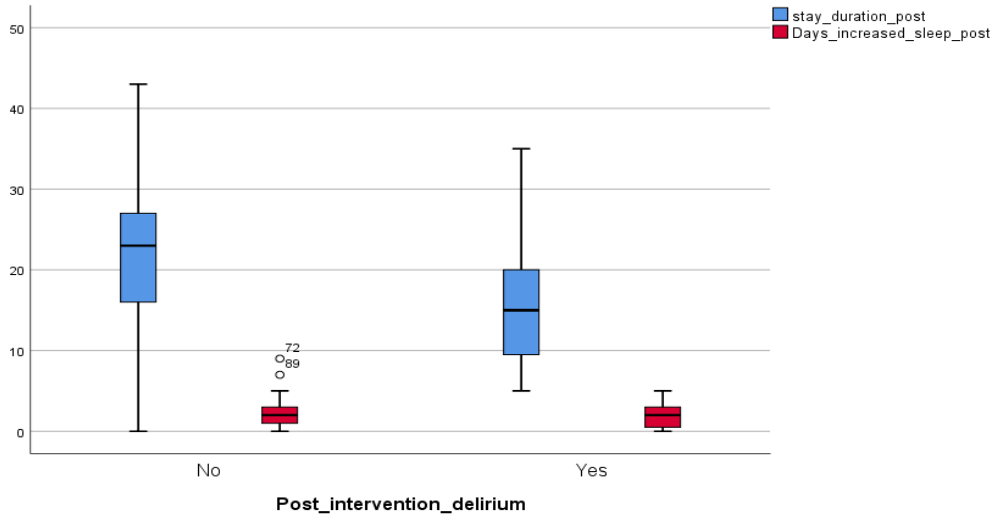
Paired Samples Test

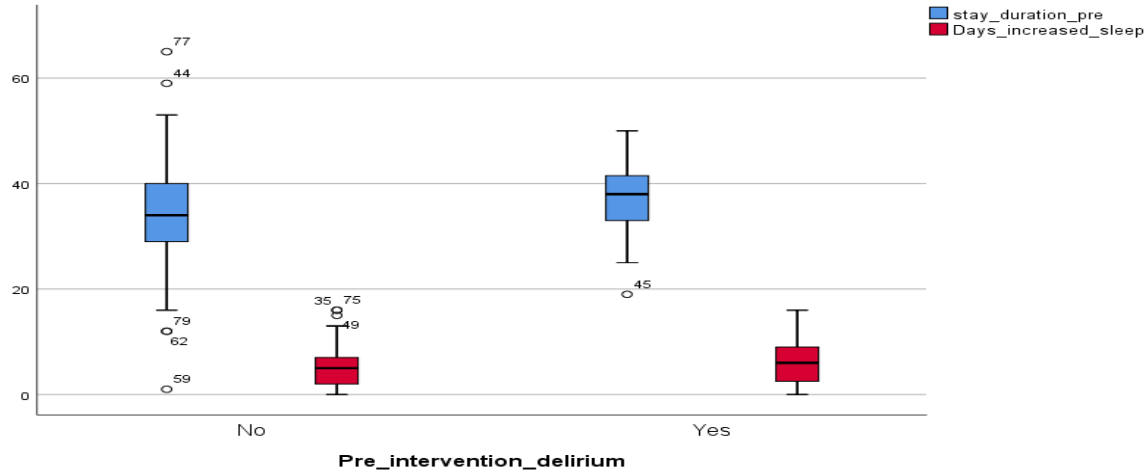
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	stay_duration_pre - stay_duration_post	13.880	14.576	1.458	10.988	16.772	9.523	99	.000

Bar Chart




Post_intervention_delirium
Percent
100
80
60
40
20
0
No
Yes
Post_intervention_delirium


stay_duration_post
Days_increased_sleep_post
50
40
30
20
10
0
72
89
No
Yes
Post_intervention_delirium


stay_duration_pre
Days_increased_sleep
60
40
20
0
77
44
79
62
59
35
75
49
45
No
Yes
Pre_intervention_delirium