5-2022

Operating Room Nurses Sleep Health: an Evidence-Based Practice Sleep Health Education Project

Gabriella M. Castignoli
Sacred Heart University, castignolig@mail.sacredheart.edu

Abstract

Operating Room Nurses Sleep Health: an Evidence-Based Practice Sleep Health Education Project

by

Gabriella Maria Castignoli

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Sacred Heart University

May 2022

Approved:

Signature	Printed Name	Role	Date
Anna Goddard, Ph.D.	Anna Goddard, Ph.D.,	DNP Faculty Advisor	3/15/2022
Signature	Printed Name	Role	Date
Sindy Kim Mulcahey, MSN, RN	Sindy Kim Mulcahey MS, RN	Project Mentor	3/17/2022
Signature	Printed Name	Role	Date
Gabriella Castignoli, RN	Gabriella Castignoli, RN	DNP Student	3/16/2022

Abstract

Background: "Sleep Health" is a new Healthy People 2023 priority due to notable poor sleep health across the nation, with more than 25% of U.S. adults reporting insufficient sleep. Adequate sleep is necessary to work effectively and safely, with operating room (OR) nurses at high risk for inadequate sleep due to atypical work schedules.

Purpose: This project aims to establish the importance of sleep health for OR nurses at a community-based hospital and improve sleep health perception and sleep health through sleep health education with staff.

Methods: The IOWA model for evidence-based practice and quality improvement tools, Plan-Do-Study-Act, and the "5-Whys," were utilized. A pre-and-post evaluation was conducted using the Pittsburgh Sleep Quality Index (PSQI) and a self-administered sleep health perception survey after implementing a sleep health educational module, based on materials from the Harvard Medical School, Division of Sleep Medicine.

Results: Global PSQI scores increased (7 to 8) one month after sleep health education, suggesting a decline in sleep health quality. However, sleep health perception increased (78.9% to 83.33%) one month after sleep health education, fewer callouts related to sleep deprivation (12.5% to 0%), an increase in self-scheduling sufficient time for rest (57.4% to 66.67%), and an increase in sleep duration (6.3 to 6.8 hours or 30 minutes).

Discussion: Targeted sleep education can change perception and sleep quality, as shown with operating room nurses at a community hospital. While this project was conducted during a global pandemic, leading to small sample size and notable attrition, a change in sleep health perception, next-day callouts, and anecdotal feedback of behavioral changes were found. Despite limitations

from COVID-19 during implementation, this project piloted a process for the nurse educators to incorporate sleep health education into ongoing professional education for the OR. The results from this project provide baseline data for future work with prioritizing sleep health with nurses and shows how the benefits of adequate sleep health can potentially serve the nursing community.

Keywords: sleep health, sleep quality, sleep perception, operating room nurse

Operating Room Nurses Sleep Health: an Evidence-Based Practice Sleep Health Education Project

Gabriella Castignoli, BSN, RN

A DNP project submitted in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice

Anna Goddard, Ph.D., APRN, CPNP-PC; DNP Project Faculty Advisor

Sindy Mulcahey, MSN, BSN, RN; Practice Mentor

Sacred Heart University Davis & Henley College of Nursing

May 2022

Acknowledgments

I would like to acknowledge the following people for their support and enthusiasm during my academic career at Sacred Heart University Davis & Henley College of Nursing in the Doctorate of Nursing Program.

- My family and friends for their unconditional support and patience. Thank you to my mother, Maria, who has been there for me since the beginning and stayed positive when times were tough. Thank you to my father, Joseph, who has provided me with words of wisdom. Thank you to my boyfriend Miguel, who has kept me focused and always reminded me how strong I am. Thank you to Lina, Bobbi, and Ayla for reminding me how important it is to keep laughing and have fun.
- Anna Goddard, Ph.D., APRN, CPNP-PC; DNP Project Faculty Advisor for her guidance, support, mentorship, and enthusiasm. Thank you for not only being a professor but someone who I aspire to be. I cannot express enough gratitude for all I have learned from you. You have been an inspiration and shining example of what it means to be a Nurse Practitioner. In the future of my career, I hope to provide the same invaluable support for future NPs as you have with me.
- Sindy Mulcahey, MSN, BSN, RN; Practice Mentor for helping me navigate this process. Thank you for facilitating my project implementation, assisting with stakeholder buy-in, and accepting the role of sub-investigator.

Table of Contents

List of Tables

List of Figures

Chapter 1: Background, Purpose and Significance of the Project

Introduction to the Problem

Operating room nurses are subject to variable scheduling, often disregarding their sleep needs. The quality of sleep a nurse receives directly impacts multiple life factors. Additionally, the nurse's perception of sleep health influences their decision to embrace or disregard change. Through targeted education to this population, sleep health perception may shift, allowing for improved sleep quality.

Healthy People 2030 reports "Sleep Health" as a new priority due to ongoing poor sleep health, with more than 25% of U.S. adults reporting insufficient sleep or rest at least 15 out of every 30 days. Adequate sleep is necessary to fight infection, support sugar metabolism to prevent diabetes, perform well in school, and work effectively and safely (Healthy People, 2020). Operating room nurses work atypical schedules making them an at-risk population for inadequate sleep and susceptible to consequences such as memory, learning, attention, and reasoning. This evidence-based practice project aims to create an educational module based on the Healthy Sleep Module from the Division of Sleep Medicine at Harvard Medical School, targeted for the operating room nurses at this community hospital. The module will aim to improve employees' knowledge and perception of sleep health to nurses most at risk for inadequate sleep-related to rotating shifts.

Available studies have shown that hospital administrators should be aware and provide preventative measures related to sleep quality, burnout, and job performance. For instance, previous studies have found correlational support between burnout and sleep quality in nurses and concluded that healthcare administrators need to provide preventative sleep measures as an intervention for their employees (Giorgi et al., 2018). Furthermore, preventive sleep hygiene

education improves self-reported sleep quality in as little as 3-5 weeks post an education module aimed at sleep health (Chen et al., 2010).

Internal Evidence

This author conducted initial interviews with the operating room nurse manager, the operating room educator, and several nurses from the operating room. The nurse educator and manager have acknowledged that nurses from the operating room will call out the next day due to lack of sleep. Furthermore, many of these nurses can recall at least one instance where they worked the entire previous night and then worked a double shift through the following day.

External Evidence

A description of the evidence search, including methods, criteria, and results, can be found in Appendix A. The following databases were searched: CINAHL, MEDLINE, Cochrane Database of Systemic Reviews. The keywords searched were: “sleep,” “hygiene,” “education,” “health,” “deprivation,” “nurse,” “implementation,” “burn out,” “programs,” “policy,” “consequences,” “benefits,” “perception,” “shift work.” Sleep health and nurses narrowed initial searches. Limits and filters for all searches pertaining to sleep health included English language only, peer-reviewed literature, full-text publications, and publications between 2000-2020. Inclusion criteria for article selection were sleep health and shift work.

Needs Assessment

The nurses employed in the operating room at this medium sized community hospital are required to take variable call shifts in addition to their 40-hour work week. The U.S. Bureau of Labor Statistics shows that 15 percent of full-time employees in the U.S. perform shift work, and many suffer from chronic sleep loss (American Academy of Sleep Medicine (AASM), 2020). Shift work disorder occurs after trouble adjusting to a work schedule during hours you

normally sleep (AASM, 2020). The National Healthy Sleep Awareness program educates employers on how sleep improvement can benefit productivity and safety and reduce the economic impact, which is currently $411 billion per year due to sleepiness and fatigue (AASM, 2020). Targeted sleep education can change perception and sleep quality for the OR nurses at this hospital, who are required to rotate shift-work schedules.

Anecdotally, the nurse educator and manager have acknowledged that nurses from the operating room will call out the next day due to lack of sleep. Furthermore, many of these nurses can recall at least one instance where they worked the entire previous night and then worked a double shift through the following day. Extreme sleep deprivation is sometimes accepted as a "normal" part of the job, or sleep health is not even part of an employee's awareness. Therefore, the need for sleep health and hygiene education for the OR nurses at this hospital would benefit the employees, administrators, and patients.

In 2018, a hospital 30 minutes away, hired a nursing educator to research ways to decrease stress, improve sleep, and stay healthy for all the hospital-employed nurses. However, a sleep-related educational module had not yet been implemented related to time constraints and lack of staffing resources. These factors led to administrative and nurse educator requests for this doctoral-led project by this author to be conducted at this hospital.

Due to long shifts and rotating schedules, these OR nurses are considered a high-risk population for inadequate sleep health. With the support of my practice mentor and my DNP faculty advisor, I aimed to create and pilot a sleep-health education module for the OR nurses to be implemented as part of the ongoing professional educational practices for employees who perform shift work.

Clinical Question

The guiding evidence-based PICO question for this project is as follows: Among operating room nurses at this community based hospital (P), would sleep health education (I) improve pre- versus post-intervention (C), quality and perception of sleep health (O)?

Project Purpose

This project involves creating and implementing an educational module for OR nurses at this hospital and a piloted implementation plan for the staff nurse educators to incorporate as part of a routine, ongoing, professional practice for this targeted nurse population. The global aim for this project is to decrease potential work-related errors and staff call-outs caused by inadequate sleep and poor sleep health by OR nurses to ultimately benefit our staff and patients. The specific aims of this project are to:

1) Establish the importance of sleep health for nurses in rotating on-call schedules in our department at an increased risk of sleep deprivation.
2) Improve sleep health perception through a sleep health education module.
3) Improve sleep health with staff, as measured through a self-report sleep index.

Significance

Healthy People 2023 targeted increasing the public knowledge of adequate sleep and treatment of sleep disorders to improve health, productivity, wellness, quality of life, and safety on roads to include sleep health in the workplace as a priority population health goal (2020). Deviating from the typical “9-5” hourly schedule, OR nurses are at the mercy of a daily fluctuating case volume schedule. This hospital is also a trauma hospital, requiring the OR staff to be prepared for emergency cases 24/7.

The Sleep Foundation recommends 7 to 8 hours of sleep per night. Contrary to this, a study by Stimpfel and colleagues states nurses reported an average of 414 minutes, or just less than 7 hours of sleep before a scheduled work day (2020). Working long shifts combined with on-call hours can limit sleep even further before or between scheduled shifts. Reducing nighttime sleep by as little as 1.5 hours for just one night could result in a reduction of daytime alertness by 32% (Fort Health Care, 2017). Call shifts for OR nurses consist of covering nighttime and weekend hours. Research shows that this type of shift work impacts circadian rhythms and can impair performance (New York University, 2019). Sleep deprivation additional impacts workers' ability to handle complex and stressful tasks, while work-related sleep loss has led to serious errors (NYU, 2019). It is imperative to educate nurses accepting this type of schedule; they are at high-risk for difficulty concentrating, learning, and communicating from lack of sleep and disrupted sleep habits (Fort Health Care, 2017).

Sleep deprivation can also cause increased memory lapses, a decline of problem-solving abilities, and a decrease in their tolerance of co-workers' differing opinions, ultimately contributing to inefficiency and job dissatisfaction (Fort Health Care, 2017). These nurses should also be aware that inadequate sleep can affect their psychological health by potentially causing anxiety, depression, paranoia, and suicidal thoughts (Watson, 2020). If they plan to work in the OR for several years, they must be aware that long-term sleep deprivation increases the risk of chronic conditions such as diabetes and heart disease (Watson, 2020). Education may bring awareness to the seriousness of sleep deprivation. The American Nurses Association states that nurses should commit to eating a healthy diet, exercising, and getting sufficient rest to balance a satisfying work environment with individual health and well-being (2017). With a large part of OR nurse shift work, including those in the OR at this community hospital, involving a chaotic

sleep schedule, orienting nurses should be educated of the benefits, risks, and prevention strategies for sleep deprivation to perform this type of job safely.

Chapter 2: The Frameworks, Models and Evidence for the Project

Introduction

Chapter 2 includes the project framework, key concepts, as well as a synthesis and review of the literature and practice guideline evidence

Framework and Key Concepts

This evidence-based practice educational intervention followed the IOWA model of evidence-based practice implementation and used quality improvement methodology to evaluate whether a sleep hygiene educational module will directly impact sleep perception and sleep health in the operating services department.

An organizational systems assessment was conducted utilizing the Institute for Health Care Improvements (IHI), Plan Do Study Act (PDSA) framework for quality improvement. Appendix B shows the PDSA model utilized. The PDSA approach was used to plan the educational model, implement the module as part of a pilot for nursing educators, and assess sleep health quality and perception in OR nurses who participated.

An organizational exploration for systems assessment at the macrolevel, mesolevel, and microlevel was completed to identify the contextual elements for quality improvement implementation at this community based hospital in the perioperative department, as recommended by the IHI. The "5 Whys" of system assessment, a recognized quality improvement tool, was completed with staff and administration to develop this project. This micro-level assessment included consideration of: "why is sleep deprivation happening with our OR staff;" “why do atypical work schedules contribute to this problem” and “why do staff continually report inadequate sleep while reporting to work” (Armstrong & Sables-Baus, 2020). This feedback and consideration were included in developing the educational model for the

department and gaining buy-in from senior-level management. The Plan-Do-Study-Act framework for this project is reviewed here and later referenced in "Chapter 3: Methods."

Plan phase. This DNP student met with the nurse educator/practice mentor for this work, to establish a time, date, and location for an educational presentation about sleep health and quality. In collaboration with the hospitals staff, several sleep modules were considered in preparation for the education. However, Harvard's open-access educational medical curriculum was chosen based on key criteria to cover for this population and the quality of the available curriculum. As required for all doctoral projects, regardless of intent and methodology, approval for data collection was submitted to the hospitals Internal Research Board (IRB) and received a full exemption. The Sacred Heart University IRB review was additionally required and sought. IRB exemption was granted based on the written protocol submitted with the application.

Do phase. With the assistance and direction of the Perioperative Department Educator, we offered a sleep health educational module in the form of a narrated PowerPoint. This module included evidence-based sleep health and hygiene overviews, based on free-online and open-to-the-public Harvard Medical School, Division of Sleep Medicine, sleep health information (Harvard Medical School, 2008). The Division of Sleep Medicine recommends the outline used for this educational module as part of the Harvard Medical School Sleep and Health Education Program (Harvard Medical School, 2008). Retrieval is available at: http://healthysleep.med.harvard.edu/healthy/

The outline of the sleep health module includes: 1) Why Sleep Matters to include the a) Benefits of Sleep, b) Consequences of Insufficient Sleep and c) Current Evidence on Sleep Health; 2) The Science of Sleep which includes a) What is Sleep?, b) How is Sleep Regulated?, and c) Variations in Sleep; and 3) Getting the Sleep you Need to include a) Overcoming Factors

that Interfere with Sleep and b) When to Seek Treatment. Key concepts in the sleep health module include background and significance of sleep health, sleep quantity recommendations, sleep quality and what that entails, sleep hygiene guidance, and consequences of poor sleep health.

