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Perioperative Nurse Education for Undiagnosed Obstructive Sleep Apnea Screening

Juanita Turnipseed
Walden University

Walden University

College of Nursing

This is to certify that the doctoral study by

Juanita Turnipseed

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Joan Moon, Committee Chairperson, Nursing Faculty
Dr. Susan Hayden, Committee Member, Nursing Faculty
Dr. Deborah Lewis, University Reviewer, Nursing Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
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Abstract

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MSN, University of North Carolina, Greensboro, 2001

BSN, University of Tennessee Health Science Center, 1992

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

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Abstract

Approximately one third of surgical patients have undiagnosed obstructive sleep apnea (OSA), the most common form of sleep disordered breathing, which presents a risk in the perioperative setting. OSA is underdiagnosed and undertreated in the adult population and has an economic impact on limited healthcare resources. The need existed for nurses in the perioperative setting to be educated on OSA, including the introduction of the STOP-BANG screening questionnaire. The analysis, design, development, implementation, and evaluation model of instructional design informed this project. The purpose of this Doctor of Nursing Practice project was to plan, implement, and evaluate a perioperative nurse education program on OSA. Three perioperative clinicians participated in the program. The first source of evidence produced by participants was the evaluation of the educational program objectives relative to the curriculum. The three participants answered "met" to each of the objectives, with met =1 and not met = 2, for a mean score of 1. The second source of evidence produced by the project was the change in knowledge from pretest to posttest, which showed a group improvement of 27% on the knowledge scores. Implications of these findings indicate that knowledge of OSA has the potential to influence improved patient outcomes and improved quality of life. The positive social change impact of this project involves increased knowledge and raised awareness among healthcare providers on the importance of recognizing undiagnosed OSA thus providing optimal safety for the patient in the surgical setting.

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Dedication

I dedicate this Doctor of Nursing Practice (DNP) project to all clinical nursing professionals who work to improve the lives of the patients we serve through evidence-based practice.

Acknowledgments

I want to thank my project committee for their support and constructive feedback throughout the project completion process. Dr. Moon, I especially thank you for your guidance, patience, and encouragement in completing my DNP project.

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Section 1: Nature of the Project

Introduction

Obstructive sleep apnea (OSA) is the most common form of sleep-disordered breathing. The condition is characterized by periods of apnea and hypopnea events lasting greater than 10 seconds during sleep despite continued respiratory effort (Flatman & Raj, 2020). These events lead to oxygen desaturations, frequent arousals, and fragmented sleep. OSA is associated with cardiovascular, neurocognitive, and metabolic comorbidities and increased all-cause mortality (Tan et al., 2016). Undiagnosed moderate to severe OSA among women and men in the general population is estimated to be 93% and 82%, respectively (Spence et al., 2018). As a result, approximately one third of surgical patients may have undiagnosed OSA, which presents an evident risk in the perioperative setting.

Raising nurses' awareness about OSA and educating nurses on assessing for OSA would contribute to increased patient safety during the perioperative period. Qassamali et al. (2019) found that two thirds of healthcare facilities do not have established policies for the care of patients with OSA. Screening patients preoperatively for risk of OSA is the first step in identifying those at substantial risk. The nurses in this hospital demonstrate a lack of knowledge about the importance of screening for OSA as recommended by the American Society of Perianesthesia Nurses (ASPAN; Scully et al., 2020). Currently, patients presenting for surgery or procedures requiring anesthesia are not being screened by nurses for OSA during the perioperative period.

Because surgical patients suspected of having OSA appear to be at increased risk for preoperative, intraoperative, and postoperative adverse events, the American Society of Anesthesiologists (ASA) issued practice guidelines for the management of patients with OSA that include OSA screening preoperatively (ASA Task Force, 2013). The literature shows that screening for OSA can improve patient safety (Bazemore et al., 2019); however, awareness regarding the consequences of untreated OSA remains inadequate in the perioperative period, as evident by the lack of universal screening for OSA among surgical patients. Screening for OSA in patients presenting for surgery and making appropriate referrals postoperatively would align with the Healthy People 2030 national goals (Office of Disease Prevention and Health Promotion, n.d.). The lack of symptom awareness among patients and the lack of a screening protocol for all surgical patients create an opportunity to improve patient care by nurses.

Although polysomnography testing is considered the gold standard for diagnosis, logistical constraints may affect the feasibility of patients obtaining the test prior to surgery. While a preoperative assessment is taken by the anesthesia provider with special attention given to the airway, another important assessment is determining OSA risk, which can be accomplished using the STOP-BANG Questionnaire as a screening tool for OSA (Seet et al., 2015). Criteria assessed include snoring, tiredness, observed apnea, high blood pressure, body mass index greater than 35, neck circumference greater than 40 cm, and male gender (Legler, 2016; Seet et al., 2015).

In general, an identified concern of The Joint Commission's Division of Healthcare Improvement regarding OSA was a lack of training for healthcare

professionals to screen for and recognize OSA (The Joint Commission, 2015). Lakdawala et al. (2018) found that raising nurses' awareness of OSA risk through education decreased patient risk for postoperative respiratory complications. Additionally, Stubberud et al. (2019) found that staff education significantly improved compliance with screening and that approximately half of the patients screened were at substantial risk for OSA. Educating perioperative RNs on the pathophysiology of OSA, the need for screening the patient for OSA in preoperative care, and the significance of maintaining heightened awareness during the postoperative period would support evidence-based practice (Scully et al., 2020), thus facilitating optimal patient care, resulting in result positive social change.

Problem Statement

The problem addressed by this Doctor of Nursing Practice (DNP) project was the need for education among perioperative RNs related to OSA and the need for an OSA screening tool in the perioperative department in the hospital for which this project was proposed. In the post anesthesia care unit, respiratory compromise requiring the use of adjunct respiratory therapies has been observed. The adjunct therapies have included using oral airways, nasal airways, continuous positive airway pressure, and emergent reintubations. The incidence of difficult intubation is increased in the OSA surgical patient and is associated with increased morbidity and mortality (Mathangi et al., 2018). From a review of studies, Nagappa et al. (2018) established that difficult intubation and difficult mask ventilation were 4 times higher in OSA versus non-OSA patients. Risk stratification, as identified by the STOP-BANG questionnaire (Dixon et al., 2016), alerts

the anesthesia provider to severity of illness and susceptibility for perioperative complications. Dixon et al. (2016) found the STOP-BANG questionnaire useful for standardizing OSA assessments in surgical patients.

Every interaction with a patient is an opportunity for the RN to provide health education and promote self-care practices. The nurse's proximity to the patient before and after surgery uniquely positions the nurse to facilitate the care process. Incorporating the STOP-BANG screening tool into the preoperative assessment allows the nurse to document interventions taken to assess risk for OSA in the patient's medical record. Nurses may thus be equipped to provide a higher level of care.

Purpose Statement

The gap in practice addressed through this staff education project was the lack of knowledge of, and screening for, OSA in the perioperative period while the evidence-based literature showed the need for such knowledge and screening (Dixon et al., 2016). Therefore, the purpose of this DNP project was to plan, implement, and evaluate a perioperative nurse continuing education program on OSA (CEOSA). The DNP project questions were as follows:

- What evidence in the literature supports that educating nurses on undiagnosed OSA can result in a change in knowledge?
- Will implementation of the continuing education on OSA result in a change in knowledge as evidenced by pretest to posttest?
- Will the participants' evaluation of the program show that the objectives have been met?

Addressing the gap in practice involving RNs' lack of knowledge related to OSA and not using an OSA screening tool would improve care because the literature shows that identifying surgical patients at risk for OSA can have a positive impact on patient outcomes (Legler, 2016). The practice-focused questions were related to the gap in practice because the evidence to support the project came from the literature and the evidence produced by the evaluation of the program by participants and change in knowledge by participants.

Nature of the Doctoral Project

Upon review of the literature, there was evidence to support the need for the CEOSA project, which included introducing the STOP-BANG questionnaire screening tool. Screening all patients presenting for surgery or a procedure requiring anesthesia services is recommended by the ASA (2014).

Evidence to Support the Project

The evidence included a review of literature published within the past 10 years, from the following databases: Cumulative Index to Nursing & Allied Health Literature (CINAHL), Medline, Science Direct, and ProQuest from the Walden University Library. Key words and phrases included *obstructive sleep apneoa, apnea* OR *apnoea, screening, preoperative,* and *STOP-BANG tool*. Other sources of evidence included the ASA (2014) guidelines. I conducted a literature review that was placed on a literature review matrix (see Appendix B) to organize the pertinent literature and grade the retrieved studies using Melnyk et al.'s (2010) tool with permission. The anesthesia provider's goal is to provide a safe, effective anesthetic while simultaneously minimizing risk. The nurses' lack of

knowledge of the need to screen for risk of OSA aligns with the purpose of the CEOSA to fill the gap in knowledge through the development of a curriculum and pre/posttest from the evidence-based literature related to OSA and screening for OSA.

Evidence to Be Produced by the Project

The evidence produced by the project included the evaluation of the educational program by participants and the change in knowledge from pretest to posttest by the participants.

Approach

The CEOSA project followed the steps of the Walden University Staff Education Manual, including planning, implementation, and evaluation. The project was framed within the phases of the analysis, design, development, implementation, and evaluation (ADDIE) model (see Appendix A) of instructional design (Jeffery et al., 2016). Having identified gaps in knowledge, skills, and practice validates the use of the ADDIE model as the educational instructional design for the CEOSA project. The following steps were used in the approach to the CEOSA project.

Planning

During the analysis phase, the need for the CEOSA project was evident due to the lack of preoperative screening of surgical patients for risk of OSA. Informal conversations with the clinical educator and the perioperative nurse manager confirmed the need for the educational program. The anecdotal evidence was consistent with the evidence from the literature. Stubberud et al. (2019) found that implementation of a universal screening initiative improved the identification of patients at substantial risk for

OSA. The site agreement was obtained. Upon approval of my proposal, I began the design and development phases. Answering the practice-focused questions was guided by the evidence in the literature as well as implementation of the program.

The content experts (CEs) consisted of a physician anesthesiologist, the clinical educator, and the perioperative nurse manager. I worked with the vice president/chief nursing officer (VP/CNO) and education department of the facility. I developed a continuing education program that included the STOP-BANG questionnaire, and the nurses were educated on how to complete and score the tool. Next, I developed the pretest/posttest for the CEOSA presentation. The CEs provided formative review by evaluating the curriculum and validating the pre/posttest items for alignment with the outlined course objectives and curriculum content. An expert in assessment reviewed the pretest/posttest items for construction. A PowerPoint presentation (PPP) on OSA and introduction of the STOP-BANG screening tool were developed that aligned with the identified learning objectives, content, and pretest/posttest. The goal was to educate the nurses on the risk of OSA and on using the STOP-BANG questionnaire to improve the nurses' care of the surgical patient.

Implementation

The implementation phase began after approval of materials during the formative evaluation by the CEs. The participants included the staff nurses for the educational program. During this step, the PowerPoint presentation was presented. A pretest/posttest was given to all staff nurses who participated in the project to evaluate individual nurses'

knowledge before and after implementation of the educational program as well as change in knowledge for the group.

