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Development of Staff Education on Improved Compliance Adherence in Sleep Apnea

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Walden University

College of Nursing

This is to certify that the doctoral study by

Mayla Garcia

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.

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Walden University
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Abstract

Development of Staff Education on Improved Compliance Adherence in Sleep Apnea

by

Mayla Garcia

MS, Walden University, 2015

BS, Virgen Milagrosa University, 1992

Project Submitted in Final Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

Walden University

February 2022

Abstract

The increasing prevalence of sleep disorders such as obstructive sleep apnea (OSA) affects approximately 25% of adults in the United States and an estimated 34% of men and 17% of women in the primary care population. In the clinical project site, the practice problem involved the increasing clinicians' knowledge about OSA and being able to implement screening tools for further treatment and evaluation. The purpose of this project was to develop an educational training and intervention for staff to increase their knowledge of OSA conditions and have it validated by a panel of experts before dispersing it to the intended audience. The theoretical framework used in developing education was the theory of planned behavior. The practice-focused question addressed whether a staff education project on sleep apnea would improve staff knowledge on compliance therapy adherence for OSA patients. The project design included an informational PowerPoint presentation, with pre and post-test questionnaires that were evaluated by a panel of experts using a Likert scale. All materials were dispersed to the panel and responses were collected from the Likert scale. The responses on the Likert scale were analyzed and utilized to validate the educational module. The educational module was validated by the panel and was noted to have the potential to enhance staff knowledge on OSA screening. All panel members awarded a "5" for all areas and unanimously approved it for dissemination to the staff. Education for clinical staff on OSA can positively impact social change by providing a better understanding of OSA and ultimately having the potential to improve patient and family's knowledge on OSA and quality of life.

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Dedication

I would like to dedicate this project wholeheartedly to my supportive husband Bernard, my three children, Jessa, Queen, and Lavern, my family, friends, relatives, and classmates. Their continued kind supervision, love, and encouragement were important to the successful completion of this journey.

Acknowledgments

A sincere appreciation for the valuable guidance and inspiration of Dr. Joanne Minnick, Dr. Amelia Nichols, Dr. Casey Cole, and Dr. Joan Hahn, who contributed a wealth of knowledge and wisdom throughout the various phases of the project. Also, I thank God for providing me with determination and strength in completing the evidence-based project with success.

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Section 1: Nature of the Project

Introduction

Sleep disorders significantly affect a substantial dimension of the general population, interfering with perceptions of life quality. One of the prevalent sleep-related breathing disorders (SBDs) is obstructive sleep apnea (OSA), described as an intermittent upper airway collapse causing temporary cessation of breathing that occurs less than 10 seconds during sleep leading to gasping or choking episodes (Aardoom et al., 2020). The global prevalence of OSA affects approximately 1 billion people. Of those impacted, 936 million adults aged 30-69 have mild to severe OSA, and 425 million adults experience moderate to severe apnea based on diagnostic criteria (Benjafield et al., 2019). Typical OSA symptoms among general populations include excessive daytime sleepiness, fatigue, tiredness or lack of energy, chronic morning headache, cognitive impairment, habitual snoring, gastroesophageal reflux, witnessed apneas, and restless leg syndrome. The nocturnal events have a potential risk for cardiovascular disease, atrial fibrillation, diabetes, heart failure, hypertension, stroke, and death (Gottlieb & Punjabi, 2020; Patil et al., 2019; Veasey & Rosen, 2019).

According to the American Academy of Sleep Medicine, undiagnosed sleep apnea results in an estimated \$150B dollars annually, and OSA is considered a significant public burden associated with morbidity and mortality when left untreated (AASM, 2017). The U.S. Preventative Service Task Force (USPSTF, 2017) systematically recommended screening and treating asymptomatic adults for early diagnosis purposes. The gold standard diagnostic test for OSA is a laboratory-based nocturnal

polysomnogram, and the front-line treatment is positive airway pressure (PAP) therapy across the spectrum of disease severity. PAP therapy comprises different devices, including automatic positive airway pressure (APAP), constant positive airway pressure (CPAP), and bilevel positive airway pressure (BiPAP). OSA severity is quantified by the apnea-hypopnea index events (AHI) per hour of sleep and classified as mild (5-15), moderate (15-30), and severe (>30). A study by Patil et al. (2019) illustrated that adherence to PAP therapy is strongly recommended to reduce the potentially serious risk of developing adverse outcomes and improving sleep-related quality of life. Those patients suffering from OSA may also impact motor vehicular collisions, endangering public safety. Approximately about 38,000 people are injured each year in the U.S. from the deleterious effects and \$55 billion in medical and work loss due to traffic crash deaths (CDC, 2020). Therefore, it is clinically significant for clinicians to initiate prescreening for all patients in mitigating risky conditions. Despite considerable improvement for the quality function of life, integrating education and knowledge-driven for staff are virtual channels in managing patients with OSA; thereby, findings ways to improve OSA diagnostic and intervention are crucial that require further research.