Study phase. Before engaging in the educational sleep module, the pre-survey was sent in an email to staff (See Appendix C). This email included a survey monkey link created by this doctoral student. A survey monkey subscription from the hospitals Department of Research was utilized. The survey link was also able to be accessed by the principal investigator, sub-investigator, and project participants. During the educational presentation, participants will be asked for their email addresses to deliver the post-education survey and PSQI one month after the educational presentation. The pre-and post-education surveys included: 1) Sleep Health Perception Survey: this self-administered survey was co-created by DNP student and the sub-investigator (Appendix D); and 2) Pittsburgh Sleep Quality Index Survey (PSQI) (Appendix E), with permission obtained from authors and creator Dr. Buysse, as seen in Appendix F.

The Pittsburgh Sleep Quality Index (PSQI) was used to assess latency, duration, efficiency, sleep disturbances, medication usage, daytime dysfunction, and overall sleep quality (Appendix E). The PSQI has internal consistency and a reliability coefficient (Cronbach's alpha) of .83 for its seven components (Smyth, 1999). Numerous studies using the PSQI have supported high validity and reliability (Smyth, 1999). Permission was requested from www.sleep.pitt.edu and granted by Dr. Buysse, MD, from the University of Pittsburgh School of Medicine.

After the educational module was completed, results were reviewed with the project team to assess if there was a positive change and whether the ongoing professional educational team

warranted including this sleep module into future orientation for OR nurses or as part of a required education conducted annually.

Act phase. The sleep health educational module was implemented with this pilot group of OR nurses. Based on the lessons learned throughout the PDSA cycle, the decision was to include this sleep health education module for the OR nurses to emphasize the importance of sleep health in shift work and healthy practices for working longer hours. The DNP student revised the process based on what was learned in the PDSA cycle and gave recommendations to the nurse education department. See Appendix B for visualization of the PDSA model.

Synthesis of the Literature and Practice Guideline Evidence

A summary of relevant information was collected from each article and summarized in Appendix G. Melnyk & Fineout-Overholt Nursing Evidence-Based Practice Research Appraisal tools, such as the systematic review, were used to critically appraise the evidence, which has been converted into synthesis tables displayed in Appendix H (Melnyk, & Fineout-Overholt, 2015).

Eight studies met the search criteria and were included in the evidence review. The strength of evidence varied among the studies. There are two Level II studies, two Level III studies, one Level IV study, one Level V study, and two Level VI studies. The quality of evidence found supported education to improve sleep quality and education, with most studies supporting this hypothesis. Several studies also supported an overall improvement in sleep health. Within all studies, education was used as the intervention. The American Academy of Sleep Medicine (AASM), The American Association of Critical-Care Nurses (AACCN), Healthy People 2021, The International Journal of Exercise Science (IJES), and The Journal of American College Health (JACH) support the use of education to improve sleep quality and perception.

They each prove a need to improve sleep health quality and perception in each population and significant improvement after initiating the intervention.

Chapter 3: Methods

Introduction

Chapter 3 discusses the project design, sample, and setting. Key stakeholders and buy-in are then mentioned and followed by project process, outcome measures, and operational variables. After, ethical merit, project approvals, and implementation processes are explained. Chapter 3 finishes with data collection, management, analysis, resources, and barriers and solutions.

Design, Sample, Setting

Design

This evidence-based practice education intervention followed the IOWA model of evidence-based practice implementation and used quality improvement methodology to evaluate whether a sleep hygiene educational module will directly impact sleep perception and sleep health in the operating services department. See Chapter 2, “Plan-Do-Study-Act” section to review the PDSA framework used to implement this module.

Sample

The participants, or “sample,” for this project included full-time and part-time OR nurses from a community based hospital. Each participant attested to having a valid nursing license in the state of Connecticut. All OR nurse participants work between 24 to 40 hours per week and participate in the on-call shift schedule monthly. The nurses were asked to participate in this project through several announcements and informational project promotion posters posted strategically in the perioperative department. All participants met the inclusion criteria and consented to participate. Nine nurses participated in the pre-education survey, the Pittsburg Sleep Quality Index (PSQI), and the sleep health education module. Six of these nurses completed the

post-education survey and PSQI. Still, with de-identified data, including who participated, there was no way to follow-up with the three participants lost to attrition at the one-month follow-up. To note, this project was conducted during the global pandemic, COVID-19. Like many hospitals and departments during COVID-19, this staff experienced turn-over and competing priorities across the hospital, which could have led to low participation and attrition.

Setting

The project occurred at a not-for-profit community hospital in Connecticut. The specific unit was the Operating Room Department. This project's source population included all registered nurses working in the Operating Room. Inclusion criteria required participating in the on-call rotation schedule of a minimum of once per month, being a registered nurse, and employment in the operating room department at this hospital. Exclusion criteria included per diem nurses, operating room nurse residents, and other nurses not employed in the operating room department.

Three separate announcements were made to recruit participants stating the sleep health educational session's time, location, and date. Additionally, this doctoral student and the nurse educator, reiterated these announcements at the daily operating room morning huddle. The administration had previously mandated that all OR nurses participate in the educational module. Announcements were made one month in advance and included a reminder two weeks pre-session and a day before the session.

Additionally, flyers were posted on all bulletin boards in the operating room department stating the educational session's location, date, time, and topic. The bulletin boards were located

in high-traffic areas and showcased important information. No project materials were placed in patient-facing areas within the hospital.

Key Stakeholders and Buy-In

The full-time operating room nurses were key stakeholders in this project. To gain buy-in for participation in the project, they were incentivized with bagels and coffee during the presentation. This was approved by the unit manager and was supplied by the DNP student.

The Operating Room nurse manager fully supported and approved this project to be conducted in the unit. Anna Goddard, Ph.D., APRN, is the academic partner, DNP Faculty Project advisor, and evidence-based practice expert. The practice mentor for the project is the Perioperative Nursing Educator for this hospital and has led numerous multidisciplinary quality and safety initiatives within the Operating Room unit and has been part of the administrative team for over four years.

Project Measures

The outcome measures for this project include OR nurse's sleep health perception and sleep health quality. Sleep health perception is defined as attaining awareness or understanding of one's sleep health (Merriam-Webster, 2022). A self-reported survey related to the participant's personal opinion on sleep health was used to measure sleep health perception. Sleep health is a multidimensional pattern of sleep-wakefulness, adapted to individual, social, and environmental demands, promoting physical and mental well-being (Buysse, 2014). Good sleep health is characterized by subjective satisfaction, appropriate timing, adequate duration, high efficiency, and sustained alertness during waking hours (Buysse, 2014). The Pittsburgh Sleep Quality Index (PSQI) was used to measure sleep health in this project. No other data was collected post-

intervention with the educational module. Implementation of the project and subsequent real-time data collection occurred between July 28th and August 30th of 2021.

Process Measures

Process measures can indicate what a health care provider does to maintain or improve health and typically inform consumers about what medical care they can expect to receive given a disease (Agency for Healthcare Research and Quality (AHRQ), 2022). This project did not evaluate quality measures used for public reporting or measures considered to be process measures (AHRQ, 2022).

Outcome Measures

Outcome measures include data collected from the pre-education survey and PSQI and one-month post-education survey and PSQI. Both measures were administered through survey monkey and used de-identified data from participants. Due to this data collection method, results can only be averaged and not compared individually pre- and post-module.

Sleep health perception. Sleep health perception was subjective and collected through a self-reported survey created by this author and her practice mentor at Norwalk Hospital. This survey has neither been proven valid nor reliable as it has not been utilized in previous work. This survey was created solely for this project to assess the sleep health perception of the participants. There were seven questions in total, with six items requiring a yes or no response and one requiring a numerical response. See Appendices D and E for the measures used.

Sleep Health. Scores on the PSQI indicate the perceived quality of sleep. For this project, the PSQI global score was calculated for the pre-education baseline, as recommended by the methodology put forth by the PSQI authors Buysse, Reynolds, Monk, Berman, and Kupfer for

de-identified participants pre- and post-module (Buysse et al., 1989). The overall PSQI scores range from 0 (best) to 21 (worst). A score of 5 or more indicates poor sleep quality, while below 5 indicates good sleep quality (Buysse, 1989). The PSQI is used to consider self-report variables of sleep, including latency, duration, efficiency, sleep disturbances, medication usage, day-time dysfunction, and overall sleep quality. The PSQI has internal consistency and a reliability coefficient (Cronbach's alpha) of .83 for its seven components (Smyth, 1999). Numerous studies using the PSQI have supported high validity and reliability (Smyth, 1999). Permission to utilize the PSQI was obtained (See Appendix F).

Ethical Merit and Project Approvals

This project involves an educational module for OR nurses and a piloted intervention for the staff nurse educators on implementation of this module for OR staff. No risks related to coercion or harm were anticipated or occurred. All data were de-identified, and no protected health information was collected.

The protection of human subjects and maintaining confidentiality were upheld as part of this project. The project mentor ultimately maintained the confidentiality of data on behalf of the hospital. No known safety issues exist as this project conducted no procedures on patients, and participation by the staff nurses was voluntary.

This project did not require Sacred Heart University Institutional Review Board (IRB) approval because it met the criteria for a quality improvement scholarly project (see Appendix I). However, this hospital requires all student projects submitted and processed by their IRB to provide an exemption, expedited review, or full review due to human subjects' participation. The approval to implement the project was submitted and approved by the IRB under #21-08-158-337 (See Appendix J). The IRB also approved the educational PowerPoint module presented to

the participants (See Appendix K). As a follow-up to the IRB submission protocol, this project was submitted to the Sacred Heart University IRB for review, and the exemption was granted under IRB#210618A (See Appendix L). The DNP student additionally obtained approval to utilize the Pittsburgh Sleep Quality Index (PSQI) (See Appendix K).

Project Implementation Process

This project began by establishing a team. The team consisted of the DNP student, the project mentor, and the project faculty advisor. A need for this project was assessed through initial interviews with the nursing staff in the OR. From there, the DNP student reached out to the Hospital Research Board to inquire about necessary documentation and approvals for this project: as mentioned previously, all doctoral student projects are required to complete this process per organizational protocol. The IRB process could begin after completing CITI training and sending the research board credentials for the project leads. A written protocol (See Appendix M) approved by the research board was required for IRB submission. Once completed, the protocol was submitted for exemption by the Research Board and received on June 1st, 2021. Three separate announcements for participant requirements were made stating the time, location, and date of the sleep health educational session (Appendix N). Either the DNP student or project mentor made each announcement at the operating room morning huddle. Announcements were repeated one month, two weeks, and one day before the session. The flyers (Appendix O) were posted on all bulletin boards in the operating room department stating the educational session's location, date, time, and topic. After the creation and approval of the educational module, the educational module was presented to participants on the morning of July 28th, 2021. Immediately before the module, an email with the survey link was sent to those who attended to complete the pre-sleep health education PSQI and survey. After the module was completed, an announcement

was made to remind participants that they would receive a second email to complete the post-module PSQI and survey approximately 1-month post-completion. Bagels and coffee were offered after the announcement as an incentive for attendance. One month later, on August 30th, 2021, a second email was sent to participants for completion. All email communications were kept private by the project mentor.

Data Collection and Management

The DNP student and nurse educator had access to all project data. The project data was used for project purposes only. The project investigators maintained the survey monkey database with oversight from the Coordinator of the Health Department of Research. The MS Excel database was stored on a password-protected network drive in the Health Department of Research office. Survey monkey data were collected throughout the entire project, including the pre and post PSQI and survey data. Neither of these databases contained protected health information. If the project were to be repeated, data should be processed in the same fashion with limited access and identification of collected data.

Data Analysis

Once all data was collected, it was exported to Microsoft Excel to analyze the variables of sleep health perception and sleep health quality. Descriptive statistics were used to compare scores from the pre-and post-surveys to see if scores changed. A summary of data elicited from PSQI scores and pre/post-sleep health perception survey was displayed as a table and a bar graph showing the data visually. The project team reviewed the data.

Baseline data included the pre-module sleep health perception survey and PSQI completed before the sleep health education presentation was collected and reviewed. These results were

compared to the post-education sleep health perception surveys and PSQIs. Additionally, the small sample size (n=9) was reviewed and considered in the analysis.

Anticipated Implementation Timeline

The project implementation timeline is illustrated in Appendix L, which includes IRB approval through data analysis and dissemination. To note, while this project was initially charged to the nurse education department pre-COVID-19, this project was initiated and implemented during the global pandemic COVID-19, which impacted participation and possibly the attrition of participants.

Deviations from Plan

The plan's deviation included an additional announcement reminding the participants to complete the post-education PSQI and survey. The email including a link to the post-survey monkey was sent twice the same day (once in the morning and once in the afternoon). The proposed time for implementation as noted in Appendix P was delayed due to waiting for IRB approval: pushing back all subsequent portions of the implementation timeline. No other deviations occurred to the proposed plan.

Resources and Return on Investment

Hundreds of billions of dollars are spent or lost annually because of poor or limited sleep (Redeker et al., 2019). Financial impacts of sleep deprivation and sleep disorders are categorized as direct (costs of medical resource utilization, including the consumption of inpatient, outpatient, and pharmaceutical services within the health care delivery system) or indirect (expenses incurred from absenteeism, reduced work productivity, and increased workplace errors and accidents) (Redeker et al., 2019). A project looking at four companies' sleep-related reductions in productivity resulted in an estimated cost of $54 million per year exclusive of the

costs of absenteeism (Redeker et al., 2019). ***This project showed that a 12.5% reduction in callouts related to sleep deprivation occurred one-month post-sleep education in this department.***

With an anticipated budget of $124.50 (See Appendix Q), the total cost of this project was $102.59. The DNP student had a budget for coffee and bagels for the educational session, costing $102.34. The DNP student researched, created, and implemented the educational PowerPoint and was an unpaid service. The DNP student conducted the education during an already allotted time in the schedule of operating room nurses, adding no further costs. The research department provided the survey monkey account utilized for data collection as an already existing account which did not result in any additional charges. Printing materials created by the Sub Investigator costs $0.25 for five pieces of paper to make flyers and is considered negligible.