Evaluation

During the evaluation phase, feedback was obtained from the participants related to the program development and outcomes. Evaluation for the project occurred during the formative step with the evaluation of the curriculum plan by the CEs and content validation of the pretest/posttest by the CEs. The impact evaluations obtained during the implementation phase were the evaluation of the staff education program by participants and the change in knowledge from pretest to posttest by participants. Finally, at the completion of the project, the CEs completed a summary evaluation of the staff education project, which provided feedback related to the project, the process, and my leadership.

Significance

Stakeholders who will benefit from the CEOSA project include nursing staff, patients, and the healthcare organization. Through engaging in continuing education, the nursing profession fulfills the ethical obligation to continually engage in the pursuit of new knowledge and improved skill sets to provide optimal care. Patients will benefit from the CEOSA project by experiencing improved quality of life because of receiving appropriate and effective care during the perioperative period. The organization will be made aware of evidence-based practices that aid in the fulfillment of regulatory guidelines.

Summary

Preoperatively identifying patients who have a high risk for OSA alerts the anesthesia provider to any advanced airway modalities that may be needed to maintain patient safety throughout the perioperative period. A heightened awareness is indicated because airway related complications account for 35% of anesthesia-related deaths, in which OSA patients have a higher incidence of difficult intubation (Mathangi et al., 2018). The review of the literature supports the need for CEOSA for perioperative nurses and the utility of the STOP-BANG questionnaire screening tool.

The gap in practice was the lack of knowledge of, and screening for, OSA in the perioperative period, while the evidence-based literature shows the need for such knowledge and screening. Therefore, the purpose of this DNP project was to plan, implement, and evaluate a perioperative nurse continuing education program on OSA. (CEOSA) in an effort to answer the practice-focused questions.

In Section 2, I discuss the literature pertaining to the ADDIE model, OSA, and screening patients presenting for surgery for the risk of OSA using the STOP-BANG questionnaire. The focus also includes the pathophysiology of OSA and associated comorbidities. A discussion of the ADDIE model, the local background and context, my role, and the CE's role in the project are also presented in Section 2.

Section 2: Background and Context

Introduction

The problem addressed by this DNP project was lack of knowledge related to OSA and the need for an OSA screening tool in the perioperative department in the hospital for which this project was developed. The evidence-based questions to be answered were the following: What evidence in the literature supports that educating nurses on undiagnosed OSA can result in a change in knowledge? Will implementation of the continuing education program on OSA result in a change in knowledge as evidenced by a pretest to posttest? Will the participants' evaluation of the program show that the objectives have been met? Therefore, the purpose of this DNP project was to plan, implement, and evaluate a perioperative nurse continuing education program on OSA.

Educational training of nurses on OSA and the STOP-BANG screening tool have been shown to increase the number of patients identified as being at high risk for OSA (Williams et al., 2017). In the following subsections, I further discuss the ADDIE model of instructional design and the relevancy of the CEOSA program to nursing practice and the role of the CEs, as well as my role.

Analysis, Design, Development, Implementation, and Evaluation Model of Instructional Design

The ADDIE model of instructional design (Jeffery et al., 2016) offers a systematic process for developing staff education projects, such as the CEOSA project. The ADDIE model takes into consideration learning theory, the learner's needs, the environment, and approaches to training practitioners in evidence-based practices (Patel et al., 2018). The

utility of the ADDIE model emerged during World War II, when the U.S. military developed strategies to train people to perform complex skills (Patel et al., 2018). The ADDIE model has proven to be beneficial in programs targeted towards changing behaviors and improving performance.

The ADDIE model was appropriate for this CEOSA program because gaps in knowledge, skills, and practice have been identified. Hsu et al. (2014) showed how the ADDIE model was used to inform organizational change. The model was successfully applied in a study by Chu et al. (2019) that found nurses to have improved pain assessment knowledge and competency. Robinson and Dearmon (2013) applied the model to the use of simulation in nursing education with the aim of improving new graduates' clinical performance. Ab Latif and Mat Nor (2020) incorporated the model in the development of a concept-mapping guideline and noted that the educator's instructional strategy improved while simultaneously enhancing the academic performance of nursing students. The ADDIE model consistently provides a systematic process that produces evident and sustained results in educational instruction.

Relevance to Nursing Practice

Care that extends beyond the immediate perioperative period would provide greater benefits to the target population. As nurses become more knowledgeable about morbidity and mortality associated with undiagnosed, untreated risk for OSA, patients will become more informed about OSA. Anecdotally, the current local state of nursing related to screening surgical patients for risk of OSA reflects a lack of screening for the

condition. The current literature identifies a lack of knowledge regarding OSA among nurses and supports using education to increase screening (Qassamali et al., 2019).

Obstructive Sleep Apnea

While OSA is a common sleep-related disorder, the condition poses an increased complication risk for patients under surgical procedures (Lockhart et al., 2013). Hypertension, congestive heart failure, stroke, coronary artery disease, atrial fibrillation, and deep venous thrombosis are cardiovascular manifestations associated with OSA (Lockhart et al., 2013). OSA occurs when there is partial or complete collapse of the upper airway during sleep (Lakdawala et al., 2018). The continued diaphragmatic efforts coupled with complete airway obstruction lead to the development of hypoxia and hypercarbia. These events can predispose the surgical patient to a cascade of complications during the perioperative period.

The severity of OSA increases with age. The clinical significance is that one third of elective surgical procedures occur in the geriatric population (Qassamali et al., 2019). The postoperative risk for cardiovascular and respiratory complications is increased in this patient population where the prevalence of undiagnosed and untreated OSA has been found to be as high as 41.5% higher (Seet et al., 2015).

Screening for Obstructive Sleep Apnea

Heart disease, obesity, stroke, and diabetes are associated comorbidities of OSA, which substantiates the need for screening patients for unrecognized OSA (Tabet & Bushnell-Lopez, 2018). During the preoperative interview, patients are often asked about

a history of OSA. However, the question alone does not address the undiagnosed and untreated risk for OSA surgical patients.

Lakdawala (2011) found that implementing the STOP-BANG questionnaire increased identification of high risk for OSA from 3% to 17% while also alleviating any untoward patient events in the high-risk group. A STOP-BANG score greater than or equal to 3 means the patient is at risk of OSA, while a score greater than or equal to 5 suggests that the patient is at high risk of OSA (Seet et al., 2015). Bazemore et al. (2017) further substantiated the need for standardized screening versus subjective screening. Standardized screening is associated with improved identification of high-risk patients.

The benefits of screening extend beyond the immediate postoperative period. Anesthesia and surgery are known to cause disturbances in sleep. Rapid eye movement rebound sleep can occur up to 72 hours or greater postoperatively in which the frequency of decreased saturations or hypoxemic episodes increased compared with the night before surgery (Spence et al., 2015). OSA discharge teaching has significant importance in the surgical patient population because most surgeries are performed on an outpatient basis, resulting in patients being discharged home within 24 to 48 hours after surgery. The knowledge gained through screening promotes greater continuity of care evident through the transition of care practices and referrals to sleep specialists as deemed necessary.

Local Background and Context

The setting for the CEOSA project was the perioperative surgical department of a 25-bed critical access hospital located in the east south central region of the United States. At the hospital, there are approximately 600 surgeries performed each year. The

hospital serves a rural community with a local population of approximately 3,685. Persons 65 years and over comprise 18.6% of the population. The CEOSA project had the support of the director of surgical services and the clinical educator. Application was made to offer continuing education credits for the RN staff upon completion of the CEOSA project. Currently, there is no routine screening of surgical patients for risk of OSA at the local hospital. The current literature and the ASA guidelines (2014) recommend that all patients presenting for surgery be screened for risk of OSA. This recommendation aligns with providing safe, quality, evidence-based care. OSA has clinical relevancy because untreated OSA has been associated with increased morbidity and mortality (Finkel et al., 2009).

My Role

Professional Context and Relationship to the Project

I am employed as a certified registered nurse anesthetist by an anesthesia group with clinical privileges in this setting. As an anesthesia provider, I am aware of the lack of screening surgical patients for risk of OSA. Safety is an integral part of my daily practice. The CEOSA project provides an opportunity to improve patient safety through a team approach. The goal of this project is to improve the lives of surgical patients by educating the RNs in direct care.

Relationship to the Topic, Participants, Evidence, or Institution

My role in this project was as the leader. Upon approval to conduct the CEOSA project, I obtained the project site agreement and continued with the approach identified in this proposal. I identified the CEs and developed the curriculum, pretest and posttest.

After the CEs completed their review of the program materials, I implemented the program and analyzed and synthesized the results. I do not report to any of the nurses who received the education, nor do they report to me. I work in another facility.

Motivation for the Project

I was motivated to implement the CEOSA project in the facility because my original facility was not able to sign a site agreement, so my chair was able to find a hospital where the surgical patients were not currently being screened for risk of OSA. Raising the nurses' awareness on the deleterious effects of an obstructing airway through the CEOSA would improve patient safety during the perioperative period. Once patients are identified as being at high risk for OSA, appropriate actions can be taken to ensure appropriate referrals to a sleep specialist for a definitive diagnosis.

Potential Biases

The project was conducted without any bias. I did not receive compensation for leading and implementing this project.

Role of the Content Experts

The following CEs contributed to the project: a board-certified physician anesthesiologist, the RN clinical educator, and the perioperative nurse manager. The RN leaders both hold a Bachelor of Science in nursing. The CEs received a packet that included all materials used in the CEOSA project. They reviewed all materials utilized for the CEOSA project, evaluated the curriculum related to the objectives, and provided content validation for the pre/posttest items, resulting in a content validity index score relative to the objectives and course content.

Summary

In Section 2, the application of the ADDIE model to the CEOSA project was described. In addressing the local background and context of the project, I provided the relevance of the problem to nursing. The practice-focused questions were supported by the sources of evidence outlined. As the project leader, I was responsible for all aspects of the CEOSA project. In the following section, the gap in practice regarding the lack of knowledge and screening of surgical patients for the risk of OSA is further addressed. In Section 3, I discuss the practice-focused questions that guided the evidence from the literature to develop the CEOSA. The participants, who included the CEs and the nurses who received the education, are presented. The procedures for collecting evidence are discussed, and the analysis and synthesis of the evidence are described. Finally, protection of all participants through adherence to IRB guidelines concludes the section.

Section 3: Collection and Analysis of Evidence

Introduction

The original plans, for the CEOSA project, were limited to planning and evaluation without implementation because of COVID restrictions. However, when COVID waned, I was informed that implementation of the staff education project would be required. To meet the requirement, I had to go through the Walden IRB process again to gain approval for the revised plan. The problem addressed by this DNP project was the need for education among perioperative RNs related to OSA and the need for an OSA screening tool in the perioperative department in the hospital for which this project was conducted.

The purpose of this DNP project was to plan, implement, and evaluate a perioperative nurse continuing education program on OSA. The nurses' lack of knowledge of and screening for OSA in the perioperative period created a gap in practice, while the literature shows the need for this knowledge and screening (Qassamali et al., 2019).