Outpatient specialty and primary care clinics appear to be the ideal setting to assess sleep quality and timing. The AASM clinical guidelines introduced the commonly used tools for screening such as snoring, tiredness, observed apnea, blood pressure, body mass index, age, neck circumference, and gender (STOP-BANG), and the Epworth Sleepiness Score ([ESS]; Chiu et al., 2017). The ESS and STOP-BANG are validated questionnaires providing evidence-based recommendations for comprehensive practice

and a baseline to establish the appropriate treatment. It is then essential to tailor the tools in the practice guidelines for delivering a treatment plan.

Appendix A shows a presentation of the OSA education information, whereas Appendix B is the ESS screening tools, and Appendix C is the STOP-BANG guidelines. Screening parameters for OSA by healthcare providers promote guidelines as a model for assessing patients at high risk for OSA (Chiu et al., 2017). When clinician staff are provided with appropriate methods to assess OSA, practice change can be effectively implemented associated with accurate interpretations. The utilization of evidence-based practice (EBP) educational modules can benefit the team in developing a care plan with patients for appropriate screening and evaluating treatment.

Problem Statement

The lack of importance of OSA impact by clinicians and patients' ambivalent adherence to PAP treatment remains a practice problem in the clinical settings and needs to integrate an evidence-based project for quality enforcement (Patil et al., 2019; Zarhin & Oksenberg, 2017). Educating healthcare providers and clinician staff about OSA implications, screening, and patient management for OSA can improve nursing practice and prompt better outcomes (Jonas et al., 2017). Educational modalities may help guide and assist clinicians' knowledge, attitudes, and methods regarding OSA screening and management (Askland et al., 2020; Patil et al., 2019). Measures of sleep assessment and depth are clinically relevant and should be the criterion focus of the practice project. This EBP practice education module is essential in assessing underlying mechanisms and

evaluating sleep disorders as a potential treatment for improving nursing practice for managing patients with OSA.

Purpose Statement

Despite numerous adverse health effects with a high prevalence of sleep issues and a significant gap in practice, the substantial impact in the current project is to determine a educational staff model structure for assessing sleep disorders knowledge awareness. Evidence-based knowledge support the clinic staff in outlining how STOP-BANG and ESS should be implemented as a core feature of sleep screening. Therefore, specific attention to the plan is warranted, and an accurate assessment of sleep impairment is critical. The project will provide educational information for the staff to increase knowledge of OSA and help identify patients who are at risk by facilitating necessary interventions to improve care for sleep disorders.

The purpose of this DNP project was to exemplify the gap in practice with the following practice-focused questions: Will a staff education project on sleep apnea improve staff knowledge on compliance therapy adherence for OSA patients? Through this project, I can now provide clinically relevant educational information to the staff on sleep apnea training to address the gap in practice in the outpatient clinic and primary care settings. The impact of sleep education, obtained by the staff, could help improve sleep interventions among OSA patients, thereby, promoting a valuable sleep strategy health practice.

Nature of the Doctoral Project

Regarding the DNP project, an evidence approach primarily addresses the practice-focused question of providing the education module for staff clinicians. This context establishes the effects of educational interventions on the knowledge and practices of staff concerning the screening process in outpatient specialty and primary care clinics, including cardiovascular, pulmonary, and bariatric weight loss clinics. The theory of planned behavior is the constructing ground model that will be used in developing the implementation of the project to improve their knowledge and skills set.

Significance

Addressing knowledge awareness of standard OSA screening from clinicians promotes quality improvement projects in patients with OSA. This project demonstrates significance to the healthcare provider for safety practice and emphasizes promoting STOP-BANG and ESS screening evaluations, thereby improving patients' quality of life and positive outcomes. An essential benefit of this change initiative will strengthen stakeholders to high clinical improvement of OSA management. Appropriate OSA screening ameliorates clinician knowledge, enhancing their ability to provide effective patient care in clinic-based assessments. Askland et al. (2020) purported that education and behavior can help improve patient health outcomes from complex multifactorial issues, reducing comorbidities. When a project program coexists with the EBP premise, this may result in positive social change in the health care environment, not only to the clinician staff but also to the patients, their families, and the community.