Barriers and Solutions

This project was conducted from July 2021 to September 2021, during the middle of the COVID-19 pandemic. At the time of this project implementation, the COVID-19 pandemic impacted hospital operations, including severe staffing shortages, increased work demands and increased staff stress, including emotional and physical fatigue (Sampaio et al., 2021). Nurses' sleep quality and symptoms of depression, anxiety, and stress showed a positive variation over the COVID-19 outbreak (Sampaio et al., 2021). While this creates more need and significance for conducting this project, this may have also affected the results.

The participants of this project were asked to work longer hours and given new tasks, roles, and responsibilities on the front lines of the pandemic in addition to working in their OR nursing jobs. With the hospital landscape dramatically changing, this could have undoubtedly

affected the results of this project, as seen in the increased post-global PSQI score and survey responses.

Additionally, three participants did not complete the post-survey and PSQI. Clarification on attrition could not be obtained due to the data being de-identified. However, an announcement was made on August 16th to remind the participants that a second survey and PSQI are to be completed before August 30th. Despite efforts to retain participants, this attrition could not be avoided.

Chapter 4: Discussion of Project Findings and Implications

Introduction

Chapter 4 begins by reporting sleep health perception and sleep health quality data. Results of data are then discussed. Strengths and limitations are described as well as implications for practice.

Project Findings

Responses for the pre-sleep health module survey and PSQI were collected directly before the sleep heath module on July 28th, 2021. The post-sleep health module survey and PSQI responses were collected one month later, on August 30th, 2021. Survey Monkey captured data and then exported it to Microsoft Excel for descriptive analysis. Nine participants completed the pre-surveys and attended the sleep education module. Only 6 participants completed the post-sleep health module follow-up surveys at the 1-month follow-up.

Sleep Health Perception

The pre-and post-test surveys revealed participants' subjective responses regarding sleep priority. Improvement at the 1-month follow-up was calculated based on “yes” answers to 5 of the seven questions, with “yes” indicating an improvement. Sleep health prioritization and caring about sleep health remained the same pre and post-intervention (100% to 100%). Believing sleep health correlates to physiological and mental health also improved at the 1-month post-module follow-up survey (87.5% to 100%). The average number of hours slept per night increased by 30 minutes per night one month after attending the module (6.3 to 6.8 hours per night). Self-perception of sleep quality as good to great remained unchanged one month after the module (50% to 50%). The scheduling of sufficient time between work and call shifts to allow for adequate time for rest has increased at the 1-month post module (57.14% to 66.67%). Due to

exhaustion, calling out from work for participants decreased 1-month post module (12.50% to 0%). On average, survey responses one-month post-sleep health module increased (no to yes). See Table 1 for a summary of these results.

Table 1.

Pre and Post Educational Module Survey Responses (n=9)

Question	Pre	Post
Is sleep health a priority for you?	**Yes** 100% (n=8) **No** 0% Skipped (n=1)	**Yes** 100%(n=6) **No** 0%
Do you care about your sleep quality?	**Yes** 100%(n=8) **No** 0% Skipped (n=1)	**Yes** 100%(n=6) **No** 0%
Do you believe that sleep health correlates with your physiological and mental health?	**Yes** 87.50%(n=7) **No** 12.50%(n=1) Skipped (n=1)	**Yes** 100%(n=6) **No** 0%
On average, how many hours do you sleep per night?	**Average Score**: 6.3	**Average Score**: 6.8
Would you say the quality of sleep you are getting is good to great?	**Yes** 50%(n=4) **No** 50%(n=4) Skipped (n=1)	**Yes** 50%(n=3) **No** 50%(n=3)
Have you self-scheduled sufficient time between work and call shifts to allow adequate sleep?	**Yes** 57.14%(n=4) **No** 42.86%(n=3) Skipped (n=2)	**Yes** 66.67%(n=4) **No** 33.33%(n=2)
Have you needed to call out from work within the past month because of exhaustion related to insufficient sleep?	**Yes** 12.50%(n=1) **No** 87.50%(n=7) Skipped (n=1)	**Yes** 0% **No** 100%(n=6)

Sleep Health Quality

Sleep health quality was measured through a sleep-report sleep index called the Pittsburgh Sleep Quality Index (PSQI). The PSQI was used to assess latency, duration,

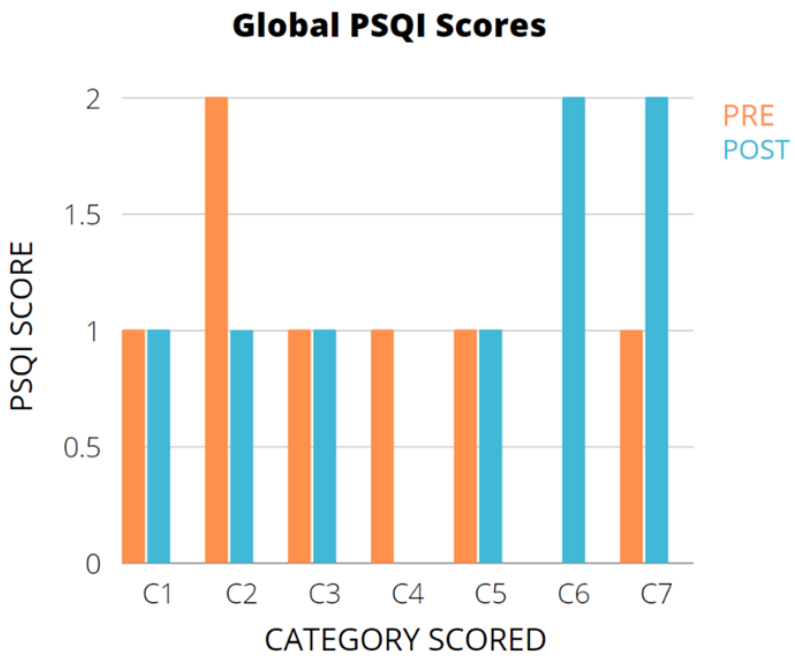
efficiency, sleep disturbances, medication usage, day-time dysfunction, and overall sleep quality. Scores on the PSQI indicate the perceived quality of sleep. This was then used to calculate one PSQI global score for pre-education based on methods put forth from the authors Buysse, Reynolds, Monk, Berman, and Kupfer (Buysse et al., 1989). The overall PSQI scores range from 0 (best) to 21 (worst). A score of 5 or more indicates poor sleep quality, while below 5 indicates good sleep quality (Buysse, 1989). Internal consistency was unable to be assessed using Cronbach's alpha due to limited sample size.

The average point allocated for each section of the pre-educational module PSQI tool was 1. Similarly, the average point allocated to each section of the post PSQI question was 1.14. Components 1 and 3 remained unchanged 1-month post module (1 to 1). Component 2 decreased by 1 point 1-month post module (2 to 1). Component 4 also decreased (1 to 0). Component 5 remained the same one month after the module (1 to 1). Component 6 increased by 2 points 1-month post module (0 to 2) and component 7 increased by 1 point post module (1 to 2). The Global PSQI scores increased one month after the sleep health module (7 to 8).

The average time reported for when each participant goes to bed increased (10:06 pm to 10:32 pm). The average time for each participant to fall asleep decreased at the1-month post module by 10 minutes (30 to 20). Participants' waking up each morning changed by 13 minutes (6:00 am to 5:47 am). The number of hours of actual sleep each participant received each night increased by 30 minutes 1-month post module (6 hours to 6 hours and 30 minutes). The average number of hours spent in bed increased 1-month post module (7 hours and 18 minutes to 7 hours and 20 minutes). Figure 1 depicts the average scores of the seven different PSQI components from before and one month after the sleep health module.

Figure 1.

Average Scores of the 7 Components of the PSQI Before and After the Sleep Health Module



Discussion

Targeted sleep education can change perception and sleep quality, as shown with operating room nurses at this community hospital. While this project was conducted during a global pandemic, leading to small sample size and notable attrition, a change in sleep health perception, next-day call-outs, and anecdotal feedback of behavioral changes were found. Overall findings included global PSQI scores increased one month after sleep health education, suggesting a decline in sleep health quality. Sleep health perception increased one month after sleep health education resulting in fewer call-outs, an increase in self-scheduling sufficient time for rest, and an increase in sleep duration.

Sleep Health Perception

Overall, sleep health perception improved from 78.9% to 83.33% after participation in a sleep health educational module in the OR department with shift-work OR nurses. The survey showed an increase in believing sleep health correlates with physiological and mental health (from 87.50% to 100%), and self-scheduling sufficient time between work and call shifts can allow for adequate sleep (from 57.14% to 66.67%). Sleep duration improved (from 6.3 hours per night to 6.8 hours). Few participants were called out from work due to exhaustion after attending the sleep health module (from 12.5% to 0%).

With improvement shown in the perception of the importance of sleep health, a solid foundation has been established for the OR staff nurse participants to improve their sleep health. This project demonstrated a change in sleep health perception suggesting a potential for sleep improvement in this key demographic after sleep education was incorporated into professional practice ongoing education in the workplace. Similar studies have shown sleep quality and duration improvement after sleep education interventions (Babamiri et al., 2017). One particular project's results showed that sleep quality-improving skills education had an important and decisive impact on the sleep quality of nursing personnel and that holding educational courses in this field can be useful (Babamiri et al., 2017). While a recognized small sample size for this project, the results demonstrated similar to that reviewed in the literature. Those who perceived poor sleep after education were more likely to utilize sleep health improvement skills learned during the educational intervention or seek medical help related to personal sleep quality (Babamiri et al., 2017). This is the precise global aim that this DNP student aimed to achieve, and department administration was hoping to instill with staff.

The nurses who participated in this project recognize the importance of sleep and have reported an improved perception of their sleep health. This can empower staff to change their sleep habits to improve their overall sleep quality and make sleep health a priority. Prioritizing sleep health has also increased effort in improving sleep (Takashi, 2012). Research suggests that consistent amounts of sleep before work are fundamental to improved performance and alertness in the workplace (Takashi, 2012). OR nurses require alertness and precise performance in their daily tasks, which can be thwarted by not obtaining enough sleep.

In addition, sufficient sleep helps maintain appropriate levels of waking function for both daytime and night-time work and is vital in promoting recovery from fatigue (Takashi, 2012). Nurses may also be inclined to assess time intervals between shifts and adjust according to the biological timing of sleep (Takashi, 2012). This sleep health educational module reviewed these key components to sleep health, and the OR nurses who participated recognized improvement of sleep health perception in the post-assessment evaluation. Although sleep is more likely to be replaced by jobs and other activities in real life, the perception of sleep health importance may elude revising work schedules to optimize sleep before, sometimes during, and after the work period (Takashi, 2012). This project by Takashi (2012) has suggested establishing work-sleep balance, similar to work-life balance, as a principle for designing and improving work schedules. Again, sleep health perception was targeted in this education module, laying the groundwork in helping to establish work-sleep balance for these OR nurses.

Sleep Health Quality

According to the results of the pre and post-PSQI, the sleep health module did not improve sleep health, as indicated by a global score of 7 that only increased after the module to a score of 8 after one month. A global score of 5 or above indicates poor sleep quality. An

increasing number leads one to conclude that participants reported worse sleep quality one month after the sleep health module. As mentioned previously, this could have been related to the ongoing COVID-19 pandemic and the increased workload and stress these nurses have endured. Select categories of the PSQI concluded that the participating nurses had a greater need for sleep medication, an unchanging view of their sleep quality, and an increased lack of enthusiasm to get things done, all of which indicate potential burnout or exhaustion was noteworthy during COVID-19.

However, analyzing each of the components of this tool individually, the participants reported an increased length of sleep and an easier time falling and staying asleep. This may indicate slight improvements within the concept of sleep health for select categories represented on the PSQI. For example, the reported sleep length increased by half an hour from 6.3 to 6.8. While slight, sleep duration may have improved based on education regarding the importance of sleep. Studies have shown that sleep education leads to later waking times and overall length of sleep duration (Kira et al., 2014). For future reiterations of this project, future nurse educators may want to consider a 3-month follow-up with the PSQI.

Staff Feedback

Feedback from participants after the sleep health education module was overwhelmingly positive. All participants verbalized that they found the presentation informative, well-presented, thorough, and helpful. Several participants suggested they would seek medical care to improve their own sleep health. One participant, in particular, has made an appointment to be tested for sleep apnea. Others commented on learning new information that they had not been aware of previously regarding the consequences of sleep deprivation. By considering participant feedback and modifying the program to diminish inessential details and enhance the enjoyment of the

learning process, greater sleep knowledge and a higher motivation to make changes to sleep behavior are more likely to follow (Kira et al., 2014). Participant and program facilitator enthusiasm about the sleep education program may have influenced participant sleep behavior (Kira et al., 2014). Recommendations and feedback were given to the nurse educator and practice mentor for this project to consider future sleep health modules.

Feedback from the health educator suggested that the information was helpful and asked for future presentations to be considered by management. The operating room manager was additionally appreciative of the education. A request for a printed copy of the sleep health information and sleep health module was made available for future sleep health education to all health care workers at this hospital. An emphasis was made on the importance of sleep health to be included by the health educator, especially in light of the consequences from the COVID-19 pandemic.

Strengths and Limitations of the Project

The strengths of this project included full organizational buy-in, and staff support for this education module. Increasing sleep health in nursing staff is an evidence-based strategy that relates directly to staff satisfaction and patient safety long-term. Administrative support and buy-in were noted, and nurse educator recommendations to continue with sleep health education. The return on investment is substantial and the possibility of providing better care for their patients and creating a happier, healthier staff.

Other strengths included obtaining permission to use the valid and reliable PSQI tool, which was easy for the participants and easy to calculate for the investigators. Securing authorization for use was timely and straightforward. The tool has been proven valid and reliable through multiple studies and will be an excellent resource for future projects and studies.

Noted limitations to this project included small sample size, retention of participants post-module follow-up, and implementing this project during COVID-19. With an already small sample, participation from pre to post decreased by 3 participants. Additionally, because the data was de-identified, there is no way to know which participants decided not to continue and why.

The self-administered survey used to determine sleep health perception before and after sleep health education was staff created and not necessarily a valid or reliable measure of sleep health perception. However, due to the intent and purpose of this project, data collected and utilized for these purposes was sufficient.