The ADDIE model of instructional design was appropriate for addressing this gap in practice, as the model has been shown to be effective in other educational projects with sustained results in knowledge in educational instruction (Chu et al., 2019; Hsu et al., 2014; Robinson & Dearmon, 2013). In Section 3, the sources of evidence supporting the need for the project are discussed. A discussion of the participants, procedures, and participant protection is included in this section as well which concludes with a description of the analysis and synthesis of the evidence.

Practice-Focused Questions

The gap in practice was the nurses' lack of knowledge regarding OSA and the lack of screening patients for OSA before surgery. Currently, the nurses do not screen surgical patients for risk of OSA. The problem was the need for education on OSA and the importance of using a screening tool to assess OSA risk. The DNP project questions were the following: What evidence in the literature supports that educating nurses on undiagnosed OSA can result in a change in knowledge? Will implementation of the continuing education on OSA result in a change in knowledge as evidenced by pretest to posttest? Will the participants' evaluation of the program show that the objectives have been met?

Therefore, the purpose of this DNP project was to plan, implement, and evaluate a perioperative nurse continuing education program on OSA. The projected outcome of the CEOSA program was to increase the nurses' knowledge of OSA and promote the use of a screening tool to assess OSA risk.

Sources of Evidence

Evidence generated to support doing the project came from the literature and was organized in a literature review matrix (see Appendix B). The literature was graded using Melnyk et al.'s (2010) tool with permission. The retrieved literature was published within the last 10 years from the following databases: CINAHL, Medline, Science Direct, and ProQuest from the Walden University library. Key words included *obstructive sleep apnea*, *apneoa* OR *apnoea*, *screening*, *preoperative*, and *STOP-BANG*. Additionally, evidence to answer the project questions came from the evaluation of the education

program by participants and the participants' change in knowledge results from the pretest/posttest (see Appendix E).

Participants

The three CE participants included a board-certified physician anesthesiologist, the RN clinical educator, and the perioperative nurse manager. The nursing leaders both hold a BSN. The CEs conducted a formative evaluation during the planning phase, including a curriculum plan evaluation by CEs (see Appendix D) and the pretest/posttest content validation by CEs (see Appendix F). The participating perioperative staff nurses evaluated the staff education program and demonstrated the change in knowledge per pre/posttests.

Procedures

The templates used to develop, collect, and evaluate the evidence for the CEOSA project were developed by my Walden University project chair. The templates were for organizational purposes only and did not require reliability and validity measurement. Melnyk et al.'s (2010) tool was used to grade the literature review and was not subject to validity and reliability testing.

Content Validity Index Tool

The Pretest/Posttest Content Expert Validity Index Scale Analysis (see Appendix N) was used. The content validity index (CVI) is the score calculated from measuring the content-related validity of an instrument (Grove et al., 2013). The CVI provides a numerical value for conceptualizing the relevancy of an instrument item. The CEs evaluated the pre/posttest questions for alignment with the objectives using a 4-point

scale, and then the CVI was calculated. The CVI is calculated by creating a dichotomized scale, which combines values 3 and 4 together and 2 and 1 together and categorizes each response as relevant or not relevant for each item (Zamanzadeh et al., 2015). A numerical value of 1 is assigned to scores of 3 or 4, and 0 is assigned to scores of 1 or 2. Then, the items considered relevant by all judges receiving a 1 are divided by the total number of items. Latif and Nor (2020) noted that while there are no fixed standards for the best coefficient reliability value, reliability is generally considered good at greater than 0.70.

Content Expert Packet

The CEs received a letter (see Appendix J) of introduction for the CEOSA project. Instructions for completing the information in the packet were outlined in the letter. I assured the CEs of their anonymity by informing them that each item in the packet would have a corresponding number identifier. The literature review matrix (see Appendix B) was included for review. Additional items included were the curriculum plan (see Appendix C), evaluation of the curriculum plan by CEs (see Appendix D), pretest/posttest (see Appendix E), and pretest/posttest content validation by CEs (see Appendix F).

Staff Education Program

The staff education program (see Appendix H) was implemented using a PowerPoint presentation format. The director of surgical services was an integral part of ensuring that participants received the program materials via email. Participants received the consent form for anonymous questionnaires prior to beginning the staff education presentation. The staff education program was shared via a Zoom link with participants to be viewed independently. All participants agreed to voluntarily participate.

Pretest/Posttest Change in Knowledge by Participants

The pretest/posttest change in knowledge by participants (see Appendix G) was determined from results of the pre/posttest. The Survey Monkey links for the pretest/posttest were included in the staff education program. Participants were asked to complete the pretest before reviewing the staff education presentation and complete the posttest at the conclusion of the presentation.

Evaluation of the Staff Education Program by Participants

The staff education program (see Appendix H) was presented via a shared Zoom link for participants. Upon completion of the program, participants were asked to complete the evaluation of the staff education program by participants (see Appendix I). The director of surgical services distributed and collected the forms, which were completed anonymously. The forms were returned to me via email.

Evaluation of the Staff Education Project, Process, and My Leadership by Content Experts

After completion of the CEOSA project, the CEs were asked to complete the evaluation of the staff education project, process, and my leadership (see Appendix K). I placed the packets in a designated area so that the CEs could pick them up anonymously. After completion of the packets, there was a designated area for the CEs to place the packets anonymously.

Protection

I submitted Form A after my chair approved the proposal. The guidelines set forth by Walden University's IRB to ensure participants' protection were followed. The site

agreement was obtained. The project proceeded after obtaining a revised approval from the university's IRB. The IRB approval # is 07-11-22-0462963. The anonymity of all materials and information obtained from and relating to the facility, staff, and patients of the facility, including identifiers associated with the organization name, employees or patient names, or city where the project took place, were maintained. All participation was voluntary. The participants for the CEOSA project were CEs and nurse participants. The CEs remained anonymous by coding all materials alphabetically for organizational purposes. The nurse participants remained anonymous by following the processes described above. The data generated from these reviewers were obtained as de-identified data from the project site. The CEs' paperwork will be kept in a locked file in the facility for 5 years and then shredded.

Analysis and Synthesis

Curriculum Plan Evaluation by Content Experts Summary

Through the curriculum plan evaluation by CEs summary (see Appendix L), I will provide evidence, using a dichotomous response, of the learning objectives being met (1) or not met (2). The findings will be reported in Section 4 using descriptive statistics. The synthesis will include the CEs' percentage rating for each objective and the mean score of each objective.

Summary Evaluation of the Staff Education Program by Participants

The results of the summary evaluation of the staff education program by participants (see Appendix M) will be analyzed to determine improvements that may prove beneficial to include for further program development.

Pretest/Posttest Change in Knowledge Results by Participants

The pretest/posttests completed by the participants (see Appendix G) will be analyzed to show the participants' change in knowledge on OSA. Descriptive statistics will be used to show results.

Summary Evaluation Results of the Staff Education Project by Content Experts

The summary of the staff education project, process, and my leadership (see Appendix O) was described thematically and presented in Section 4.

Summary

Section 3 described how evidence generated by the project was collected, analyzed, and synthesized. The sources of evidence were discussed, and evidence from the literature were discussed and evaluated using Melnyk et al.'s (2010) tool. Evidence from the literature supported the project. The CEs evaluated the curriculum plan (see Appendix D) and the practice-focused questions for alignment with the project objectives. Each pretest/posttest item was evaluated by the CEs for content validity using the content validation index (I-CVI; see Appendix F). In this section, protection of the CEs' anonymity was outlined according to the Walden University IRB. Section 4 consists of discussions of the findings and implications of the data analysis performed in Section 3. The section also includes a description of the project team's contribution and the strengths and limitations of the project.

Section 4: Findings and Recommendations

Introduction

The problem addressed by this DNP project was the need for education among perioperative nurses related to OSA and the need for an OSA screening tool in the perioperative department in the hospital for which this project was proposed. The perioperative department lacks a screening protocol for OSA. Therefore, the purpose of this project was to plan, implement, and evaluate a CEOSA program. The practice focused questions were the following:

- What evidence in the literature supports that educating nurses on undiagnosed OSA can result in a change in knowledge?
- Will implementation of the continuing education on OSA result in a change in knowledge as evidenced by pretest to posttest?
- Will the participants' evaluation of the program show that the objectives have been met?

The purpose of this DNP project was to plan, implement, and evaluate the CEOSA program. Evidence generated by the project was gained from the curriculum plan (see Appendix C), curriculum plan evaluation by CEs (see Appendix D), pretest/posttest (see Appendix E), pretest/posttest content expert validation by CEs (see Appendix F), pretest/posttest change in knowledge by participants (see Appendix G), and summary evaluation of the staff education project by CEs (see Appendix O).

Findings and Implications

The educational program was implemented for perioperative nurses in a hospital in the east south-central region of the United States. The surgical director allowed time for the nurses to voluntarily participate; however, the education program was designed to be completed at the nurses' convenience. Participants were emailed the education program, which included Survey Monkey links for the pretest/posttest. Participants were instructed to complete the pretest prior to beginning the education presentation. At the completion of the education presentation, the participants were instructed to complete the posttest. Printed evaluation forms were available upon completion of the CEOSA. The evaluation forms were collected by the surgical director and returned to me by email, maintaining anonymity of the participants. The program was analyzed using the percentages and mean scores from the pretest/posttest, which included the same 10 questions. Higher scores on the posttest revealed increased knowledge on OSA and the STOP-BANG screening questionnaire.

Identifying patients presenting for surgery who may be at risk for OSA could have a positive impact on patient safety during the perioperative period. The education program provided an evidence-based practice solution for closing the identified gap in practice. The inability to implement the education program at another facility due to ongoing COVID restrictions was a limitation to the project. The project led to social change by raising the nurses' awareness about undiagnosed OSA. In an effort to improve patient safety and quality throughout the perioperative period, there was a need to educate the nurses at both levels of awareness and identification of patients at risk for OSA.

Curriculum Plan Evaluation by Content Experts Summary

The CEs completed an evaluation of the curriculum plan, curriculum content, and literature review matrix for alignment with each objective (see Appendix D). A dichotomous scale was used to indicate whether the objective was met (1) or not met (2). Analysis of the curriculum plan evaluation by CEs indicated that each objective was met with a mean of 1 for the whole curriculum plan.

Pretest/Posttest by Content Experts Validity Scale Analysis

The pre/posttest content validation by content experts (see Appendix F) used a 4-point Likert scale ranging from 1-4 (1 =*not relevant*, 2 =*somewhat relevant*, 3 =*relevant*, and 4 =*very relevant*). The answer for each question was in the course content. The 10 items received a score of 3 (*relevant*) or 4 (*very relevant*), which was scored as a 1. Each pretest/posttest item resulted in an I-CVI of 1, and the S-CVI revealed a mean score of 1, demonstrating that each pretest/posttest item aligned with the curriculum and the program objectives (see Appendix M).

Summary Evaluation of the Staff Education Program by Participants

The three participants answered "met" to each of the objectives, with met = 1 and not met =2, for a mean score of 1 (see Appendix I). Responses from participants included that they learned a lot and that there was a significant amount of information that they were unaware of about OSA.