Summary

Section 1 presented the problem statement, purpose statement, nature of the doctoral project, and the significance of the project. OSA is one of the chronic sleep breathing disorders that predominantly affect the population. Providing education and training to the staff will help improve knowledge of OSA treatment and compliance therapy for patients with OSA disorders. Section 2 will discuss the background and context of the doctoral project.

Section 2: Background and Context

Introduction

The crucial practice problem in the outpatient specialty and primary care clinic determines the lack of knowledge awareness among clinicians on instituting valid screening methods such as STOP-BANG and ESS in every patient who is at risk for OSA and referred for further management and improving compliance adherence. The DNP project practice-focused question is: Will a staff education project on sleep apnea improve staff knowledge on compliance therapy adherence for OSA patients? My DNP project intention is to extensively facilitate EBP education information to improve the knowledge, skills, and ability of clinicians and to practice proper assessment, screening, and evaluation of OSA. With the aim of improving staff knowledge on sleep apnea, this can establish optimal standardized management and promote compliance therapy. Also, the influence of the educational interventions will ensure an appropriate treatment decision and practice changes in the clinical settings.

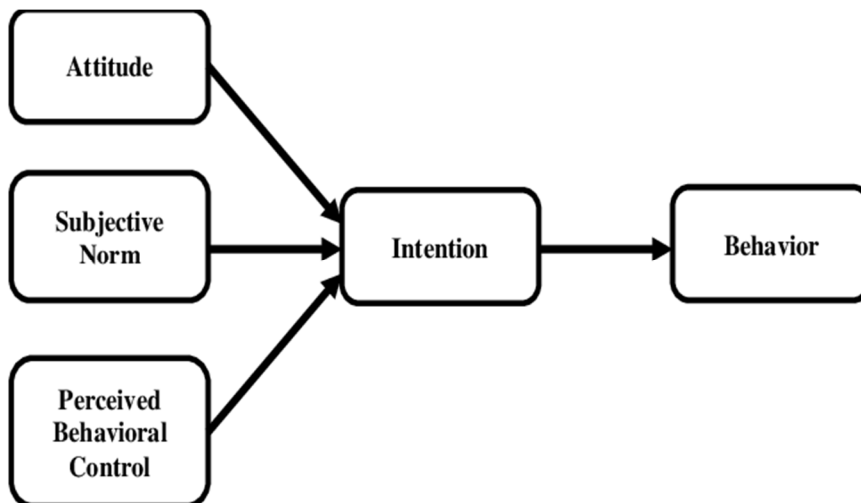
Concepts, Models, and Theories

Understanding the educational programs' implications for clinical practice in a clinical setting to improve existing knowledge of health professions may be helpful guidance and assistance for future behavior in the long-term plan. The theory of planned behavior, proposed by Ajzen in 1985, was used in developing the tool for this project (Ajzen & Manstead, 2007). Additionally, the emersion of this model in the project contributed to in-depth analysis and experiences that produce predetermined categories of

adherence perspectives. Its component is applicable to comprehending the adoption of the sleep domain, allowing a better outline of behavior parameters.

Figure 1

Theory of Planned Behavior



Note. Adapted from Ajzen & Manstead (2007).

The theoretical framework is informed diagrammatically in Figure 1. Each dimension explains that a wide array of psychological factors such as attitudes, subjective norms, and perceived behavioral control of healthcare professionals will envision their practical intentions. In this project, *attitude* means feedback regarding the implementation of the screening tools; *subjective norms* refer to the clinicians' beliefs and values that are implicated by their cultural background. *Perceived behavioral control* describes the obstacles from an acquired perception that may prevent the desired changes in OSA screening. *Intention* defines that clinician are equipped to change their attitudes and beliefs regarding the project above. The *behavior* pertains to clinicians' reactions to the

new recommended educational project. Presenting the theoretical concept of planned behavior shows potential in cultivating successful practice management (Ajzen & Manstead, 2007). The use of this framework helped guide the development of education training and the implementation of the tool.