Implications for Practice

The purpose of this project was to establish the importance of sleep health for nurses in the OR who are at high risk for sleep deprivation, improve sleep health perception through a sleep health module, and improve sleep health with staff. This project's aim aligned with the health educators' charge of evaluating sleep health and incorporating sleep health into the onboarding and professional development for OR nurse staffing. Additionally, this initiative directly aligns with the Healthy People 2030 goals and can be included as part of this hospital's report on supporting staff with this goal.

Although the global score of the PSQI increased after the completion of the sleep health module, ultimately suggesting a decline in sleep quality, the sleep health perception survey data found that these OR nurses improved their personal perception of sleep health. Specifically, prioritizing their sleep health and finding sleep as an essential component to well-being correlates with their physiological and mental health. With an improved perception of the importance of sleep health, nurses may no longer accept sleep deprivation as a "normal" part of their job.

From the managers' point of view, nurses who perceive poor and insufficient sleep are a significant occupational health problem, which may increase the frequency of sickness (Chan, 2009). Providing a sleep health education module can raise awareness of sleep health and provide health care administrators an opportunity to support nurses with their sleep hygiene as part of professional self-care (Chen et al., 2010). Ultimately, this project provided an established pilot protocol to demonstrate how a health educator can expand on the required nurse education for staff in terms of sleep hygiene.

While this project was limited by the small sample size and the impact of COVID-19, I was able to implement the Harvard Medical School Sleep and Health Education Program into the perioperative health educators planning programming for staff. Positive staff reception and feedback were noted to include the health educator and department manager for paving the initial demonstration of this work.

Key Lessons Learned

In summation, the sleep health module has improved sleep health perception and made small improvements in sleep quality. As a result, the OR nurses have scheduled sufficient time for rest between shifts showing prioritization of sleep. They have also called out 0 times due to exhaustion since incorporating the sleep health education module. They have increased their length of sleep and fall asleep sooner. All participants now believe sleep health correlates with physiological and mental health.

Chapter 5: Dissemination, Sustainability and Recommendations

Introduction

Chapter 5 describes the project's future in terms of plans to disseminate and sustain the work, as well as implications and summative recommendations.

Future of the Project

Sustainment strategies for improving sleep health include revitalizing the sleep health education team and incorporating the educational presentation into the mandatory onboarding training for new nurses at this hospital. These strategies serve as reminders for staff who have attended the educational presentation and reach future generations of nurses.

The hospital currently has a policy establishing mandatory education each nurse must complete by the end of orientation. An amendment to the policy, to include sleep health education, can promote better work schedule patterns and motivate managers and workers to adopt strategies that reduce health and safety risks (Healthy People, 2020). Without sleep health education, individuals often prioritize other activities, oversleep and accept constant sleepiness and sleep disruption as inevitable (Healthy People, 2020). Establishing this policy amendment will ensure every new nurse becoming part of the OR staff has received proper and informative education about navigating and handling an atypical working schedule safely and effectively.

The team championing sleep health education will need to be reinvigorated as education staff come and go to ensure sleep health remains a priority. The strategy of continuing sleep education includes acquiring correct knowledge about sleep and the sleep-related behaviors that are important for improving sleep quality (Tanaka & Tamura, 2016). A designated team of 1-2 nurses will be responsible for collecting current evidence supporting the need for sleep health education, distributing that evidence to operating room nurses and administrators, and showing

continued interest in sleep health education. The importance of sleep education suggests that sleep improvement requires the dissemination of appropriate knowledge, providing supportive tools, and developing human resources to sustain change (Tanaka & Tamura, 2016).

Implications for Nursing Practice, Health Policy, and Education

Sleep education programs have been implemented because knowledge guides behavior and points behavior to the desired result (Kira et al., 2014). Operating room nurses with improved sleep health perception have shown an increase in sleep duration once educated on the importance of sleep health. Sleep health education may have improved perception in the operating room, suggesting that this new knowledge has guided a behavior change. This project showed that a 12.5% reduction in callouts related to sleep deprivation occurred one-month post-sleep education in this department, supporting the potential for other positive outcomes beyond those specifically for this project.

Sleep health is essential to operating room nurses due to their variable shifts and taxing work. Too long or repeated shifts reduce the opportunity for sleep and shorten recovery time in nurses, thus endangering their safety and health, quality of care, and patient safety (Stanojevic et al., 2016). Sleep quality is poorer among nurses who have variable schedules than those nurses with consistent schedules (Jehan et al., 2017). The nature of the nursing occupation, strenuous physical exertion, and continuous mental stress in the workplace can disturb sleep or increase sleep problems (Jehan et al., 2017).

The Center for Disease Control and Preventions Workplace Health Resources Center (2020) stresses that sleep is a significant health and safety concern. Strategies for prioritizing sleep health in the workplace include education, training, and assessment. Several sleep health initiatives at work have proven beneficial in utilizing these strategies (CDC, 2020). For example,

the United States law enforcement officers implemented a 1-hour sleep hygiene program with positive results in improving sleep hygiene knowledge (Redeker et al., 2019). A hospital in Taiwan implemented a 5-week sleep hygiene training program for their nurses resulting in significant improvements in sleep quality (Redeker et al., 2019). The United States transcontinental flight crew began a 3.5-hour fatigue management training program significantly improving sleep duration, knowledge about sleep, and reaction time (Redeker et al., 2019). A hospital in Colorado implemented a 1-hour fatigue management program for nurses showing at a four-week and three-month follow-up that there were significant improvements in sleep duration, sleep quality, alertness, and error prevention (Redeker et al., 2019). A comprehensive set of practice guidelines for managers to reduce shift work, long hours, and other causes of worker fatigue have been put into action at several institutions across the United States (Redeker et al., 2019). Similar to these other disciplines, as mentioned above that have prioritized and mandated sleep health as part of employee professional development, it is time that the nursing profession recognizes sleep health education as essential to practice.

Summary Recommendations

Sleep health education is a priority for many professions, and it is time that nursing considers the importance of sleep health, especially for required shift work. Adequate sleep is necessary to work effectively and safely, and OR nurses are at higher risk for atypical and inadequate sleep. The aims of this project to establish the importance of sleep health for nurses with on-call schedules and to improve sleep health perception through a sleep health education module were met. Targeted sleep education can change the perception and sleep quality of nursing staff. These initial results can help drive future clinical quality initiatives at this community based hospital. Inclusion of sleep health education for standard ongoing professional

development or continuing health education for all OR nurses. The results from this project provide baseline data for future work with prioritizing sleep health with nurses. This project shows how the benefits of adequate sleep health can potentially serve the nursing community.

References

Agency for Healthcare Research and Quality (AHRQ) (2022). Types of Health Care Quality Measures. https://www.ahrq.gov/talkingquality/measures/types.html

American Academy of Sleep Medicine (AASM). (2020). Sleep Works for You. Retrieved from http://sleepeducation.org/healthysleep/sleep-works-for-you

American Nurses Association. (2017). *Healthy Sleep*. ANA. https://www.nursingworld.org/practice-policy/hnhn/2017-year-of-the-healthy-nurse/healthy-sleep/

Armstrong, G., Sables-Baus, S. (2020). *Leadership and Systems Improvement for the DNP*. New York, NY: Springer Publishing Company.

Babamiri, M., Moeini, B., Tahmasian, H., Barati, M., & Roshanai, G. (2017). The study of sleep health education effect on sleep quality among Lorestan nursing personnel. *Journal of Ergonomics*, *4*(4), 8–13. https://doi.org/10.21859/joe-04042

Brown, F. C., Jr., W. C., & Soper, B. (2006). Development and evaluation of the sleep treatment and education program for students (STEPS). *Journal of American College Health, 54*(4), 231-237. doi:10.3200/jach.54.4.231-237

Buysse,D.J., Reynolds,C.F., Monk,T.H., Berman,S.R., & Kupfer,D.J. (1989). The Pittsburgh Sleep Quality Index (PSQI): A new instrument for psychiatric research and practice. *Psychiatry Research, 28*(2), 193-213.

Buysse, D. J. (2014). Sleep health: Can we define it? does it matter? *Sleep, 37*(1), 9–17. https://doi.org/10.5665/sleep.3298

Centers for Disease Control and Prevention (CDC). (2020). *Sleep: An important health and safety concern at work*. CDC Workplace Health and Resources Center. from

https://www.cdc.gov/workplacehealthpromotion/initiatives/resource-center/pdf/WHRC-Brief-Sleep-508.pdf

Chan, M. F. (2009). Factors associated with perceived sleep quality of nurses working on rotating shifts. *Journal of Clinical Nursing*, *18*(2), 285–293. https://doi.org/10.1111/j.1365-2702.2008.02583.x

Chen, P., Kuo, H., & Chueh, K. (2010, December). Sleep hygiene education: Efficacy on sleep quality in working women. *The Journal of Nursing Research*, *18*(4), 283-289. https://www.ncbi.nlm.nih.gov/pubmed/21139448

Cheval, B., Cullati, S., Pihl-Thingvad, J., Mongin, D., Von Arx, M., Chopard, P., & Courvoisier, D. S. (2018). Impact of Care-related Regret Upon Sleep (ICARUS) cohort study: protocol of a 3-year multicenter, international, prospective cohort study of novice healthcare professionals. *BMJ Open*, *8*(3), 4–9. https://doi.org/10.1136/bmjopen-2018-022172

Division of Sleep Medicine at Harvard Medical School. (2008, January 2). *Getting the Sleep You Need*. Getting the Sleep You Need | Healthy Sleep. http://healthysleep.med.harvard.edu/healthy/getting.

Fallis, W.M., McMillan, D.E., & Edwards M.P. (2011). Napping during night shift: practices preference, and perceptions of critical care and emergency department nurses. *American Association of Critical-Care Nurses, 31,*e1=e11. doi: 10.4037/ccn2011710

Fort Health Care. (2017). *Business Health and Sleep Deprivation*. Forthealthcare.Com. https://www.forthealthcare.com/wp-content/uploads/2014/06/sleep-deprivation-and-work

Giorgi, F., Mattei, A., Notarnicola, I., Petrucci, C., & Lancia, L. (2018, March). Can sleep quality and burnout affect the job performance of shift-work nurses? A hospital cross-

sectional study. *Journal of Advanced Nursing*, *74*(3). https://www.ncbi.nlm.nih.gov/pubmed/29164664

Healthy People. (2020). Sleep Health. https://www.healthypeople.gov/2020/topics-objectives/topic/sleep-health

Jehan, S., Zizi, F., Pandi-Perumal, S. R., Myers, A. K., Auguste, E., Jean-Louis, G., & McFarlane, S. I. (2017). Shift work and sleep: Medical Implications and Management. *International Journal of Sleep Medicine and Disorders, 1*(2). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5836745/

Kira, G., Maddison, R., Hull, M., Blunden, S., & Olds, T. (2014). Sleep education improves the sleep duration of adolescents: A randomized controlled pilot study. *Journal of Clinical Sleep Medicine*, *10*(7), 787–792. https://doi.org/10.5664/jcsm.3874

Liu, H., Liu, J., Chen, M., Tan, X., Zheng, T., Kang, Z., . . . Hao, Y. (2019). Sleep problems of healthcare workers in a tertiary hospital and influencing factors identified through a multilevel analysis: A cross-sectional study in China. *BMJ Open*, *9*(12). doi:10.1136/bmjopen-2019-032239

Melnyk, B. M., & Fineout-Overholt, E. (2015). *Evidence-Based Practice in Nursing & Healthcare A Guide to Best Practice* (3rd ed.). Philadelphia, PA: Wolters Kluwer Health.

Merriam-Webster. (2022). *Perceive definition & meaning*. Merriam-Webster. https://www.merriam-webster.com/dictionary/perceive

National Sleep Foundation. (2020, November 18). National Sleep Foundation. https://www.thensf.org/

New York University (NYU). (2019, December 13). Nurses sleep less before a scheduled shift, hindering patient care and safety: Nurses get under 7 hours of sleep before a work shift –

83 minutes fewer than days off. *ScienceDaily*. www.sciencedaily.com/releases/2019/12/191213115450.htm

O'Donnell, S., & Driller, M. W. (2017). Sleep-hygiene Education improves Sleep Indices in Elite Female Athletes. *International Journal of Exercise Science*, *10*(4), 522–530 https://pubmed.ncbi.nlm.nih.gov/28674597/

Redeker, N. S., Caruso, C. C., Hashmi, S. D., Mullington, J. M., Grandner, M., & Morgenthaler, T. I. (2019). Workplace interventions to promote sleep health and an alert, healthy workforce. *Journal of Clinical Sleep Medicine, 15*(04), 649–657. https://doi.org/10.5664/jcsm.7734

Sampaio, F., Sequeira, C., & Teixeira, L. (2021). Impact of COVID-19 outbreak on nurses' Mental Health: A Prospective Cohort Study. *Environmental Research*, *194*, 110620. https://doi.org/10.1016/j.envres.2020.110620

Smyth, C. (1999). The Pittsburgh Sleep Quality Index (PSQI). *Journal of Gerontological Nursing*, *25*(12), 10–10. https://doi.org/10.3928/0098-9134-19991201-10

Sonnega, J., Sonnega, A., & Kruger, D. (2019). The city doesn't sleep: Community perceptions of sleep deficits and disparities. *International Journal of Environmental Research and Public Health*, *16*(20), 3976. doi:10.3390/ijerph16203976

Stanojevic, C., Simic, S., & Milutinovic, D. (2016). Health effects of sleep deprivation on nurses working shifts. *Medical Review*, *69*(5-6), 183–188. https://doi.org/10.2298/mpns1606183s

Stimpfel, A. W., Fatehi, F., & Kovner, C. (2020). Nurses' sleep, work hours, and patient care quality, and safety. *Sleep Health, 6*(3), 314–320. https://doi.org/10.1016/j.sleh.2019.11.001

Takahashi, M. (2012). Prioritizing sleep for healthy work schedules. *Journal of Physiological Anthropology*, *31*(1). https://doi.org/10.1186/1880-6805-31-6

Tanaka, H., & Tamura, N. (2015). Sleep education with self-help treatment and sleep health promotion for mental and physical wellness in Japan. *Sleep and Biological Rhythms, 14*(S1), 89-99. doi:10.1007/s41105-015-0018-6

Watson, S. (2020, May 15). *The Effects of Sleep Deprivation on Your Body*. Healthline. https://www.healthline.com/health/sleep-deprivation/effects-on-body#Immune-system

Zhang, L., Sun, D.-, Li, C.-, & Tao, M.-. (2016). Influencing factors for sleep quality among shift-working nurses: A cross-sectional study in China using 3-factor Pittsburgh Sleep Quality Index. *Asian Nursing Research*, *10*(4), 277–282. https://doi.org/10.1016/j.anr.2016.09.002

Appendix A

Description of Evidence Search

The following databases were searched: CINAHL, MEDLINE Cochrane Database of Systemic Reviews. The keywords searched were: Sleep, hygiene, education, health, deprivation, nurse, implementation, burn out, programs, policy, consequences, benefits, perception, shift work. Sleep health and nurses narrowed initial searches. Limits/Filters for all searches pertaining to sleep health included English language, peer-reviewed, Boolean phrase, full text, published between 2010-current. Inclusion criteria for article selection were sleep health and shift work. Tables 1-3 below display the database, search terms, and search results.