Pretest/Posttest Change in Knowledge by Participants

Three nurses completed the pretest prior to viewing the PPP. The posttest was completed at the conclusion of the PPP. The change in knowledge by participants from

pretest to posttest was analyzed (see Appendix G) using descriptive statistics. The change in knowledge from pretest to posttest showed individual ranges from 4 - 6 and 6 - 9 respectively, with the change in knowledge ranging from 2 to 4 and a group change being 2.6 or 27%. The results of these analyses indicated that a positive change in knowledge was observed.

Summary Evaluation of the Staff Education Project by Content Experts

The CEs were asked to complete a summary evaluation on my project (see Appendix O). All CEs expressed that the education project was well designed and did not make suggestions for improvement. I was commended for taking the initiative to educate the perioperative nurses on OSA. The CEs expressed being happy to support the project. The CEs suggested offering the education program to nurses in other procedural areas where patients may receive sedation.

Recommendations

The CEs for my DNP project were not affiliated with the facility in which the project was implemented. However, the CEs expressed that the project should be presented after the COVID restrictions are lifted. The CEs recommended that an OSA screening protocol be developed and implemented in the surgical area during the preoperative period. The CEs agreed that measures to ensure continued competency on OSA should be incorporated into annual educational requirements.

Contribution of the Content Experts

The CEs contributed to the project by evaluating the curriculum plan for alignment with the stated objectives and supporting evidence from the literature review.

The pretest/posttest items were validated by the CEs. The CEs did not make any recommendations for improvement in the proposed project. There was a consensus among the CEs that all surgical patients should be screened for OSA risk.

Strengths and Limitations of the Project

Strengths

A major strength of the project was the willingness of the CEs to participate in the project and offer valuable feedback. The participants in the project found the content of the project to be informative and appropriate to incorporate into their practice. The presentation format of the project offers another strength, which allows the participant to review materials at the most convenient time. Another strength was introducing a validated screening tool that would allow for easy incorporation into an OSA protocol.

Limitations

A major limitation to the project was the low participation in the project. The self-paced presentation format could have contributed to the lack of significant participation. In future presentations, I would prefer to present the project in real time.

Summary

Upon approval of the curriculum by the CEs, I developed the PP education program, which was presented via a Zoom link. The CEs rated all pretest/posttest items as very relevant, resulting in an I-CVI score of 1 and a S-CVI of 1 (see Appendix N). The three participants concluded in their evaluations that all objectives had been met. A move from pretest to posttest showed a positive increase in knowledge. Recommendations were set forth that included disseminating the education to a broader

nursing professional audience. In Section 5, I discuss dissemination of the project that relates to analysis of myself, within the roles of a practitioner, scholar, and project manager.

Section 5: Dissemination Plan

Once COVID restrictions are lifted, I plan to present the program at the local facility. The goal is to implement screening for OSA risk for all patients presenting for surgery. I plan to participate in developing an OSA protocol for this population. I plan to seek the opportunity to present the program at the state nurses' association annual meeting.

Analysis of Self

Quality and safe care have always been goals for my daily patient interactions. Safety is an integral part of my anesthesia practice. For these reasons, when I recognized the gap in practice, I was compelled to explore this topic further. By embarking on this doctoral journey, I learned the evidence-based process for making practice changes. I look forward to being instrumental in ensuring that all surgical patients are screened for risk of OSA in my anesthesia practice.

Practitioner

As a certified registered nurse anesthetist, I am acutely aware of the complications associated with undiagnosed OSA. Educating the perioperative nurses on OSA and ways to better care for this surgical population would prove beneficial for creating a safer perioperative environment. Closing this identified gap is a practice challenge that I would gladly render my services toward. The benefits of this program extend beyond the nurses to include patient benefits because of increased awareness among nurses.

Scholar

As an advanced practice nurse, I have an ethical obligation to engage in continued education. This role often involves being a leader in the clinical area. To develop this scholarly project, I spent a significant amount of time researching and reading evidence-based literature on OSA. Educating myself on the topic gave me the knowledge and confidence to identify objectives, develop the curriculum plan, and create the nurse education program.

Project Manager

As the project manager, I faced a major challenge with the initial target site due to administration changes and COVID restrictions. Although there were unforeseen challenges, the CEs remained steadfast in their commitment to the education project. Through the navigation of this challenge, I developed additional collaboration skills. A site for the project implementation was identified with the guidance of my DNP project chair. I value the leadership experience gained through developing and implementing the education project.

Summary

The DNP project was developed to improve surgical patients care through educating the perioperative nurses on OSA and by introducing a screening tool for OSA. The project was appropriate for this site because there was no screening of surgical patients during the perioperative period for OSA risk. Improving patient safety and providing quality healthcare services was the overall goal of this project. The specific goal of the education project for the perioperative nurses was to raise awareness about the

significance of the undiagnosed, untreated risk for OSA surgical patient. Improvement of patient care because of the project was the overarching goal.

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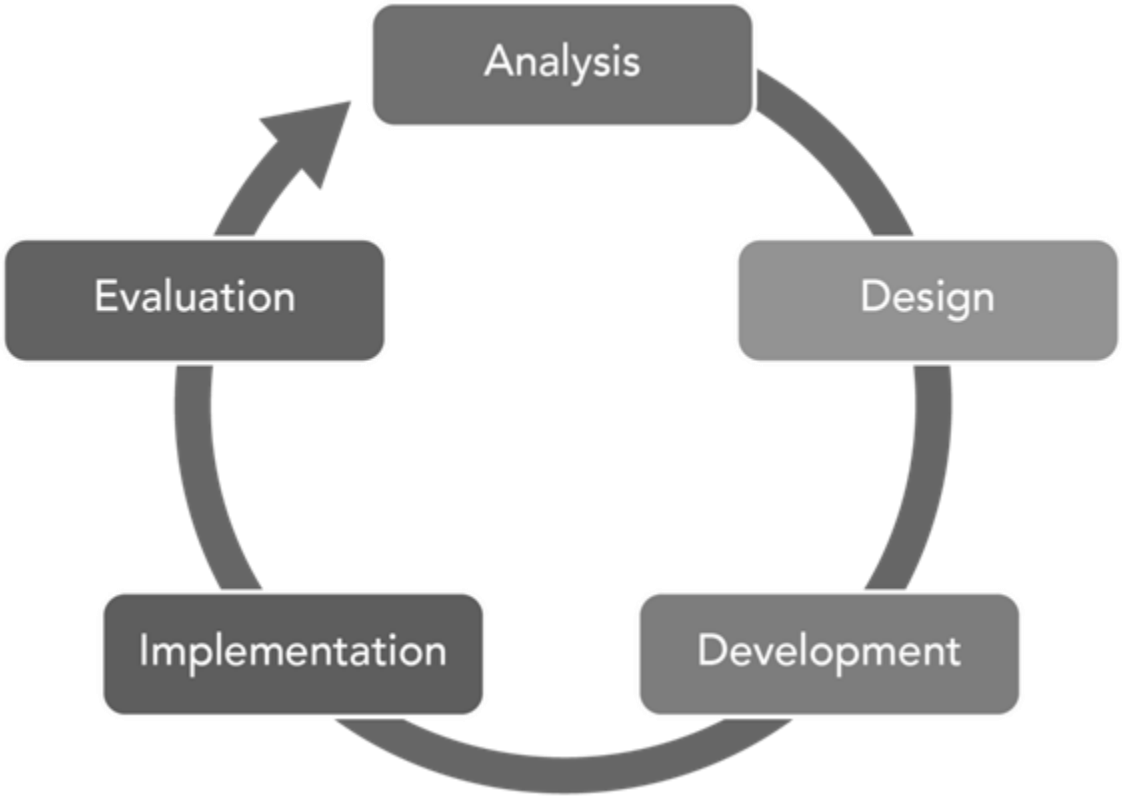
Appendix A: Assessment, Design, Development, Implementation, and Evaluation Model of Instructional Design



Note. From *ADDIE Model*, by International Society for Educational Technology, 2023 (https://www.isfet.org/pages/addie-model). Copyright 2023 by ISFET.

Appendix B: Literature Review Matrix

Melnyk, Bernadette Mazurek, and Ellen Fineout-Overholt's tool, Used with Permission

Reference	Theoretical/ conceptual framework	Research questions(s) hypothesis	Research methodology	Analysis & results	Conclusions	Grading the evidence
Ab Latif, R. & Mat Nor, M. Z. (2020). Using the ADDIE model to develop a rusnani concept mapping guideline for nursing students. *Malays Journal of Medical Science, 27*(6), 115-127. https://doi.org/10.21315/mjms2020.27.6.11	ADDIE model	Objective was to improve the educator's instruction strategy and to enhance the academic performance of nursing students by the development of a guideline to build a concept mapping based learning strategy called the Rusnani concept mapping (RCM).	Mixed-Method sequential exploratory design	The reliability of the RCM was 0.816, showing that the RCM guideline has high reliability and validity.	RCM is an effective and innovative teaching method to enhance the academic performance of their nursing students	VII
Bazemore, K. E., Barker, M., Morgan, B.T., & Goode, V. (2019). Utilization of the STOP-BANG questionnaire as a standardized screening tool for obstructive sleep apnea in veteran administration surgical patients. *Journal of PeriAnesthesia Nursing*, *34*(1), 60-65. https://doi.org/10.1016/j.jopan.2017.11.006	None	Lack of standardized screening results in decreased detection of patient at risk for OSA	Pre-Post Implementation design	Preimplantation 200 charts reviewed, of the 200 reviewed 63 had an existing diagnosis and 137 did not. Post implementation 200cdharts were reviewed and found 62 had an existing diagnosis and 138 did not. After implementation 126 patients were screened	The use of screening tools can promote preoperative screening practices and improve identification of high-risk patients.	IV

				using the STOP-BANG tool and 55 patients (43.6%) had a score of 4 or greater.		
Chu, T. L., Wang, J., Lin, H. L., Lee, H. F., Lin, C. T., & Chieh, L. Y. (2019). Multimedia-assisted instruction on pain assessment learning of new nurses: a quasi-experimental study. *BMC Medical Education, 19* (68), 1-8. https://doi.org/10.1186/s12909-019-1496-z	ADDIE instructional model	The goal of the study was to evaluate a multimedia instructional program to boost new nurses' ability to conduct pain assessment and treatment, through simulated scenario instructions.	A quasi-experimental, pre-test-posttest design with purposive sampling.	The experimental group had significantly higher satisfaction scores and demonstrated greater knowledge of pain assessment.	The program can improve nurses' pain assessment knowledge and competence.	III
Dixon, S. E., Haas, S. A., Klopp, A., & Carlson, J. (2016). A quality improvement project: Using the STOP-BANG tool in a military population to improve equity in preoperative screening. *Journal of PeriAnesthesia Nursing, 31* (5), 371-380. http://dx.doi.org/10.1016/j.jopan.2014.12.002	None	The aim of the study was to implement a prescreening tool to identify diagnosed or undiagnosed OSA before a surgical procedure.	The STOP-BANG tool was used to identify and stratify 1,625 patients into low-risk, intermediate-risk, high risk, and known OSA categories.	The STOP-BANG tool confirmed the diagnosed OSA rate to be 13.48% and increased at-risk OSA detection by 24.69%.	The STOP-BANG tool identified and stratified surgical patient at risk for OSA and standardized OSA assessments.	IV
Finkel, K. J., Searleman, A. C., Tymkew, H., Tanaka, C. Y., Saager, L., Zadeh-Safer, E. Bottros, M., Selvidge, J. A., Jacobsohn, E., Pulley, D., Duntley, S., Becker, C., & Avidan, M. S. (2009). Prevalence of undiagnosed obstructive sleep apnea among Adult surgical patients in an academic center. *Sleep Medicine, 10*, 753-	None	They evaluated the feasibility of screening surgical patient for OSA and determined the prevalence of undiagnosed OSA.	Prospective observational study	There were 2877 patients screened; 661 (23.7%) screened high-risk for OSA, of whom 534 (81%) did not have diagnosed OSA.	Undiagnosed OSA is prevalent in adult surgical patient. Implementing universal screening is feasible and can identify undiagnosed OSA in many surgical patients.	IV

758.doi:10.1016/j.sleep.2008.08.007						
Flatman, K. & Raj, D. (2020). Obstructive sleep apnoea and anaesthesia. *Anesthesia and Intensive Care Medicine*, *21*(4), 195-199. DOI: 10.1016/j.mpaic.2017.01.010	None	None	None	None	OSA patients have an increased risk of cardiovascular and respiratory postoperative complications.	VII
Hsu, T. C., Hsieh-Lee, J., Turton, M. A., & Cheng, S. F. (2014). Using the ADDIE model to develop online continuing education courses on caring for nurses in Taiwan. *The Journal of Continuing Education in Nursing, 45*(3), 124-131. doi:10.3928/00220124-20140219-04	ADDIE model	To implement a framework of caring in clinical practice. The study was conducted to develop online courses for caring for the hospital's nurses.	The ADDIE model was applied to develop and evaluate the caring curriculum.	Nurses' self-evaluations showed positive results. No significant difference was found between pre- and post-course patient evaluations.	The study showed the usefulness of the ADDIE model. It also provided evidence on the effects of caring education.	VI
Lakdawala, L. (2011). Creating a safer perioperative environment with an obstructive sleep apnea tool. *Journal of PeriAnesthesia Nursing, 26* (1), 15-24.doi:10.1016/j.jopan.2010.10.004	None	The purpose of this quality improvement project was to promote evidence-based practice for nurses to screen patient with OSA in the perioperative setting.	Reviewed patient data pre- and post-implementation of an OSA screening tool.	Revealed evidence of safer patient care.	As a result of incorporating an OSA assessment, patient advocacy and a safer perioperative environment was created.	IV
Lakdawala, L., Dickey, B., & Alrawasbdeb, M. (2018). Obstructive sleep apnea among surgical patients: A quality improvement project. *Journal of PeriAnesthesia Nursing*, *33*(6), 814-821. https://doi.org/10.1016/j.jopan.2017.12.003	None	This project screened patient for OSA and explore its relationship with respiratory complications.	Neurosurgical patients were preoperatively screened using STOP-BANG questionnaire scores of 5 or greater as high risk and less than 5 as low risk for	Of the 161 patients screened, 29.8% scored high risk for OSA ($P < .05$). Education improved nurses' awareness of OSA	The OSA care protocol decreased risk for postoperative respiratory complications.	IV

			moderate to severe OSA. .Postoperative respirator complications were compared between both OSA groups. Perioperative staff and patient education included an OSA care protocol using STOP-BANG screening.	risks by 81%, and 87.5% of patients were satisfied with the OSA care protocol.		
Legler, C. D. (2016). STOP-BANG assessment and postoperative outcomes. *Journal of Perianesthesia Nursing*, *33*(3), 330-337. https://dx.doi.org/10.1016/j.jopan.2015.06.004	None	To assess the intraoperative and postoperative complications caused by obstructive sleep apnea (OSA).	Retrospective chart analysis. Review of 150 patient charts over a 3- month period.	87% screened high (STOP-BANG score of 3 or greater) for OSA and had a higher rate of postoperative complications compared with patients at low risk. Postoperative complications included e events of hypoxemia and acute hypercapnia.	There is a relationship between scores of the STOP-BANG Screening Questionnaire and postoperative complications among surgical patients.	IV
Lockhart, E. M., Willingham, M. D., Abdallah, A. B., Helsten, D. L., Bedair, B. A., Thomas J., Duntley, S., & Avidan, M. S. (2013). Obstructive sleep apnea screening and postoperative mortality in a large surgical	None	Objective was to determine if a prior diagnosis of OSA or a positive screen for OSA was associated with increased risk for 30-day and	Prospective cohort study. Unselected adult surgical patients were prospectively enrolled between February 2006 and April	The sample included 14,962 patients, of whom 1939 (12.9 %) reported a history of OSA. All	Neither a prior diagnosis of OSA nor a positive screen for OSA was associated with increased 30-day or	IV

cohort. *Sleep Medicine,* 407-415. http://dx.doi.org/10.1016/j.sleep.2012.10.018		one-year mortality.	2010.Patients were preoperatively screened with the Berlin and Flemons screening tools. STOP and STOP-BANG scores were obtained.	four screening tools identified a high prevalence of undiagnosed patients at risk for OSA (9.5% - 41.6%).	one-year postoperative mortality.	
Mathangi, K., Mathews, J., & Mathangi, C. D. (2018). Assessment of perioperative difficult airway among undiagnosed obstructive sleep apnoea patients undergoing elective surgery: A prospective cohort study. *Indian Journal Anaesthesia*, *62*, 538-544. http://whww.ijaweb.org	None	The aim of the study was to estimate the occurrence and compare utility of OSA screening parameters in predicting difficult mask ventilation (DMV) and difficult intubation (DIT) in patients with undiagnosed OSA.	A prospective observational study was conducted in patients undergoing elective surgery. STOP-BANG questionnaire was administered preoperatively. Population was divided in to OSA and non-OSA groups based on STOP-BANG score >3.Occurrence of DMV, laryngoscopy (DL), and DIT were compared between both groups using DMV score, Cormack-Lehane grading, and intubation difficulty scale score, respectively.	A total of 54 patients in OSA and 46 patients in non-OSA group were studied. A total of 49 cases of DMV, 14 cases of DIT, and 25 cases of DL were encountered. Multivariate logistic regression analysis demonstrated STOP-BANG score as the single most important predictor of DMV.	Positive screening test for OSA is associated with difficult airway management.	IV
Nagappa, M., Wong, D.T., Cozowicz, C., Ramachandran, S. K., Memtsoudis, S. G., & Chung, F. (2018). Is obstructive sleep apnea associated with difficult airway? Evidence from a systematic review and meta-analysis of	None	The objective was to evaluate the evidence of a difficult airway being associated with OSA patients	Systematic review and meta-analysis of prospective and retrospective cohort studies. The databases	Combined difficult intubation (DI) and difficult mask ventilation (DMV) was 4.12-fold higher	OSA is associated with both DI and DMV.	V

prospective and Retrospective cohort studies. *PLOS One, 13*(10), 1-15. https://doi.org/10.1371/journal.pone.0204904		undergoing surgery.	were searched from 1946 to April 2017. The studies included adult surgical patients with suspected or diagnosed OSA with at least one difficult airway event.	in the OSA versus non-OSA patients.		
Patel, S. R., Margolies, P. J., Covell, N. H., Lipscomb, C., & Dixon, L. B. (2018). Using instructional design, analyze, design, develop, implement, and evaluate, to develop e-learning modules to disseminate supported employment for community behavioral health treatment programs in New York State. *Frontiers in PublicHealth, 6*, 1-9. Doi:10.3389/fpubh.2018.00113	ADDIE model	Describes the application of an instructional design framework in the development and evaluative of e-learning modules.	Applied quantitative and qualitative methods to develop and evaluate three individual placement and support (IPS) e-learning modules. Conducted formative and summative evaluation throughout the ADDIE process.	Formative evaluation with key stakeholders identified a range of learning needs that informed the development of a pilot training program in IPS.	Instructional design approaches such as ADDIE may offer a flexible and systematic approach for the development of e-learning modules.	VI
Qassamali, S. R., Lagoo-Deenadayalan, S., McDonald, S., Morgan, B., & Goode, V. (2019). The importance of the STOP-BANG questionnaire as a preoperative assessment tool for the elderly population. *Geriatric Nursing, 40,* 536-539. https://doi.org/10.1016/j.gerinurse.2019.08.01	None	Quality improvement project to identify undiagnosed OSA in the surgical geriatric patient.	A retrospective utilization of a modified STOP-BANG (SB) screening on charts that did not receive a clinical OSA evaluation.	23 of the 52 charts were considered high-risk for OSA but were not identified prior to surgery.	The SB questionnaire is underutilized, and patient's OSA is often unidentified prior to surgery.	VI
Robinson, B. K., & Dearmon, V. (2013). Evidence-based nursing education: effective use of instructional design and simulated learning environments to enhance knowledge transfer in	ADDIE model of instructional design	None	None	The ADDIE model was to the use of simulation in nursing education in an effort	A mixed research methodology allows testing at both the formative and	VI

undergraduate nursing students. *Journal of Professional Nursing, 29* (4), 203-209. http://dx.doi.org/10.1016/j.profnurs.2012.04.022				to facilitate improved clinical performance in new graduate nurses.	summative levels.	
Scully, K. R., Rickerby, J., & Dunn, J. (2020). Implementation science: Incorporating obstructive sleep apnea screening and capnography into everyday practice. *Journal of PeriAnesthesia Nursing*, *35*, 7-16. https://doi.org.10.1016/j.jopan.2019.06.004	None	Describes the implementation and maintenance of OSA screening and capnography monitoring.	Staff education was provided to three perianesthesia care units. A STOP-BANG score of 5 or more indicated high risk for OSA. A post anesthesia care unit audit tool tracked STOP-BANG scores, capnography use, hypoventilation events, nursing interventions, and respiratory complications.	Of the 314 patients with OSA, 36% were identified as high risk. Nurses used capnography on 76% of OSA patients and were able to readily identify hypoventilation and intervene. Respiratory complications occurred in 10.8% (n=34) requiring a higher level of care.	The nurses found OSA screening and capnography east to incorporate into practice. The process can reduce respiratory complications in the surgical patient with OSA.	IV
Seet, E., Chua, M., & Liaw, C. M. (2015). High STOP-BANG questionnaire scores predict intraoperative adverse events. *Singapore Medical Journal*, *56*(4), 212-216. doi.1011622/smedj.2015034	None	The study aimed to establish the use of the STOP-BANG questionnaire for perioperative patient risk stratification.	In this retrospective cohort study, the demographic, medical and perioperative outcome data of all patients who underwent elective surgery, excluding ophthalmic surgeries, from January to December 2011.	Found the risk of unexpected intraoperative and early postoperative adverse events was greater in patients with STOP-BANG scores of 3 or greater compared to those	STOP-BANG score may be used as a preoperative risk stratification tool to predict the risk of intraoperative and early postoperative adverse events.	VI