Table 1

Search Terms and Search Results by Database [CINAHL]

Search Terms	Number of hits	Number of titles & abstracts reviewed	Number of full-text articles reviewed	Number of articles selected for this review without duplicates
Sleep Health	780	n/a	3	1
Sleep Health and nurses	49	n/a	8	4
Sleep Health benefits	54	n/a	4	0
Sleep Health and shift work	36	n/a	5	1
Sleep health and consequences	49	n/a	5	0
Sleep Heath and education	120	n/a	6	0
Sleep Health, education, implementation	6	n/a	0	0
Sleep Health implementation	18	n/a	3	1
Sleep Health, perception, nurses	25	n/a		0
Sleep health, perception	42	n/a	1	0
Sleep hygiene	320	n/a	9	2
Sleep hygiene, nurses	28	n/a	5	1
Sleep hygiene, shift work	4	n/a	1	0
Sleep health, burn out	12	n/a	0	1

Table 2

Search Terms and Search Results by Database [MEDLINE]

Search Terms	Number of hits	Number of titles & abstracts reviewed	Number of full-text articles reviewed	Number of articles selected for this review without duplicates
Sleep Health	1412	n/a	0	0
Sleep Health, nurses	60	n/a	12	4
Sleep Health, nurses, shift work	16	n/a	3	0
Sleep health, consequences	87	n/a	0	0
Sleep Heath, education	209	n/a	0	0
Sleep Health, education, implementation	10	n/a	1	0
Sleep Health , nurses, implementation	1	n/a	0	0
Sleep Health, perception, nurses	2	n/a	0	0
Sleep health, perception	79	n/a	3	1
Sleep hygiene	321	n/a	6	1
Sleep hygiene, nurses	13	n/a	0	0
Sleep hygiene, shift work	10	n/a	3	0
Sleep health, burn out	1	n/a	0	0

Table 3

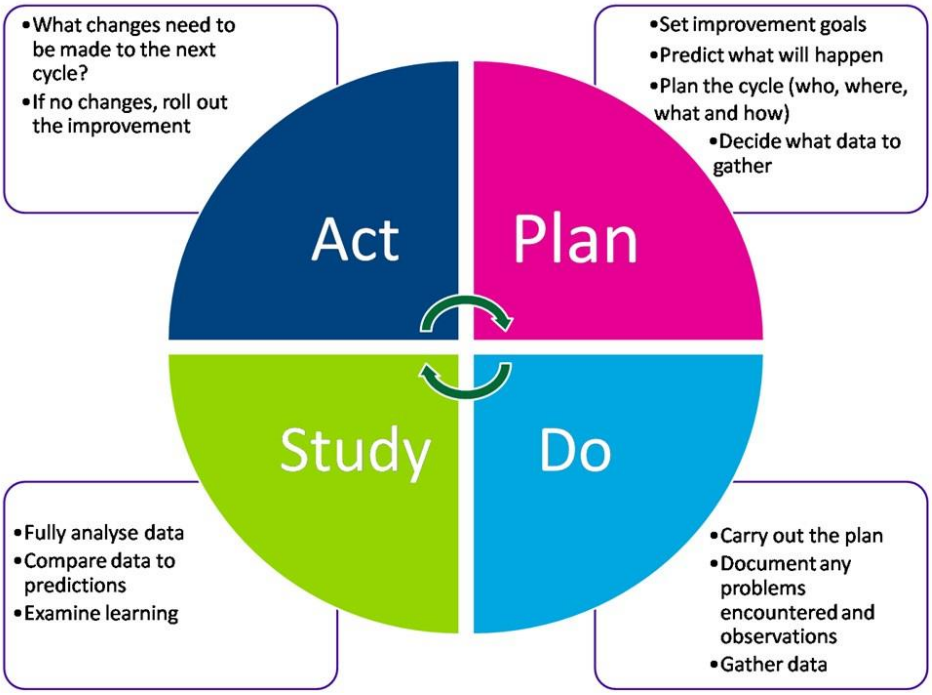
Search Terms and Search Results by Database [Cochrane Database of Systemic Reviews]

Search Terms	Number of hits	Number of titles & abstract reviewed	Number of full-text articles reviewed	Number of articles selected for this review without duplicates
Sleep Health	21	n/a	0	0
Sleep Health and nurses	1	n/a	0	0
Sleep Health benefits	8	n/a	0	0
Sleep Health and shift work	1	n/a	0	0
Sleep health and consequences	2	n/a	0	0
Sleep Heath and education	0	n/a	0	0
Sleep Health implementation	2	n/a	0	0
Sleep hygiene	2	n/a	0	0
Sleep deprivation	4	n/a	0	0

CINAHL yielded the most useful results, while MEDLINE produced useful results with several duplicates. The Cochrane Database yielded no results.

Appendix B

Plan Do Study Act Model for Action-Oriented Learning



Appendix C

Survey Monkey Email

Hello!

Thank you for choosing to participate in this project. The title of this project is Operating Room Nurses Sleep Health: an Evidence-Based Practice Sleep Health Education Project.

This project aims to see if sleep health education improves how you perceive sleep health and improves your sleep health.

If you choose to participate in this project, you will attend an educational session that includes a 30-minute powerpoint presentation about sleep health, followed by a discussion.

Before and after the educational session, you will be asked to complete a pre-and post-survey about your sleep health perception and a Pittsburgh Sleep Quality Index survey. Each survey will take about 5 minutes to complete.

Below is a link to the pre-survey mentioned above. Please complete this survey prior to the educational session at DATE/TIME at LOCATION.

After the educational session, you will be emailed a second link containing the post-survey will be sent to you for completion.

[LINK WILL BE ADDED HERE}

Our hope is that the people who participate in this project will better understand and know of sleep health, their personal sleep needs, and their perception of sleep health. There are no risks, your answers are anonymous, and there will be no compensation.

If you have any questions, please feel free to email or call me.

Thank you,

Gabriella Castignoli, BSN, RN
EMAIL
(203) 727-4012

Appendix D

Sleep Health Perception Survey

Pre and Post Education Survey Questions on Survey Monkey

Survey Questions – please mark the appropriate choice:

1) Is sleep health a priority for you? Yes/No_
2) Do you care about your sleep quality? Yes/No
3) Do you believe sleep quality correlates with your physiological and mental health? Yes/No
4) On average, how many hours do you sleep per night? Please list the number of hours __
5) Would you say the quality of sleep you are getting is good to great? Yes/ Not
6) Have you self-scheduled sufficient time between work and call shifts to allow adequate sleep? Yes/No
7) Have you needed to call out from work within the past month because of exhaustion related to insufficient sleep? Yes/No

Appendix E

Pittsburgh Sleep Quality Index

Name_____ Date_____

Sleep Quality Assessment (PSQI)

What is PSQI, and what is it measuring?

The Pittsburgh Sleep Quality Index (PSQI) is an effective instrument used to measure the quality and patterns of sleep in adults. It differentiates "poor" from "good" sleep quality by measuring seven areas (components): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month.

INSTRUCTIONS:

The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

During the past month,

1. When have you usually gone to bed? _____
2. How long (in minutes) has it taken you to fall asleep each night? _____
3. What time have you usually gotten up in the morning? _____
4. A. How many hours of actual sleep did you get at night? _____
   B. How many hours were you in bed? _____

5. During the past month, how often have you had trouble sleeping because you	Not during the past month (0)	Less than once a week (1)	Once or twice a week (2)	Three or more times a week (3)
A. Cannot get to sleep within 30 minutes				
B. Wake up in the middle of the night or early morning				
C. Have to get up to use the bathroom				
D. Cannot breathe comfortably				
E. Cough or snore loudly				
F. Feel too cold				
G. Feel too hot				
H. Have bad dreams				
I. Have pain				
J. Other reason (s), please describe, including how often you have had trouble sleeping because of this reason (s):				
6. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?				
7. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?				
8. During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?				
9. During the past month, how would you rate your sleep quality overall?	Very good (0)	Fairly good (1)	Fairly bad (2)	Very bad (3)

Scoring

Component 1	#9 Score	C1 _____
Component 2	#2 Score (<15min (0), 16-30min (1), 31-60 min (2), >60min (3)) + #5a Score (if sum is equal 0=0; 1-2=1; 3-4=2; 5-6=3)	C2 _____
Component 3	#4 Score (>7(0), 6-7 (1), 5-6 (2), <5 (3)	C3 _____
Component 4	(total # of hours asleep) / (total # of hours in bed) x 100 >85%=0, 75%-84%=!, 65%-74%=2, <65%=3	C4 _____
Component 5	# sum of scores 5b to 5j (0=0; 1-9=1; 10-18=2; 19-27=3)	C5 _____
Component 6	#6 Score	C6 _____
Component 7	#7 Score + #8 score (0=0; 1-2=1; 3-4=2; 5-6=3)	C7 _____

*Add the seven component scores together*_____ *Global PSQI* _____

A total score of "5" or greater is indicative of poor sleep quality.
If you scored "5" or more it is suggested that you discuss your sleep habits with a healthcare provider

Appendix F

Pittsburgh Sleep Quality Index Permission

Gmail

Gabriella Castignoli <castignolig@gmail.com>

Request to use sleep measure/instruments (PSQI)

Gasiorowski, Mary <GasiorowskiMJ@upmc.edu> Thu, Mar 25, 2021 at 7:08 PM
To: "\"Gabriella Maria Castignoli\"" <castignolig@gmail.com>

Sent on behalf of Dr. Buysse

Dear Gabriella Maria Castignoli,

You have my permission to use the PSQI for your research study. You can find the instrument, scoring instructions, the original article, links to available translations, and other useful information at www.sleep.pitt.edu under the Measures/Instruments tab. Please ensure that the PSQI is accurately reproduced in any on-line version (including copyright information). We request that you do cite the 1989 paper in any publications that result.

Note that Question 10 is not used in scoring the PSQI. This question is for informational purposes only, and may be omitted during data collection per requirements of the particular study.

This copyright in this form is owned by the University of Pittsburgh and may be reprinted without charge only for non-commercial research and educational purposes. You may not make changes or modifications of this form without prior written permission from the University of Pittsburgh. If you would like to use this instrument for commercial purposes or for commercially sponsored research, please contact the Office of Technology Management at the University of Pittsburgh at 412-648-2206 for licensing information.

Good luck with your research.

Sincerely,

Daniel J. Buysse, M.D.

Professor of Psychiatry and Clinical and Translational Science

Appendix G

Evidence Summary Table

Search Question in PICO format: (P) In on-call nurses at a community hospital, (I) would sleep education, (C) compared to no education, (O) improve sleep health, decrease call-outs, and change sleep health perception?

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
1	Brown (2006)	(1) to develop a manageable sleep education program to prevent and treat sleep difficulties among students; (2) to evaluate the impact that such a program has on students' knowledge about healthy sleep habits and the importance of such habits; (3) to examine the extent to which students' sleep quality and habits improve after taking part in the psychoeducational program; (4) to determine whether such a program can prevent students from developing sleep difficulties.	Type of study: Double-Blind experimental design Supported by multiple relevant RCTs; Level I	Two introductory psychology classes during the early part of the fall term at a university	STEPS is defined as a 30-minute Sleep Treatment and Education Program for Students Students defined as first-year college students enrolled in introductory psychology class	Pittsburgh Sleep Quality Index Sleep Hygiene Awareness and Practices Scale Sleep Habits Survey	Over a 6-week period, participants in the treatment condition demonstrated significantly better overall sleep quality on the PSQI when compared with the control group. Among PSQI subtest scores, the treatment group had significantly lower sleep disturbance scores, sleep latency, and sleep medication use. Students in the treatment group had significantly better changes in sleep hygiene practices over the 6 weeks than did	The inclusion of a psychoeducational program, such as STEPS, in university orientation classes may significantly Improve sleep quality. Behavioral sleep interventions should be advertised for improving sleep quality. Results of this study also support the need to implement sleep awareness programs, such as STEPS, to prevent the deterioration of sleep quality Moderate worth findings suggest better sleep on weekends, and

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
							students in the control group. As for specific sleep practice changes over time, those in the treatment group had significant decreases in the number of naps, hunger before bedtime, and medications with caffeine.	adjustment in class schedule is also necessary. The quality of evidence is high with close to no bias.
2	Cheval (2018)	To examine how newly practicing healthcare professionals adapt to their challenging job by assessing the impact of care-related regret on sleep and job quitting	The ICARUS cohort study is a prospective, longitudinal, multicenter, and international study of newly practicing healthcare professionals working in acute care hospitals and clinics. Level IV	Newly practicing healthcare professionals were working in acute care hospitals and clinics. Novice healthcare professionals were selected because young age is a significant factor of turnover intentions. Participants were selected from a random	five regret variables (frequency, highest intensity and three coping strategies) on job quitting were not defined. Sleep problems was not defined. No variable definitions were provided.	A weekly survey which takes <30 minutes.	None	Results were to validate the ICARUS tool. This will not help to answer my PICO question. Worth is low, while quality of evidence is moderate.