			Multivariate regression analysis was used to predict independent risk factors intraoperative and early postoperative events.	with scores of 0. Patients with STOP-BANG scores of 5 or greater had a fivefold increased risk of unexpected intraoperative and early postoperative adverse events, while those with scores of 3 or greater had a one in four chance of having an adverse event.		
Spence, D., Han, T., Morrison, T., & Couture, D. (2018). High rate of undiagnosed obstructive sleep apnea in patients undergoing total joint arthroplasty. *American Association of Nurse Anesthetists Journal*, *86*(4). www.aana.com/aanajournalonline	None	The study described the incidence and severity of OSA and determined the sensitivity and specificity of the STOP-BANG questionnaire in patients undergoing total joint arthroplasty (TJA) at a military academic medical center.	A prospective, observational cohort study of adult patients undergoing TJA Inclusion criteria between 18 and 80 years, undergoing total knee arthroplasty (TKA) of total hip arthroplasty (THA), and no history of OSA. All subjects completed an unattended sleep study in the patient's home 1 to 60 days before surgery.	Descriptive and inferential statistics were used to analyze the results. Overall, 71.6% (n = 58) had an SB score of 3 or more and 32.1% (n = 27) had a score of 5 or greater. The apnea-hypopnea index (AHI) increased with higher SB scores.	Recommended using a SB score of 3 or more for referral for postoperative sleep study consultation for evaluation.	IV

Stubberud, A. B., Moon, R. E., Morgan, B. T., & Goode, V. M. (2019). Using the electronic medical record to improve preoperative identification of patients at risk for obstructive sleep apnea. *Journal of PeriAnesthesia Nursing*, *34*(1), 51-59. https://doi.org/10.1016/j.jopan.2018.04.002	None	The implementation of a preoperative universal screening process using the STOP-BANG questionnaire to identify patients at high risk for OSA.	A pre-post design was used to evaluate screening compliance. Included staff education for the process of evaluating and documenting STOP-BANG scores. The data was collected via a chart review of the electronic medical record (EMR).	The rate of screening for OSA doubled after implementation. Nearly half of the patients screened were found to be at high risk for OSA.	Implementation of a universal screening improves compliance with screening and identification of patients at high risk for OSA.	VI
Tabet, C. H., & Bushnell-Lopez, K. (2018). Sleep, snoring, and surgery: OSA screening. *Journal of PeriAnesthesia Nursing*, *33(*6), 790-800. https://doi.org/10.1016/j.jopan.2017.01.009	None	The aim was to identify OSA in ambulatory surgical patients and create perianesthesia nursing protocol using a reliable and validate screening tool	A nurse initiated OSA survey was conducted in 1,118 preoperative ambulatory surgical patients using the STOP-BANG questionnaire to identify patients at risk for OSA.	10% of patients scheduled for ambulatory elective surgery had undiagnosed OSA.	The STOP-BANG questionnaire is a useful tool for screening patients with risks of OSA in the ambulatory surgical setting.	VI
Tan, A., Yin, J. D. C., Tan, L. W. L., van Dam, R., M., & Lee, C. (2016). Predicting Obstructive sleep apnea using the STOP-BANG questionnaire in the general population. *Sleep Medicine, 27-28*, 66-71. http://dx.doi.org/10.1016/j.sleep.2016.06.034	None	Aimed to evaluate the validity of the STOP-BANG questionnaire to predict moderate to-severe and severe OSA in the general population.	A sample of 242 subjects selected from a population-based cohort in Singapore completed a home-based sleep testing with a type 3 monitor. Subjects were asked to complete the STOP-BANG questionnaire score of 3 or greater on indicate high risk of OSA.	86 subjects had and AHI of 15 or greater and 26 subjects had an AHI of 30 or greater per hour. The sensitivity of a STOP-BANG score of 3 or greater was 66.2% to detect AHI of 15 or greater. The	The STOP-BANG questionnaire can be used as a screening tool in the general population.	IV

				specificity was 74.7%		
Valerio, T. D. & Heaton, K. (2014). The effects of an online educational program on nurse practitioners' knowledge of obstructive sleep apnea in adults. *Journal of The American Association of Nurse Practitioners, 22* (11), 603-611. Doi: 10.1002/2327-6924.12097	None	To determine the effects of an online educational program on nurse practitioner's (NP's) knowledge of identifying and evaluative adults at-risk for OSA.	Knowledge was assessed with a 15-question pre-test and post-test, after a 53-minute narrated PowerPoint educational session.	54 participants entered the program and 38 completed.	After the educational session, 97.4% of participants indicate highly likely or likely to evaluate patients for OSA.	VI
Wang, C. A., Palmer, J. R., Madden, M. O., Levy-Covey, W., Vakharia, R. M., & Roche, M., W. (2019). Perioperative complications in patients with sleep apnea following primary total shoulder arthroplasty: an analysis of 33,366 patients. *Journal of Orthopaedics, 16*, 382-385. https://doi.org/101016/j.jor.2019.04.003	None	The study evaluated whether sleep apnea (SA) patients undergoing total shoulder arthroplasty (TSA) are at greater odds of complications, readmissions rates, and costs.	Complications and readmissions were assessed using logistic regression analysis. Welch's t-test was used to compare Charlson – comorbidity index (CCI) and cost between cohorts.	33,366 patients equally distributed in both cohorts. SA increased the odds of medical and implant – related complications. Readmissions rates were similar to controls. Costs were higher.	SA increases complications and costs following TSA.	IV
Williams, R., Williams, M., Stanton, M. P., & Spence, D. (2017). Implementation of an obstructive sleep apnea screening program at an overseas military hospital. *AANA Journal, 85* (1), 42-48. www.aana.com/aanajournalonline	None	The aim was to determine whether educating nurses about OSA and incorporating the STOP-BANG questionnaire into preoperative forms was associated with suspected OSA and an increased frequency of nurse-generated	A retrospective chart review of 100 consecutive charts over a 1 – month period using the STOP-BANG questionnaire criteria was completed before and after implementation of the education and	Descriptive and inferential statistics were used to analyze results. Two hundred charts were reviewed. The prevalence of a STOP-BANG score of 3 or more increased from 5 %	An increased proportion of patients at high risk of OSA were identified	VI

		anesthesia consultation for OSA.	screening program	to 21% after program implement ation (P = .001)		
Zamanzadeh, V., Ghahramanian, A. & Nikanfar, A. R. (2015). Design and implementation content validity study: Development of an instrument for measuring patient-centered communication. *Journal of Caring Science, 4*(2), 165-178. doi: 10.157171/jcs.2015.017	None	To give an overview of the content validity process and explain the complexity of this process by introducing an example.	A methodologic al study conducted to examine the content validity of the patient-centered communicati on instrument through a two-step process (development and judgement).	From a set of 188 items, content validity identified seven dimension s. Content validity study revealed that this instrument has an appropriat e level of content validity.	Illustrated acceptable quantities indices for content validity a new instrument.	VI

Appendix C: Curriculum Plan

Title of Project: Perioperative Nurse Education for Undiagnosed Obstructive Sleep Apnea Screening

Student: [redacted]

Problem: The problem addressed by this DNP project was the need for education among peripoerative registered nurses (RNs) related to obstructive sleep apnea (OSA) and the need of an OSA screening tool in the perioperative department in the hospital for which this project is being proposed.

Purpose: The purpose of this DNP project is to plan, implement, and evaluate a perioperative nurse continuing education program on OSA.

Project Questions: What evidence in the literature supports the need for educating nurses on undiagnosed OSA and the need for preoperative screening for OSA? Will implementation of the continuing education program on OSA result in a change in knowledge by perioperative nurses as evidenced by a pretest/posttest? Will the participants' evaluation of the CEOSA program show that the objectives have been met relative to the curriculum?

Objective number and statement	Detailed content outline	Evidence (from literature review matrix)	Grading the evidence per Johns Hopkins	Method of presenting	Method of evaluation P/P item
1. Define OSA and describe the clinical manifestations.	What is OSA? • the most common sleep-related breathing disorder • characterized by recurrent, episodic cessation of breathing that lasts for ten seconds or more during sleep • associated with cardiovascular, neurocognitive, metabolic comorbidities and increased all-cause mortality • comorbidities such as: diabetes, hypertension, stroke, heart failure, coronary artery disease, obesity, metabolic	5,10,11,18,22	IV, VI	PowerPoint Presentation	1,3,5

	syndrome, atrial fibrillation, gastroesophageal reflux disease, deep venous thrombosis				
2. Identify how OSA is diagnosed and treated and discuss limitations.	What is a polysomnography (PSG)? • in laboratory sleep study • PSG reports an apnea-hypopnea index (AHI) per hour aa a measure of severity of OSA • mild OSA as an AHI of 5 to 15 • moderate OSA as an AHI of 15 to 30 • severe OSA as an AHI of 30 or more Limitations of PSG • increased cost • inadequate available resources • unplanned or urgent operative procedures Treatment of OSA • continuous positive airway pressure (CPAP) applied nasally, orally, or via a combination interface during sleep is the preferred treatment option for OSA.	4,18,19,25	IV,VI,	PowerPoint Presentation	2,6
3. Describe perioperative complications	• comorbidities together with the pathophysiological effects of sedatives and /or analgesic and anesthetic agents may aggravate the symptoms of OSA by: • reducing pharyngeal tone, ventilatory reflexes and arousal responses • leads to airway obstruction, hypoxia, hypercarbia, hemodynamic aberrations, and other adverse events	2,9,11,18	IV,VI	PowerPoint Presentation	4

	during perioperative period • difficult airway management • prolonged hospital length of stay • unexpected need for intensive care treatment Preoperative- sensitivity to sedatives and analgesics Intraoperative- difficult mask ventilation and intubation, EKG changes Postoperative- de-saturation while on oxygen via nasal cannula or inability to maintain oxygen saturation > or equal to 90%				
4. Define and describe the STOP-BANG questionnaire.	What is the STOP-BANG questionnaire? • an 8-point scoring system that is routinely administered during the perioperative assessment to screen for risk OSA • validated in this population against AHI values from in laboratory PSG What does the acronym STOP-BANG stand for? • snoring loudly • tiredness in daytime • observed apnea during sleep • high blood pressure • body mass index >35 • age > 50 years • neck circumference >40 cm or 17 inches • male gender What does the score mean? • scores range from 0 to 8	2,4,9,10,18	IV, VI	PowerPoint Presentation	7,8,9,10

	• a score > or equal to 3 means the patient is at risk for OSA • a score > or equal to 5 indicates that the patient is at high risk for OSA • recommended patients with scores of 3 to 4, 5 to 8 with comorbidities should be tested • when the STOP-BANG score increased from 3 to 8, the predicted probabilities for moderate/severe OSA increased from 0.36 to 0.60				
5. Demonstrate knowledge of administering the STOP-BANG questionnaire.	Instructions on assessing OSA risk using the STOP-BANG questionnaire.	4,9,20	IV,VI	PowerPoint Presentation	

Appendix D: Curriculum Plan Evaluation by Content Experts

Date: June 27, 2022

Student: [redacted]

Products for Review: Curriculum Plan, Complete Curriculum Content, Literature Review Matrix

Instructions: Please review each objective related to the curriculum plan, content and matrix.

The answer will be a "met" or "not met" with comments if there is a problem, understanding. the content or if the content does not speak to the objective. At the conclusion of this educational experience, the participant will be able to:

Objective Number	Objective Statement	Met 1	Not Met 2	Comment
1.	Define OSA and describe the clinical manifestations.			
2.	Identify how OSA is diagnosed and treated and discuss limitations.			
3.	Describe OSA perioperative complications.			
4.	Define and describe the STOP-BANG questionnaire.			
5.	Demonstrate knowledge of assessing for undiagnosed OSA using the STOP-BANG questionnaire.			
etc.				

Appendix E: Pretest/Posttest

1. OSA is the least common sleep-related breathing disorder.

   A. True

   B. False

2. OSA is clinically diagnosed by polysomnography (PSG).

   A. True

   B. False

3. OSA is associated with the following comorbidities except

   A. cardiovascular

   B. neurocognitive

   C. musculoskeletal

   D. metabolic

4. Sedatives and/ or analgesics and anesthetic agents administered during the perioperative period may aggravate the symptoms of OSA by increasing pharyngeal tone, ventilatory reflexes and arousal responses.

   A. True

   B. False

5. Which arrhythmia is most often associated with OSA?

   A. ventricular tachycardia

   B. second degree AV heart block

   C. atrial fibrillation

6. Which of the following is the preferred treatment for OSA patients?

   A. supplemental oxygen

   B. oral airway

   C. CPAP application

   D. end tidal carbon dioxide monitoring

7. The STOP-BANG questionnaire is used to assess risk for OSA.

   A. True

   B. False

8. Which score of the STOP-BANG suggests the patient is at risk for OSA?

   A. 1

   B. 2

   C. greater than or equal to 3

9. Which of the following is not an indicator of OSA?

A. snoring

B. low blood pressure

C. tiredness during the day

10. Men are twice as likely to develop OSA as women.

A. True

B. False

Appendix F: Pretest/Posttest Content Validation by Content Experts

Title of Project: Perioperative Nurse Education for Undiagnosed Obstructive Sleep Apnea Screening

Student: [redacted]

Respondent Letter: (A, B, C)

Accompanying Packet: Curriculum Plan, Pretest/Posttest with answers, Pretest/Posttest Expert Content Validation Form

INSTRUCTIONS: Please check each item to see if the question is representative of the course objective and the correct answer is reflected in the course content.

Test Item # 1 2 3 4

1 Not Relevant __ Somewhat Relevant__ Relevant___ Very Relevant__

Comments:

2 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comments:

3 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comments:

4 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comments:

5. Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comments:

6 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comments:

7 Not Relevant__ Somewhat Relevant__ Relevant ___ Very Relevant__

Comments:

8 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comments:

9 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comments:

10 Not Relevant__ Somewhat Relevant__ Relevant___ Very Relevant__

Comments:

Appendix G: Pretest/Posttest Change in Knowledge by Participants

Participant Number	Pretest Score	Posttest Score	Numerical Difference	Percentage of Change
1	4 (40%)	6 (60%)	2	20%
2	6 (60%)	8 (80%)	2	20%
3	5 (50%)	9 (90%)	4	40%

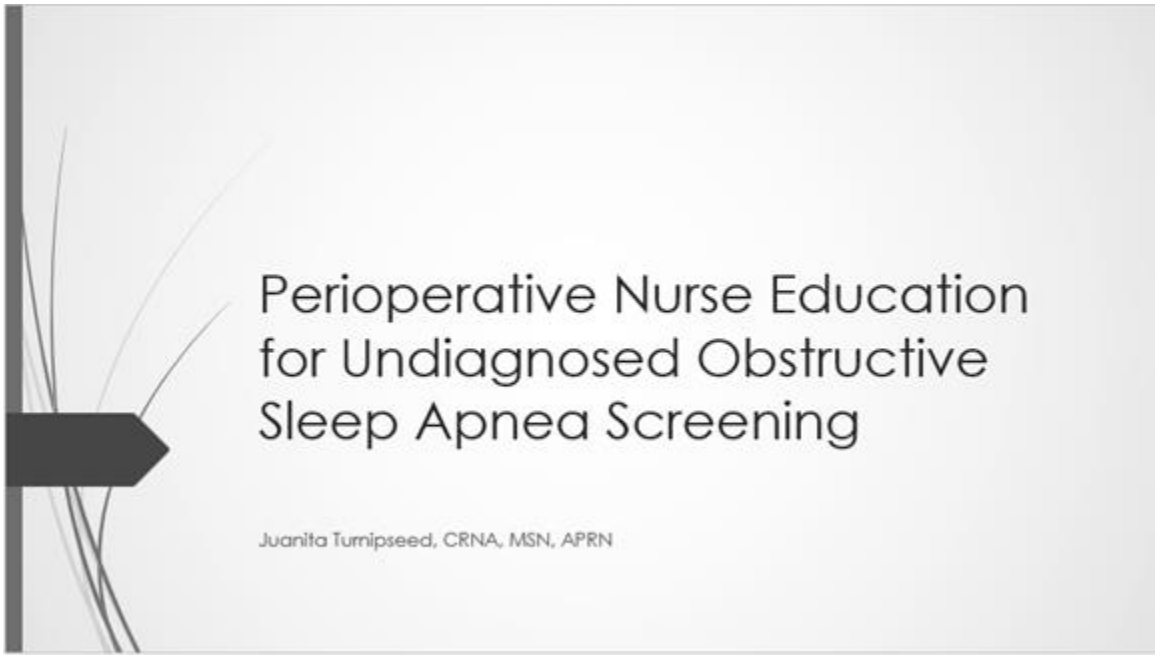
Individual range in pretest scores was 4 to 6

Individual range in posttest scores was 6 to 9

Change in knowledge for individuals ranged from 2 to 4

Percentage change in knowledge was 27% for the group

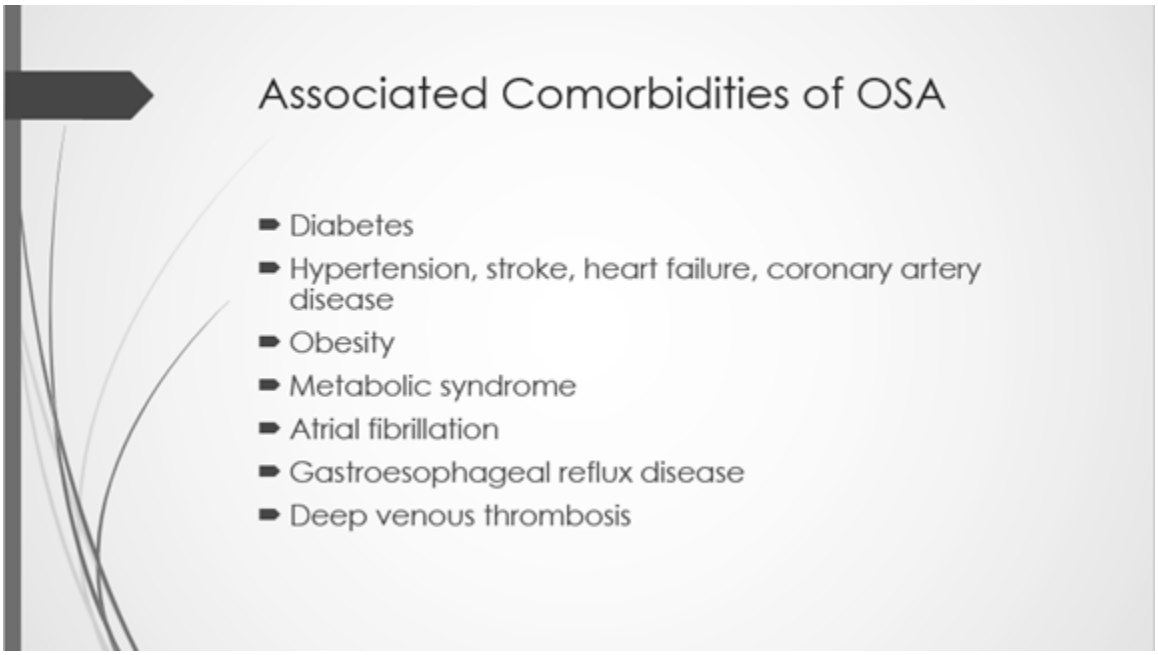
Appendix H: Staff Education Program

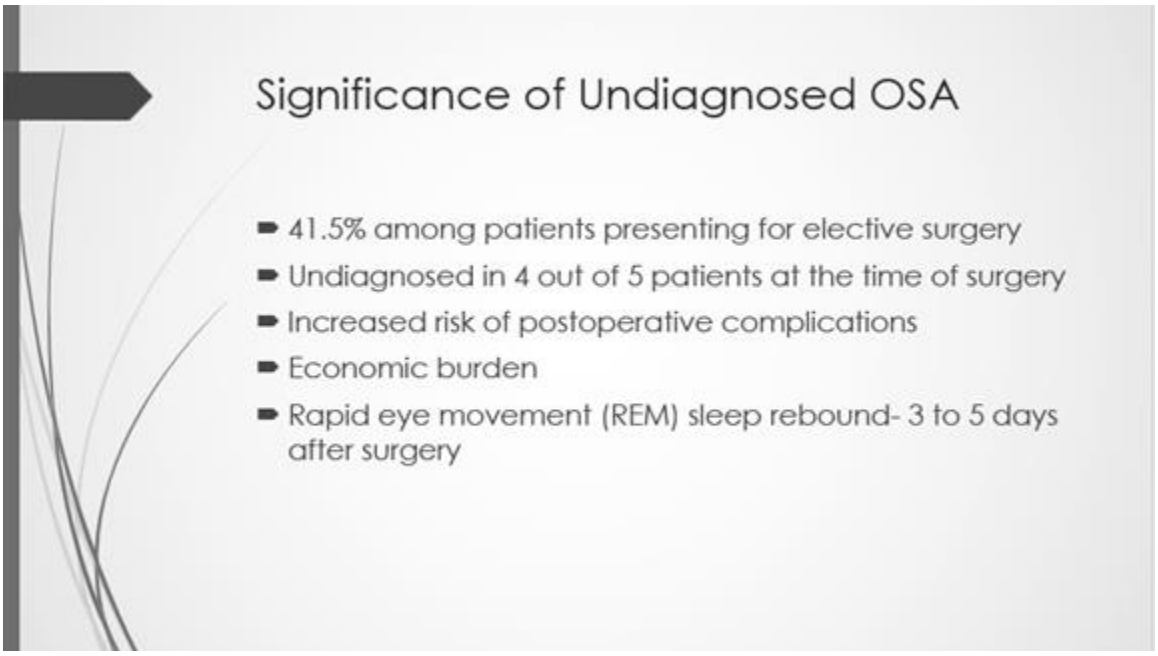


What is obstructive sleep apnea (OSA)?