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
				sample of schools from the French-speaking, English-speaking, German-speaking and Danish-speaking countries.				
3	Fallis (2011)	To provide an in-depth description of critical care nurses' practices, preferences, and perceptions of napping/not napping when working night shift in either an emergency department or an intensive care unit (ICU). The benefits and drawbacks and the impact of napping/not napping on both patients' and nurses' personal health and safety were sought.	Qualitative Descriptive Study; Level V	An accredited acute care community hospital in central Canada with active 8-bed mixed ICU, and an emergency department with more than 30000 visits per year. Nurses in these areas generally work either 8- or 12-hour shifts on a day/night or day/evening. Participants were 13 critical care	Critical care nurses, for the purpose of this research, were defined as registered nurses working in either an emergency department or an ICU.	An interview guide was devised for this study. Interview questions were based on a review of the literature and the clinical expertise of the researchers, which included both emergency department and ICU experience, as well as expertise in sleep health. A demographic	10 of the 13 nurses in this study noted improvements in mood, energy level, and response time when the work environment allowed them to nap. Even a short 20-minute nap was viewed by some nurses as restorative, allowing them to better attend to their job and improve their work performance. The recommendations of other researchers also support a brief	Quality of evidence was moderate. This article does support sleep importance for variable shifts, however it relates to napping vs. education.

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
				nurses with an average of 17 years' experience. Ten nurses napped regularly; 2 avoided napping because of sleep inertia.		questionnaire was devised to provide descriptive information related to the sample of participants. Information such as sex, age category, department, marital status, and length of time working on the night shift was collected.	nap during the shift period to combat the sleep loss and fatigue associated with night shift work. Participants in this study identified impairments in cognitive functioning and decision making when naps were desired but not possible, experiences congruent with findings that nurses were at increased risk for making and not catching errors during periods of sleep deprivation.	
4	Liu (2019)	To examine the prevalence of sleep problems among tertiary hospital employees in China and identify associated factors	Cross-sectional questionnaire survey study; Level II	317 departments at 33 tertiary hospitals in the Heilongjiang Province, China Representative sample of 4007	***Outcome measure (dependent variable): sleep problems*** - falling asleep, waking up frequently during the night or waking up too early in the morning	Participants completed a structured questionnaire which collected data regarding demographics, sleep problems, employment,	Nearly half of the respondents reported experiencing sleep problems. Healthcare workers themselves should pay attention to their chronic pain	Quality of evidence is high but worth is moderate relating sleep disturbances to headaches. However the study supports shift work or clinical nurses as

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
				healthcare workers, including clinicians, medical technicians and office workers, who were selected using a multistage cluster sampling method. Ultimately, 3810 participants completed valid questionnaires, yielding a response rate of 95%.	Individual-level variables included sociodemographic indicators (age, sex, educational background, job title and monthly salary), working conditions (average weekly working hours, number of night shifts per month and one-way commute time), health-related behaviours (physical exercise and regularity of diet) and experience of chronic pain (headache, neck and shoulder pain, lumbar and back pain and knee pain). department type was a level 2 explanatory variable in our analysis because individuals in the same department	chronic pain and health-related behaviours. A two-level logistic regression model was constructed to examine determinants of sleep problems	problems and engage in regular diet and exercise.	a prominent population suffering from sleep problems.

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
					are not independent of each other			
5	O'Donnell (2017)	To evaluate the effects of a single sleep hygiene education session on the sleep quality and quantity of female netball athletes over an acute period of time (two weeks) during a pre-season, heavy phase of training	Nonrandomized experimental design; Level III	A total of 26 elite female netball athletes volunteered to participate in the current study. Athletes were of international and/or national representative standard and the study took place in the pre-season phase of competition.	Sleep hygiene is described as practicing behaviors that facilitate sleep and avoiding behaviors that interfere with sleep. Sleep hygiene education includes the provision of advice based on various aspects of lifestyle and behavior as well as environmental factors that influence sleep such as light, noise and temperature Definitions included: Total Sleep Time (TST) - Minutes Total time spent asleep Sleep Efficiency (SE) % - Total	Single group pre-post design whereby athletes performed one week of baseline sleep monitoring (PRE) followed by a sleep education session and a further week of sleep monitoring (POST). Participants were required to wear a wrist actigraphy device over a 2-week (14 day) period to monitor sleep patterns. The raw activity scores were translated to sleep-wake scores based	Sleep hygiene education may be used to improve sleep in elite athletes. A single one-hour session of sleep hygiene education resulted in a significant improvement in total sleep time and wake variance, with 22 minute and 21 minute improvements, respectively, from pre to post education in 26 elite female athletes. Whilst there were no significant differences for the other sleep indices, there were some trends towards improvements in total time in bed, sleep efficiency and sleep latency	The quality of evidence is high and found statistically significant results for improvement of sleep because of sleep health education. Although this study provides evidence to the importance of educating athletes about sleep and optimal sleep hygiene this will support the benefits of sleep health hygiene for nurses for my PICO question. The type of design (non randomized experimental design) is weaker because there is no randomization which can create bias

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
					time in bed divided by total sleep time Total Time in Bed (TTB) - Minutes Total time spent in bed Sleep Latency (SL) - Minutes Time taken for sleep onset Wake Episodes per Night (WE) - Number count Total number of awakenings per night Sleep Onset Variance (SOV) - Minutes Sleep onset consistency relative to mean Wake Variance (WV) - Minutes Wake time consistency relative to mean Wake Episode Duration (WED) - Minutes Mean wake episode duration Sleep Onset Time (SOT) - Time of day Time of transition from	on computerized scoring algorithms	pre to post education. The findings provide evidence that a sleep education session may be useful in improving both sleep quantity and quality	

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
					wakefulness into sleep Wake Time (WT) - Time of day Wake up time for the sleep period			
6	Sonnega (2019)	To make progress on improving the overall sleep health of urban residents by gaining further insight into community perceptions about this issue. Addressing the ecological context of sleep may be a promising avenue for not only addressing sleep deficits and disparities but also in preventing the onset of prevalent diseases.	Qualitative Study; Level VI	They assembled a diverse group of participants, with regard to age and gender, from neighborhoods that had reported poor sleep, which the GIS mapping had suggested were predominantly African American majority areas. Seven focus groups, ranging in size from 8 to 13 participants, were conducted successively in the spring and summer. A total of 70	No variables were defined Poor sleep Sleep hygiene Fair sleep Good sleep	Semi structured focus groups were asked multiple questions related to sleep health	Theme 5: Sleep environment (3 Groups) Mattress comfort Room temperature Noise Television Was shown to be a cause of causing poor sleep	Quality of evidence is moderate. It will support my study by confirming poor sleep hygiene as a cause of poor sleep. This can show a need for education on sleep hygiene improvements.

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
				individuals took part in the discussions. Six of the focus groups were with community adults, and one was with a group of college students from the area. Focus groups took place at community locations such as the library or church.				
7	Tanka (2015)	To provide an overview of the effects of the sleep education with self help treatment for student, teacher, and local resident and sleep health promotion for mental and physical wellness for elderly with actual examples of public health from the	RCT with randomization; Level II	One-hundred and forty-eight children from two schools participated in this study. Schools provided one group for sleep education and a second group as controls. Two-hundred and twenty-nine students	All variables defined throughout study and in table form. Sleep hygiene measures Poor sleep Sleep habits Sleep Education Etc.	Pre and post education questionnaire. Knowledge survey. Pre questionnaire was given before education. Post questionnaire was given 6 months after	Results suggest sleep education using a short term cognitive-behavioral method (knowledge of sleep and self-help treatment) improves the quality of sleep, arousal levels, daytime concentration, and motivation. We referred to	All of the findings of this study support the benefits of sleep health education. This study shows significant results and improvements to its populations after delivering sleep health education. It also shows sleep improvement in multiple age groups and

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
		community and schools.		at the first grade of two junior high schools were enrolled in this study: the sleep education group and the wait-list group. Twenty-two school nurses in elementary school and junior high school were divided into the only educational group and the self-help treatment group. Sixty high school students participated in the sleep education program using the self-help treatment.		education and self help. Knowledge survey was given before education and directly after education.	the importance of sleep education and sleep management in schools and suggest that sleep improvement assistance requires (1) the dissemination of appropriate knowledge, (2) providing support tools, and (3) the development of human resources. Moreover, these findings strongly suggest that reconsidering lifestyles and ensuring high-quality sleep will be effective in greatly reducing the number of elderly with dementia or confined to bed.	multiple areas of improvement such as perception, sleep habits AND health risks. Quality of Evidence is High.

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
8	Zhang (2016)	The aim of this study was to identify influencing factors for sleep quality among shift-working nurses based on a three-factor scoring model that included sleep efficacy, sleep quality and daily dysfunction.	Cross sectional survey; Level VI	513 nurses were recruited over 6 months from a hospital in Shanghai, China. Cluster Sampling was used.	All tools and variables were defined in chart form	Using a self-reported questionnaire. Sleep quality was measured by the Pittsburgh Sleep Quality Index (PSQI). Data were analyzed based on the three-factor PSQI model: Factor 1, sleep efficacy; Factor 2, sleep quality; Factor 3, daily disturbances.	Performing current shift work and performing shift work previously were significantly associated with poor sleep quality	This study shows an appropriate arrangement and intervention strategies are needed in order to improve sleep quality among shift-working nurses. This supports the need of my PICO question for its particular population. Quality of evidence is moderate with low level of evidence.

Appendix H

Evidence Synthesis Tables

Table 1

Level of Evidence Synthesis Table

Article Number	1	2	3	4	5	6	7	8
Level I: Systematic review or meta-analysis								
Level II: Randomized controlled trial				X			X	
Level III: Controlled trial without randomization	X				X			
Level IV: Case-control or cohort study		X						
Level V: Systematic review of qualitative or descriptive studies			X					
Level VI: Qualitative or descriptive study, CPG, Lit Review, QI or EBP project						X		X
Level VII: Expert opinion								

Table 2

Outcomes Synthesis Table

Article Number	1	2	3	4	5	6	7	8
Sleep Health	↑	NE	↑	NE	↑	SN	↑	SN
Burnout	NE	NE	NE	ND	NE	NE	NE	SN
Cost	NE	NE	NE	NE	NE	NE	NE	NE
Perception	↑	NE	↑	↑	↑	↑	↑	SN
Sleep Quality	↑	NE	↑	↑	↑	SN	↑	SN

NE, not evaluated; ND, no statistically significant difference; SN, shows a need

Appendix I

Differentiating Quality Improvement and Research Activities Tool

Question		Yes	No
1.	Is the project designed to bring about an immediate improvement in patient care?	X	
2.	Is the purpose of the project to bring new knowledge to daily practice?	X	
3.	Is the project designed to sustain the improvement?	X	
4.	Is the purpose of measuring the effect of a process change on care delivery?	X	
5.	Are findings specific to this hospital?	X	
6.	Are all patients who participate in the project expected to benefit?	X	
7.	Is the intervention at least as safe as routine care?	X	
8.	Will all participants receive at least usual care?	X	
9.	Do you intend to gather just enough data to learn and complete the cycle?	X	
10.	Do you intend to limit the time for data collection in order to accelerate the rate of improvement?	X	
11.	Is the project intended to test a novel hypothesis or replicate one?		X
12.	Does the project involve withholding any usual care?		X
13.	Does the project involve testing interventions/practices that are not usual or standard of care?		X
14.	Will any of the 18 identifiers according to the HIPAA Privacy Rule be included?		X

Adapted from Foster, J. (2013). Differentiating quality improvement and research activities. Clinical Nurse Specialist, 27(1), 10–3. https://doi.org/10.1097/NUR.0b013e3182776db5

An answer of yes to all of the items in l-l0 and no to all of the items in 11-I4 indicates that this project meets the criteria for a Quality Improvement Project. It also indicates that the project does not qualify as human subjects' research and does not have to go through the Institutional Review Board at Sacred Heart University

Appendix J

Hospital IRB Approval

To:

From: Andrea Waldron, CIP, Expedited Review Team Leader

CC: BRANY IRB File # 21-08-158-337
, Director, Clinical Outcomes and Health Services Research
Research Coordinator

Date: 06/01/2021

Event ID: # 182843

Re: **BRANY IRB Approval for Investigator Initiated Protocol 21-1702**

Protocol Title: **Operating Room Nurses Sleep Health: an Evidence-Based Practice Sleep Health Education Project**

1. **BRANY IRB Decision:** BRANY IRB conditionally approved the above referenced research project. The BRANY IRB approval date for this submission is 06/01/2021, which is the date the conditions of approval were satisfied. Modifications are in accord with those suggested by BRANY IRB.

   Important Note(s):
   a. **All research must be conducted in accordance with this approved submission. Any changes to the approved study must be reviewed and approved by the BRANY IRB prior to implementation, except when necessary to eliminate an apparent immediate hazard to the subject.**
   b. **All subjects are to be consented with the BRANY IRB-approved consent form(s).**
   c. **Unanticipated problems (including serious adverse events, if applicable) must be reported to BRANY IRB within 5 days of discovery using xForm#16 (Reportable Event xForm)**
   d. **Any complaints or issues of non-compliance must be immediately reported to BRANY IRB.**

   **This approval requires that all procedures and activities are performed in accordance with relevant state and local law (including tribal law, when applicable).*

2. **Items :/Approved:**

   - Investigator Initiated Protocol 21-1702 - Version Date: 06/01/2021 including the following:
     - Appendix A: Sleep Health Perception Survey
     - Appendix B: Pittsburgh Sleep Quality Index
     - Appendix C: Verbal Announcement
     - Appendix D: Announcement Flyer
     - Appendix E: Survey Monkey Email – Informed Consent

- Sleep Health Powerpoint (BRANY IRB Approved 06/01/2021)

BRANY | 1981 Marcus Avenue, Suite 210, Lake Success, NY 11042 | 516.470.6900 T | 516-470-6903 F | **www.brany.com**

3. **Study Personnel Approved to Participate in this Study:**
   a. MSN, BSN
   b.
   c. PhD
   d.

4. **Clinical Trial Agreement Execution**:
   When applicable, this project may not commence without a fully executed Clinical Trial Agreement.

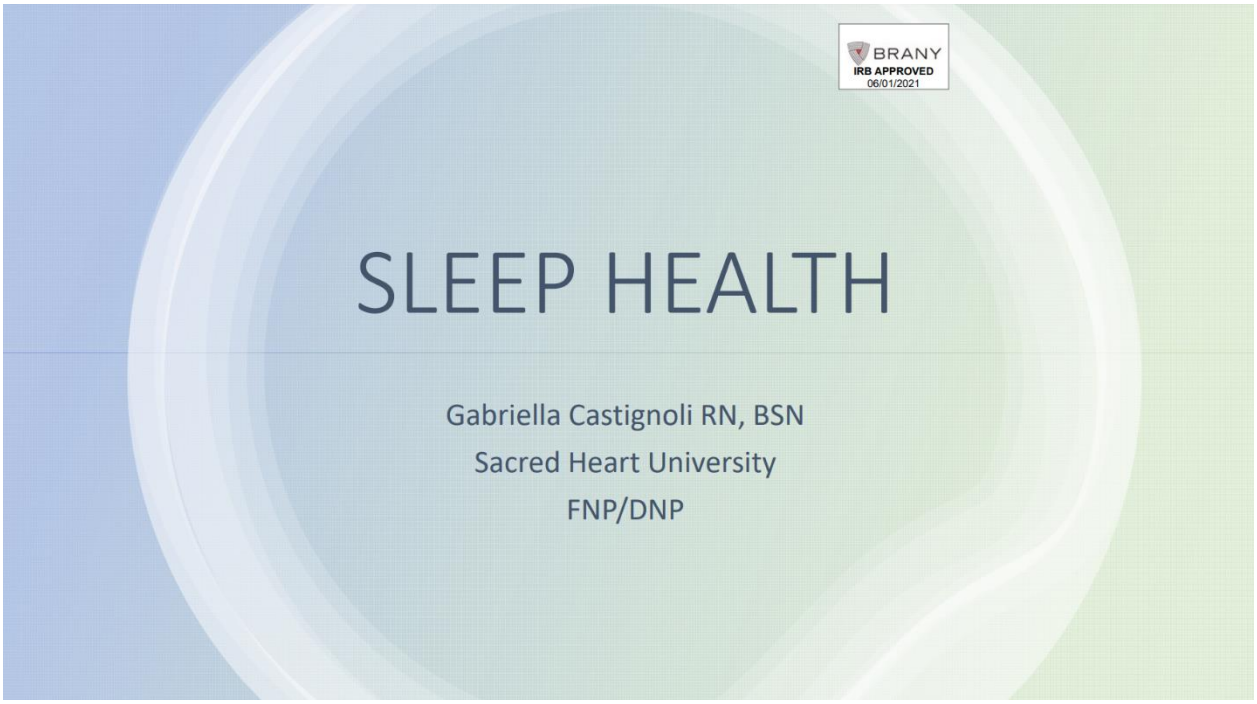
5. **Non-Expiring IRB Approval**:
   This study was reviewed under the Revised Common Rule (2018 Requirements) and therefore does not require continuing review in accordance with 45 CFR 46.109(f)(1)(i).

   However, BRANY IRB requires you "check in" at least annually to ensure your study status is up to date and in compliance. Your **Annual Report** to BRANY IRB is due on **06/01/2022** (submit xForm: 12-ANNUAL REPORT). If the status of the research changes, or it is completed prior to this date, you must notify the IRB (submit xForm: 04-Study Status Change-Closed/Enrollment Closed

If you have any questions or require any additional information, please call me at 516-470-6906 or send an email to me at awaldron@brany.com. Thank you.

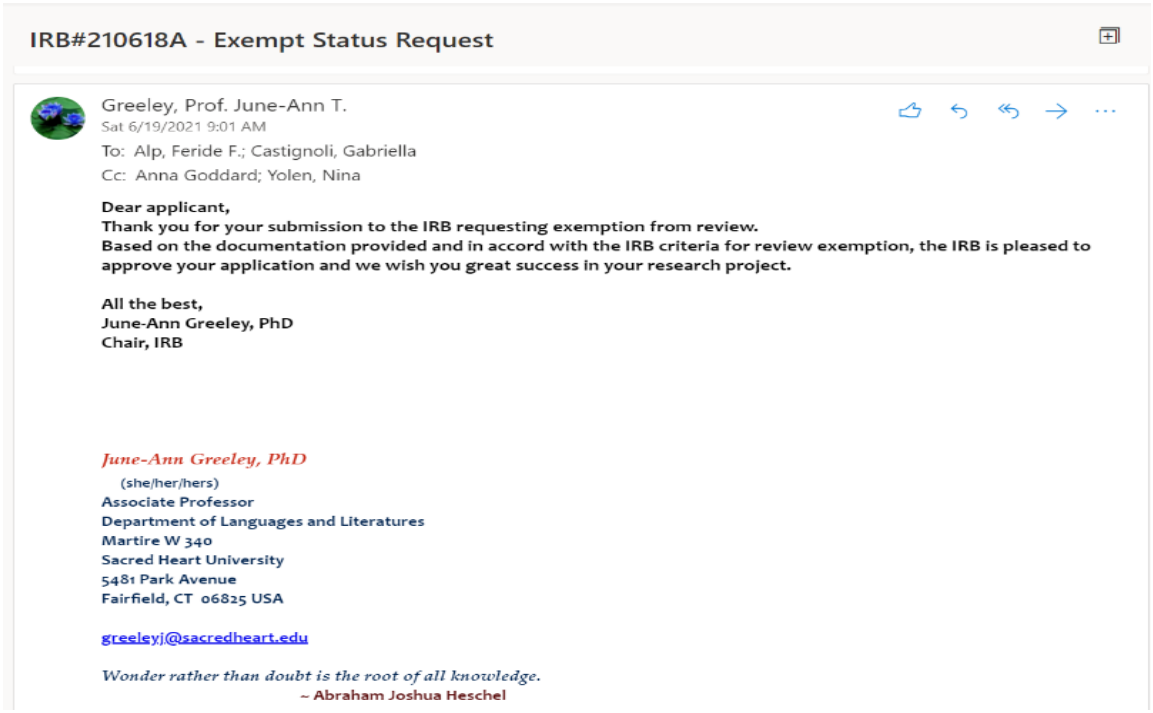
Appendix K

Hospital IRB Educational PowerPoint Approval



Appendix L

Sacred Heart University IRB Exemption



IRB#210618A - Exempt Status Request

Greeley, Prof. June-Ann T.
Sat 6/19/2021 9:01 AM
To: Alp, Feride F.; Castignoli, Gabriella
Cc: Anna Goddard; Yolen, Nina

Dear applicant,
Thank you for your submission to the IRB requesting exemption from review.
Based on the documentation provided and in accord with the IRB criteria for review exemption, the IRB is pleased to approve your application and we wish you great success in your research project.

All the best,
June-Ann Greeley, PhD
Chair, IRB

June-Ann Greeley, PhD
(she/her/hers)
Associate Professor
Department of Languages and Literatures
Martire W 340
Sacred Heart University
5481 Park Avenue
Fairfield, CT 06825 USA

greeleyj@sacredheart.edu

Wonder rather than doubt is the root of all knowledge.
~ Abraham Joshua Heschel

Alp, Feride F.
Fri 6/18/2021 10:44 AM
To: Castignoli, Gabriella; Greeley, Prof. June-Ann T.
Cc: Anna Goddard; Yolen, Nina

Dear June-Ann,

On behalf of Gabriella Castignoli, please find IRB#210618A for exempt status review.

Best,
Funda

Funda Alp '91
Executive Director
Office of Sponsored Programs
Sacred Heart University
5151 Park Avenue
Fairfield, CT 06825
O: 203-396-8241

www.sacredheart.edu/osp

Appendix M

Written Protocol

Protocol Title: Operating Room Nurses Sleep Health: an Evidence-Based Practice Sleep Health Education Project

Protocol Number: 21-1702

Version Date: 03/10/2021

Sponsor: Investigator-Initiated

Principal Investigator(s): MSN, BSN, RN, CNOR

Co-Investigator(s): Gabriella Castignoli, BSN, RN

Coordinator: Department of Research and Innovation

Institution:

Address: 34 Maple Street, Norwalk CT 06850

Telephone: 203-727-4012

Background:

Healthy People 2030 reports "Sleep Health" as a new priority due to ongoing poor sleep health, with more than 25% of U.S. adults reporting insufficient sleep or rest at least 15 out of every 30 days. Adequate sleep is necessary to fight off infection, support sugar metabolism to prevent diabetes, perform well in school, and work effectively and safely (Healthy People, 2020). Operating room nurses work atypical schedules making them an at-risk population for inadequate sleep and susceptible to its consequences. This evidence-based practice project aims to use an educational module based on the Harvard Sleep Health Foundation for the operating room nurses who work rotating shifts to improve the knowledge and perception of sleep health with our employees.

The nurses employed in the operating room at Hospital are required to take variable call shifts in addition to their 40 hours work week. The U.S. Bureau of Labor Statistics shows that 15 percent of full-time employees in the U.S. perform shift work, and many suffer from chronic sleep loss (AASM, 2020). Shift work disorder occurs after trouble adjusting to a work schedule that takes place during hours when you normally would sleep (AASM, 2020). The National Healthy Sleep Awareness program provides employers with education on how sleep improvement can benefit productivity safety and reduce the economic impact of $411 billion per year due to sleepiness and fatigue (AASM, 2020).

Available studies have shown that hospital administrators should be aware and provide preventative measures related to sleep quality, burnout, and job performance. For instance, previous studies have found correlational support between burnout and sleep quality in nurses and concluded that healthcare administrators need to provide preventative sleep measures as an intervention for their employees (Mattei et al., 2018). Furthermore, preventive sleep hygiene education has been shown to improve self-reported sleep quality in as little as 3-5 weeks post an education module (Chen, Kuo, & Chueh, 2010).

Targeted sleep education can potentially change perception and sleep quality for the operating room nurses at Hospital, who are required to rotate shift-work schedules. Anecdotally, the nurse educator and manager at Hospital have acknowledged that nurses from the operating room will call out the next day due to lack of sleep. Extreme sleep deprivation is sometimes accepted as a "normal" part of the job, or sleep health is not even part of an employee's awareness. Therefore, the need for sleep health and hygiene education for the OR nurses at hospital would benefit the employees, administrators, and patients. The nurses in the operating room at are a specific high-risk population due to long shifts and rotating schedules. This project aims to pilot a sleep-health education module for the Norwalk OR nurses and assess its impact on the quality and perception of sleep among those who attend the presentation.

The guiding evidence-based PICO question for this project is as follows: Among operating room nurses at Hospital (P), would sleep education (I), improve (pre versus post-intervention) (C) quality and perception of sleep (O)?

Objectives

The purpose of this evidence-based quality improvement project is to improve the sleep health perception and quality of sleep health among registered nurses in the operating room at Hospital. This project aims to incorporate an educational module on sleep health and to include a pre- and post-test for those who attend the session (Appendix A and B). The specific aims of this project are to:

4) Establish the importance of sleep health for nurses in the OR who are at high risk for sleep deprivation.
5) Improve sleep health perception through a sleep health module.
6) Improve sleep health with staff, as measured through a self-report sleep index.

Design

This evidence based-practice education intervention will use quality improvement methodology to evaluate whether a sleep hygiene educational module will directly impact sleep perception and sleep health in the operating services department.

An organizational systems assessment will be conducted utilizing the Institute for Health Care Improvements, the Plan Do Study Act (PDSA) framework for quality improvement.

The Institute for Healthcare Improvement's Plan-Do-Study-Act (PDSA) approach will be utilized in order to assess sleep health quality and perception. The "5 Whys" of quality improvement was considered in the development of this project, including "why is sleep deprivation happening with our OR staff at Hospital;" "why does atypical work schedules contribute to this problem" and "why do staff continually report inadequate sleep while reporting to work."

Participants

The source population for this project will include all part-time and full-time registered nurses working in the Operating Room at Hospital. Exclusion criteria are mentioned below in under selection and withdrawal of subjects.

Recruitment

To help recruit participants, three separate announcements will be made stating the time, location, and date of the sleep health educational session (Appendix C). Each announcement will be made by either the Sub Investigator, Gabriella Castignoli, or Principal Investigator at the operating room morning huddle. All nurses participating in the morning huddle will be offered the opportunity to participate. Announcements will be made one month, two weeks, and one day in advance of the session.

Additionally, flyers (Appendix D) will be posted on all bulletin boards in the operating room department stating the educational session's location, date, time, and topic. The bulletin boards are located in high-traffic areas for staff and showcase important information. No project materials will be placed in patient-facing areas within the hospital.

Intervention

With the assistance and direction of the Perioperative Department Educator, , we will offer a sleep health educational session in the form of a voice over narrated PowerPoint with evidence-based sleep health and hygiene overview, based on a free-online, and open-to-the-public Harvard Medical School sleep health information, which will include:

1) Why Sleep Matters
    a. Benefits of Sleep
    b. Consequences of Insufficient Sleep
    c. Current Evidence on Sleep Health
2) The Science of Sleep
    a. What is Sleep?
    b. How is Sleep Regulated?
    c. Variations in Sleep
3) Getting the Sleep You Need
    a. Overcoming Factors that Interfere with Sleep
    b. When to seek treatment

The outline for this educational PowerPoint was retrieved from http://healthysleep.med.harvard.edu/healthy/getting, and is recommended by the Division of Sleep Medicine at Harvard Medical School as a Sleep and Health Education Program (Harvard Medical School, 2008).

Key concepts that will be covered include:

1) Background and significance of sleep health
2) Sleep quantity recommendations
3) Sleep quality and what that entails
4) Sleep hygiene guidance
5) Consequences of poor sleep health

Pre-and post-education surveys will include:

1) Sleep Health Perception Survey: this survey was created by Gabriella Castignoli, sub-investigator (Appendix A).
2) Pittsburgh Sleep Quality Index Survey: we have obtained permission to use this survey (Appendix B).

The pre-survey will be sent in an email (See Appendix E), before engaging in the sleep educational presentation. This email will include a survey monkey link created by the Sub Investigator. A survey monkey subscription from the Health Department of Research will be utilized. The link will be accessed by the principal investigator, sub-investigator, and project participants. During the educational presentation, participants will be asked for their email address to deliver the post-education survey and PSQI one month after the educational presentation.

The Pittsburgh Sleep Quality Index (PSQI) will be used to assess latency, duration, efficiency, sleep disturbances, medication usage, day-time dysfunction, and overall sleep quality (Appendix B). The PSQI has internal consistency and a reliability coefficient (Cronbach's alpha) of .83 for its seven components (Smyth, 1999). Numerous studies using the PSQI have supported high validity and reliability (Smyth, 1999). Permission was requested from www.sleep.pitt.edu, and granted by Dr. Buysse, MD, from the University of Pittsburgh School of Medicine.