- Most common sleep-related breathing disorder
- Recurrent, episodic cessation of breathing that lasts for 10 seconds or longer during sleep
- Apneic and hypopnea events
- Cardiovascular, neurocognitive, metabolic comorbidities, and increased all-cause mortality

Obstructive Sleep Apnea Cycle


Associated Comorbidities of OSA
Diabetes
Hypertension, stroke, heart failure, coronary artery disease
Obesity
Metabolic syndrome
Atrial fibrillation
Gastroesophageal reflux disease
Deep venous thrombosis

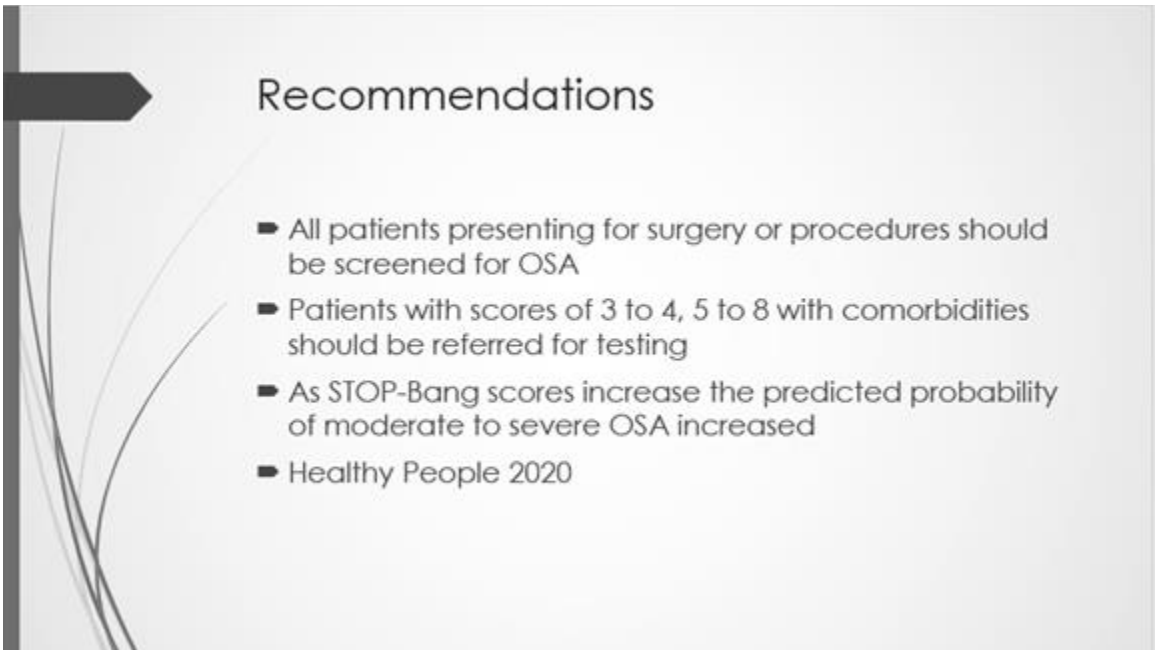

Significance of Undiagnosed OSA
41.5% among patients presenting for elective surgery
Undiagnosed in 4 out of 5 patients at the time of surgery
Increased risk of postoperative complications
Economic burden
Rapid eye movement (REM) sleep rebound- 3 to 5 days after surgery


Diagnosis and Treatment of OSA
What is a polysomnography (PSG)?
in laboratory sleep study
gold standard for diagnosing OSA
reports an apnea-hypopnea index (AHI)
mild OSA
moderate OSA
severe OSA


Diagnosis and Treatment of OSA, cont.
Limitations of PSG
increased cost
inadequate available resources
unplanned or urgent operative procedure
Treatment of OSA
continuous positive airway pressure (CPAP)


Perioperative Complications of OSA
Reduced pharyngeal tone, ventilatory reflexes and arousal responses
Leads to airway obstruction, hypoxia, hypercarbia, hemodynamic aberrations
Difficult airway management
Prolonged hospital length of stay
Unexpected need for intensive care treatment


What is the STOP-Bang Questionnaire?
A validated preoperative assessment tool for OSA
8 patient related items:
snoring
tiredness
observed apnea
pressure
body mass index
age
neck size
gender
Used to determine risk of OSA
low risk
intermediate risk
high risk


Recommendations
All patients presenting for surgery or procedures should be screened for OSA
Patients with scores of 3 to 4, 5 to 8 with comorbidities should be referred for testing
As STOP-Bang scores increase the predicted probability of moderate to severe OSA increased
Healthy People 2020


Posttest Link
https://www.surveymonkey.com/r/TKY2G5G

Appendix I: Evaluation of the Staff Education Program by Participants

Objective Statement	Were the objectives met? Please circle.	
1. Define OSA and describe the clinical manifestations.	Yes No	
2. Identify how OSA is diagnosed and treated and discuss limitations.	Yes No	
3. Describe OSA perioperative complications.	Yes No	
4. Define and describe the STOP-BANG questionnaire.	Yes No	
5. Demonstrate knowledge of assessing for undiagnosed OSA using the STOP-BANG questionnaire.	Yes No	
Additional Comments		

Appendix J: Content Expert Letter

Hello Everyone,

Thank you for agreeing to be a content expert for my Doctoral Capstone Project. Enclosed in this packet, you will find the literature review matrix, curriculum plan, evaluation of curriculum plan by content experts, pretest/posttest, and pretest/posttest content validity by content experts. All data collected from you will be anonymous. All materials enclosed in your packet are coded with a corresponding letter for data analysis purposes only. The packets have been distributed anonymously and will be collected anonymously by placing the packets back in the designated area. Please contact me anytime for additional questions.

Thank you,

[redacted]

[redacted]

[redacted]

Appendix K: Evaluation of the Staff Education Project, Process, and My Leadership by Content Experts

Title of Project: Perioperative Nurse Education for Undiagnosed Obstructive Sleep Apnea Screening

Student: [redacted]

Thank you for completing the Summary Evaluation on my project. Please complete and place anonymously in the designated area at the surgical desk.

I. Content Expert Approach
   a. Please describe the effectiveness (or not) of this project in terms of communication, and desired outcomes etc.
   b. How do you feel about your involvement as a content expert member for this project?
   c. What aspects of the content expert process would you like to see improved?

II. There were outcome products involved in this project including an educational curriculum and pre/ posttest.
   a. Describe your involvement in participating in the development/approval of the products.
   b. Share how you might have liked to have participated in another way in developing/approving the products.

III. The role of the student was to be the leader of the project.
   a. As a leader how did the student direct you to meet the project goals?
   b. How did the leader support you in meeting the project goals?

Please offer suggestions for improvement.

Moon/Aug 2020

Appendix L: Curriculum Plan Evaluation by Content Experts Summary

Met = 1 Not Met = 2

Objective Number and Statement	Evaluator A	Evaluator B	Evaluator C	Average Score
1. Define OSA and describe the clinical manifestations.	1	1	1	1
2. Identify how OSA is diagnosed and treated and discuss limitations.	1	1	1	1
3. Describe OSA perioperative complications.	1	1	1	1
4. Define and describe the STOP-BANG questionnaire.	1	1	1	1
5. Demonstrate knowledge of assessing for undiagnosed OSA using the STOP-BANG questionnaire.	1	1	1	1

Moon/August 2019

Appendix M: Summary of the Evaluation of the Staff Education Program by Participants

Objective	Response	Number
Define OSA and describe the clinical manifestations.	Yes No	3
Identify how OSA is diagnosed and treated and discuss limitations.	Yes No	3
Describe OSA perioperative complications.	Yes No	3
Define and describe the STOP-BANG questionnaire.	Yes No	3
Demonstrate knowledge of assessing for undiagnosed OSA using the STOP-BANG questionnaire.	Yes No	3
Comments: Participants expressed that they learned a lot of things that they were unaware of or had even thought about. The consensus by all three participants was that the presentations was great presentation was great. Mean = 1		

Moon/Dec/2021

Appendix N: Pre/Posttest Content Expert Validity Index Scale Analysis

Rating on X-Items Scale by Three Experts on a 4-point Likert Scale

Items	Expert 1	Expert 2	Expert 3	Total Item Rating
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	1	1	1	1
7	1	1	1	1
8	1	1	1	1
9	1	1	1	1
10	1	1	1	1

1. Review each CE individual item score from Appendix F. Any item that gets a 1 or 2, gets a 0 on this form. Any score that is a 3 or 4 gets a 1 on this form.
2. Add all three of the CEs scores horizontally and divide by the number of CEs to achieve the I-CVI and put in the Total Item Rating column for that item.
3. Add the Total Item Ratings vertically and divide by the number of test items.
4. The S-CVI should have a score between 0 and 1.
5. Note: Acceptable validity score should be between .78 and 1. Otherwise any items that are poorly rated need to be revisited.

S-CVI/UA, scale-level content validity index, universal agreement calculation method Adopted from Polit, D. F., & Beck, C. T. (2006).

Appendix O: Summary Evaluation Results of the Staff Education Project by Content Experts

Title of Project: Perioperative Nurse Education for Undiagnosed Obstructive Sleep Apnea Screening

Student: [redacted]

I. Content Expert Approach

Please describe the effectiveness (or not) of this project in terms of communication, and desired outcomes etc.

Evaluator A	Evaluator B	Evaluator C
The project goals and methods were clearly communicated.	The plans for the project were easy to follow because of good communication throughout process.	The communication had a positive effect on project outcomes.

How do you feel about your involvement as a content expert member for this project?

Evaluator A	Evaluator B	Evaluator C
My input was well received.	I was asked for any additional input.	I was encouraged to offer any suggestions for improvement.

II. There were outcomes products in this project including an educational curriculum and pre/posttest.

Describe your involvement in participating in the development/approval of the products.

Evaluator A	Evaluator B	Evaluator C
I evaluated the pre/posttest for alignment with the curriculum plan.	I evaluated the items after being developed.	I evaluated the curriculum plan and the tests after being developed.

d. Share how you might have liked to have participated in another way in developing/approving the products.

Evaluator A	Evaluator B	Evaluator C
The project was well developed.	My role as content expert was sufficient.	None noted.

III. The role of the student was to be the leader of the project.

As a leader how did the student direct you to meet project goals?

Evaluator A	Evaluator B	Evaluator C
She gave detailed and thorough directions for meeting goals.	The instructions that she provided were easy to follow for meeting goals.	She was very knowledgeable on the topic and provided detailed instructions on meeting goals.

How did the student support you in meeting the project goals?

Evaluator A	Evaluator B	Evaluator C

She was available for guidance as needed.	She provided instructions and was accessible for answering questions.	She offered support by being available to clarify any questions that I had.

IV. Please offer suggestions for improvement.

Evaluator A	Evaluator B	Evaluator C
I have no additional suggestions.	I have no additional suggestions.	I have no additional suggestions.

Moon/Mar 2022