Selection and withdrawal of subjects

As this is an evidence-based practice educational model aimed at improving employees' sleep health through sleep health information, participation will be offered to all full-time and part-time registered nurses working in the Operating Room at Hospital. The participant must be a registered nurse in Connecticut and an employee of the . Hospital Operating Room department. Exclusion criteria include those who are not registered nurses or those employed in departments outside the Operating Room.

All participants will be fully aware they are participating in a sleep health education project to assess their perception and sleep quality before and after being educated on sleep health. The participants will be made aware of participation being voluntary. At any time, the operating room nurses who chose to participate may opt-out of the anonymous pre-and post-surveys. The information collected from this project will remain confidential. Participants will have the opportunity to ask questions at any time.

Ethical Considerations

All data will be kept confidential and will be analyzed by Gabriella Castignoli and . Surveys will not contain any identifying information. Since participants will be providing their email addresses to receive the pre-and post-surveys, those addresses will be saved

by the Principal Investigator in a separate, password-protected file. Once the post-surveys are distributed, that file will be deleted. Data will be de-identified and not linked to original participants.

Interaction with subjects/ Treatment of subjects

As previously stated, participants include Operating Room Nurses at . Hospital. This project will utilize survey data from participants. No other information or interventions beyond the educational module will be conducted.

Potential Risks

There are no known risks to this project. People who participate in this project may have a better understanding and knowledge of sleep health, their personal sleep needs, and their perception of sleep health.

Statistical analysis

Survey Monkey will be utilized to capture data. Once all data are collected, they will be exported to Microsoft Excel for descriptive analysis of variables, including Sleep Health perception and Sleep Health Quality. Pre- and post-survey data will be analyzed for normality depending on the level of measurement (nominal, O/R, continuous), and descriptive statistics will be used to compare scores from the pre-and post-surveys to see if there was a change in scores.

Assessment of Efficacy

This project is not designed to assess the efficacy of any drug, supplement, or device.

Assessment of Safety

This project is based on introducing a sleep health education module to staff. No risks related to coercion or harm are anticipated. All data will be de-identified, and no protected health information will be collected.

The protection of human subjects and maintenance of confidentiality will be upheld as part of this project. No known harm or risk is anticipated. Confidentiality of data will ultimately be maintained by MSN, RN, CNOR. No known safety issues exist as this project will conduct no procedures on patients.

Direct Access to Source Data Documents

The project's Principal Investigator and sub-investigator will access all project data. The project data will be used for project purposes only. The project investigators will maintain the survey monkey database with oversight from the Health Department of Research Coordinator, and the MS Excel database will be stored on a password-protected network drive in the Health Department of Research office. Neither of these databases will contain protected health information. Data may be released to regulatory agencies as necessary, including the US Food and Drug Administration, Department of Health and Human Services agencies, BRANY, accrediting agencies, and data safety monitoring boards.

References of Written Protocol

American Academy of Sleep Medicine (AASM). (2020). Sleep works for http://sleepeducation.org/healthysleep/sleep-works-for-you

Chen, P., Kuo, H., & Chueh, K. (2010, December). Sleep hygiene education: Efficacy on sleep quality in working women. https://www.ncbi.nlm.nih.gov/pubmed/21139448

Division of Sleep Medicine at Harvard Medical School. (2008, January 2). *Getting the Sleep You Need*. Getting the Sleep You Need | Healthy Sleep. http://healthysleep.med.harvard.edu/healthy/getting

Giorgi, F., Mattei, A., Notarnicola, I., Petrucci, C., & Lancia, L. (2018). Can sleep quality and burnout affect the job performance of shift-work nurses? A hospital cross-sectional study. *Journal of Advanced Nursing, 74* (3): 698-708. https://www.ncbi.nlm.nih.gov/pubmed/29164664

Healthy People. (2020). Sleep Health. https://www.healthypeople.gov/2020/topics-objectives/topic/sleep-health

Smyth, C. (1999). The Pittsburgh Sleep Quality Index (PSQI). *Journal of Gerontological Nursing*, *25*(12), 10. https://doi.org/10.3928/0098-9134-19991201-10

Appendix A of Written Protocol

Sleep Health Perception Survey

Pre and Post Education Survey Questions on Survey Monkey

Survey Questions – please mark the appropriate choice:

1) Is sleep health a priority for you? Yes/No_
2) Do you care about your sleep quality? Yes/No
3) Do you believe sleep quality correlates with your physiological and mental health? Yes/No
4) On average, how many hours do you sleep per night? Please list the number of hours __
5) Would you say the quality of sleep you are getting is good to great? Yes/ Not
6) Have you self-scheduled sufficient time between work and call shifts to allow adequate sleep? Yes/No
7) Have you needed to call out from work within the past month because of exhaustion related to insufficient sleep? Yes/No

Appendix B of Written Protocol

Pittsburgh Sleep Quality Index

Name_____ Date_____

Sleep Quality Assessment (PSQI)

What is PSQI, and what is it measuring?

The Pittsburgh Sleep Quality Index (PSQI) is an effective instrument used to measure the quality and patterns of sleep in adults. It differentiates "poor" from "good" sleep quality by measuring seven areas (components): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month.

INSTRUCTIONS:

The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

During the past month,

1. When have you usually gone to bed? _____
2. How long (in minutes) has it taken you to fall asleep each night? _____
3. What time have you usually gotten up in the morning? _____
4. A. How many hours of actual sleep did you get at night? _____
   B. How many hours were you in bed? _____

5. During the past month, how often have you had trouble sleeping because you	Not during the past month (0)	Less than once a week (1)	Once or twice a week (2)	Three or more times a week (3)
A. Cannot get to sleep within 30 minutes				
B. Wake up in the middle of the night or early morning				
C. Have to get up to use the bathroom				
D. Cannot breathe comfortably				
E. Cough or snore loudly				
F. Feel too cold				
G. Feel too hot				
H. Have bad dreams				
I. Have pain				
J. Other reason (s), please describe, including how often you have had trouble sleeping because of this reason (s):				
6. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?				
7. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?				
8. During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?				
9. During the past month, how would you rate your sleep quality overall?	Very good (0)	Fairly good (1)	Fairly bad (2)	Very bad (3)

Scoring

Component 1	#9 Score	C1 _____
Component 2	#2 Score (<15min (0), 16-30min (1), 31-60 min (2), >60min (3)) + #5a Score (if sum is equal 0=0; 1-2=1; 3-4=2; 5-6=3)	C2 _____
Component 3	#4 Score (>7(0), 6-7 (1), 5-6 (2), <5 (3)	C3 _____
Component 4	(total # of hours asleep) / (total # of hours in bed) x 100 >85%=0, 75%-84%=!, 65%-74%=2, <65%=3	C4 _____
Component 5	# sum of scores 5b to 5j (0=0; 1-9=1; 10-18=2; 19-27=3)	C5 _____
Component 6	#6 Score	C6 _____
Component 7	#7 Score + #8 score (0=0; 1-2=1; 3-4=2; 5-6=3)	C7 _____

Add the seven component scores together _____ *Global PSQI* _____

A total score of "5" or greater is indicative of poor sleep quality.
If you scored "5" or more it is suggested that you discuss your sleep habits with a healthcare provider

Appendix C of Written Protocol

Verbal Announcement

Gabriella: Hello, Everyone! I am conducting a quality improvement project titled "Operating Room Nurses Sleep Health: an Evidence-Based Practice Sleep Health Education Project." This project aims to see if sleep health education helps improve your sleep quality and how you perceive sleep health. As a part of this project, you will be asked to take a pre-survey on survey monkey, which includes questions about your sleep quality and perception of sleep. I will then be presenting a 30-minute sleep health education PowerPoint in the Operating Room lounge on *date* at *time*. One month following the educational session, I will email you a post-survey, second Pittsburgh Sleep Quality Index. I hope that those of you who are full-time and part-time OR/RNs will be interested in participating. If you are interested, please let me know. Coffee and Bagels will be provided.

: Hello, Everyone! Gabriella is conducting a quality improvement project titled "Operating Room Nurses Sleep Health: an Evidence-Based Practice Sleep Health Education Project." This project aims to see if sleep health education helps improve your sleep quality and how you perceive sleep health. As a part of that project, you will be asked to take a pre-survey on survey monkey, which includes questions about your sleep quality and perception of sleep. Gabriella will then be presenting a 30-minute sleep health education PowerPoint in the Operating Room lounge on *date* at *time*. One month following the educational session, I will email you a post-survey. I hope that full-time and part-time OR/RNs will be interested in participating in this project. If you are interested, please let me know. Coffee and Bagels will be provided.

Appendix D of Written Protocol

Announcement Flyer

Sleep Health Education

By Gabriella Castignoli, BSN, RN

WHAT: 30 minute PowerPoint lecture on the importance of Sleep Health

Plus tips on how to improve your sleep quality!

WHERE: Operating Room Lounge on the 4th floor

WHEN: *TBD*

WHO: Seeking Full/Part Time OR/RNs

Coffee and Bagels Provided!!!

Appendix E of Written Protocol

Survey Monkey Email

Hello!

Thank you for choosing to participate in this project. The title of this project is Operating Room Nurses Sleep Health: an Evidence-Based Practice Sleep Health Education Project.

This project aims to see if sleep health education improves how you perceive sleep health and improves your sleep health.

If you choose to participate in this project, you will attend an educational session that includes a 30-minute PowerPoint presentation about sleep health, followed by a discussion.

Before and after the educational session, you will be asked to complete a pre-and post-survey about your sleep health perception and a Pittsburgh Sleep Quality Index survey. Each survey will take about 5 minutes to complete.

Below is a link to the pre-survey mentioned above. Please complete this survey before the educational session at DATE/TIME at Hospital.

After the educational session, you will be emailed a second link containing the post-survey will be sent to you for completion.

[LINK WILL BE ADDED HERE}

Our hope is that the people who participate in this project will better understand and know of sleep health, their personal sleep needs, and their perception of sleep health. There are no risks, your answers are anonymous, and there will be no compensation.

If you have any questions, please feel free to email or call me.

Thank you,
Gabriella Castignoli, BSN, RN

(203) 727-4012

Appendix N

Verbal Announcement

Gabriella: Hello, Everyone! I am conducting a quality improvement project titled "Operating Room Nurses Sleep Health: an Evidence-Based Practice Sleep Health Education Project." This project aims to see if sleep health education helps improve your sleep quality and how you perceive sleep health. As a part of this project, you will be asked to take a pre-survey on survey monkey, which includes questions about your sleep quality and perception of sleep. I will then present a 30-minute sleep health education PowerPoint in the Operating Room lounge on *date* at *time*. One month following the educational session, I will email you a Pittsburgh Sleep Quality Index post-survey. I hope that those of you who are full-time and part-time OR/RNs will be interested in participating. If you are interested, please let me know. Coffee and Bagels will be provided.

, Hello, Everyone! Gabriella is conducting a quality improvement project titled "Operating Room Nurses Sleep Health: an Evidence-Based Practice Sleep Health Education Project." This project aims to see if sleep health education helps improve your sleep quality and how you perceive sleep health. As a part of this project, you will be asked to take a pre-survey on survey monkey, which includes questions about your sleep quality and perception of sleep. Gabriella will then present a 30-minute sleep health education PowerPoint in the Operating Room lounge on *date* at *time*. One month following the educational session, I will email you a Pittsburgh Sleep Quality Index post-survey. I hope that those of you who are full-time and part-time OR/RNs will be interested in participating in this project. If you are interested, please let me know. Coffee and Bagels will be provided.

Appendix O

Announcement Flyer

Sleep Health Education

By Gabriella Castignoli, BSN, RN

WHAT: 30-minute PowerPoint based lecture on the importance of Sleep Health

Plus tips on how to improve your sleep quality!

WHERE: Operating Room Lounge on the 4th floor

WHEN: *TBD*

WHO: Seeking Full/Part Time OR/RN's

Coffee and Bagels Provided!!!

Appendix P

Estimated Project Timeline

Phase	Key Actions	Activity	Person(s) Responsible	Completion Date
Phase I: Assess Need	Determining OR nurses at this hospital are a high-risk population for sleep deprivation and how this affects them.	Audit of tired nurses and average hours/ shifts worked—research of sleep health. Develop PICO Question.	Castignoli, G.	April 2020
Phase II: Planning Microsystem Level	Discuss with OR administration about sleep health education given to nursing staff.	Approval from administration to pursue Sleep Health Education within the unit	Castignoli, G.	June 2020
Phase III: Appraisal of evidence education	Discussions were held with EBP instructor to appraise and discuss articles from the review of literature	Appraisal of evidence	Castignoli, G.	August 2020
Phase IV: Appraisal of evidence	Articles reviewed and critically appraised	Appraisal of evidence	Castignoli, G.	August-September 2020
Phase V: IRB process and project planning	Discussion with Research and Educational Board at the hospital. Discussion with Project advisor to outline project information.	CITI Training delivered initial credentials to begin IRB process. Rough draft of the project outline.	Castignoli, G.	October 2020
Phase VI: Presentation Proposal and IRB deliverables	Create project proposal and IRB deliverables.	Create project proposal PowerPoint presentation, Sleep health education PowerPoint, sleep health perception survey and PSQI – deliver to IRB,	Castignoli, G.	February 2020

		practice mention and project advisor		
Phase VII: Implementation	Obtain baseline data, deliver education, and post-sleep perception survey	Obtain staff baseline perception of sleep health, PSQI scores and complete sleep health educational PowerPoint with a post-sleep health perception survey	Castignoli, G.	Goal: June 2021
Phase VIII: Implementation	Obtain second PSQI scores	Participants will be given a second PSQI to fill out and complete one month after sleep health education.	Castignoli, G.	Goal: July 2021
Phase IX: Evaluation	Analysis of collected data	Principal Investigator, Sub Investigator, and Project Advisor, in conjunction with the research department will synthesize the results from the surveys and PSQI's comparing pre to post to illicit statistics determining the results of sleep health education on quality and perception.	Castignoli, G.	Goal: July 2021
Phase X: Dissemination	Deliver project results to Operating room staff	A newsletter will be drafted with the results of the analyzed data and details of the project (omitting any personal information) and left	Castignoli, G.	Goal: August 2021

	at the OR front desk for everyone to take and read.

Appendix Q

Anticipated Budget

Cost for project implementation

Expenses	
Coffee and Bagels for the educational session	$120.00
Printing of consents (x30) and Pittsburgh Sleep Quality Index (x60) sheets (.05$ per sheet)	$4.50
Total Estimated Cost	$124.50