Relevance to Nursing Practice

A step process involving the use of STOP-BANG and ESS tools is lacking in the clinical practicum site and allows the inclusion of screening procedures and detection of patients at risk with OSA conditions which makes the project relevant (Chiu et al., 2017; Chung et al., 2016). The ESS tool was developed in 1990 by Johns Murray, composes of eight situations in which patients are asked to rate the likelihood of falling asleep (Johns, 1991). The ESS uses the following scores: 0 = *never*; 1 = *slight*; 2 = *moderate*; 3 = *high*. A score of > 10 is abnormal. The STOP-BANG is a validated tool and a practical approach; developed in 2008 by Chung Frances et al., it comprises eight dichotomous *yes* or *no* items including snore, tired, observed stopped breathing, high blood pressure, BMI >35 kg/ m², age greater than 50 years, neck greater than 15.75 inches, and male gender. A score of greater than two *yes* responses is an indication that additional testing must be considered (Chung et al., 2016). Hence, it is vital to understand knowledge awareness on OSA patients for further treatment and evaluation. Highlighting the integration of screening methods is also essential to early identification of OSA, and the use of that knowledge will promote change, reducing medical complications.

Local Background and Context

As described in the contextual background, there was no comprehensive formal education module employed in screening for OSA at the clinical practicum site. This section will elaborate on the content and delivery of the EBP staff educational project that will be further enhanced at the outpatient specialty/primary location. A study by Mead and Irish (2020) showed that sleep education has potential to result in positive outcomes when delivered appropriately. Inadequate sleep health education may contribute to the disparity in the management of sleep disorders. Thus, educating the staff on the importance of OSA could create a foundation to improve sleep awareness specifically for patients with sleep disorders (King et al., 2021). With this foundation, trained healthcare provider can promote patient compliance and long-term follow-up.

As the prevalence of OSA increases, ensuring information on knowledge awareness and training on screening will give confidence to clinicians to effectively manage compliance therapy. Ajzen and Manstead (2007) depicted the underlying theory of planned behavior provides substantive implications to the project interventions focusing on knowledge dimension, changing attitudes, subjective norms, and intentions. Chiu et al. (2017) posited the STOP-BANG and ESS screening tools were designed to improve positive health outcomes. The utilization of these tools will further guide the way to determine if nocturnal polysomnogram as a diagnostic confirmation is needed for patients with OSA and to undergo necessary interventions. Chen et al. (2020) depicted that compliance adherence is imperative and can be done by a telemonitoring system improving CPAP usage. Hence, knowledge integration about OSA is important: all

clinicians should be educated on OSA for quality performance. Pretest and posttest scales, to validate knowledge acquisition, can be collected using a questionnaire I created.

Role of the DNP Student

As a DNP-prepared student, I am employed in Neurology/Sleep Medicine as an advanced practice nurse and collaborating with a neurologist to provide care to multiple neurodegenerative diseases and sleep medicine. My distinct and expected role is developing skills and disseminating and evaluating outcomes of the staff education module. Such opportunities systematically encourage routine screening for OSA by clinicians in an outpatient specialty/primary care setting using appropriate methods and effect quality improvement measures. Bias will be avoided by underpinning the theory of planned behavior in the project, a goal-directed attitude, by implementing this objective design process and methodology concept, and analyzing the quantitative data measures that can impact best practices. Furthermore, examining the obstacles faced by nonadherent PAP users associated with ambivalence was considered. This suggests that I must proactively conduct education training that may benefit from the treatment and commitment to device usage compliance. Staff education will help enhance and may establish effective utilization of PAP compliance and acceptance. Hence, it is imperative to establish a standardized strategy to incorporate knowledge awareness amongst staff for extensive quality measurements.

Role of the Project Team

There will be a panel of five experts in attendance for the presentation. The director of a facility, senior administrator of the sleep laboratory, two certified nurse practitioners, and a nurse educator. The director of sleep medicine and a board-certified neurologist physician in specialty practice has 25 years of experience. The senior administrator has 16 years of experience managing the care of sleep disorders. The nurse practitioner specializing in bariatric weight loss education has more than 10 years of experience and is a coordinator of bariatric surgery. The second certified nurse practitioner has 3 years of experience specializing in cardiology practice. The registered nurse has 10 years of experience and works as a nurse educator. The five panels will review the staff education project via email and identify further suggestions on the PowerPoint, pre and post-test prior to disseminating to the intended audience.

Summary

Patients diagnosed with OSA are more likely to develop complex complications affecting their quality of life and lowering their health self-efficacy. The OSA screening of patients should be proactively implemented in specialty/primary care settings. In this quality improvement project, my purpose was to create and validate an educational staff module in an outpatient specialty/primary care clinic specializing in managing OSA and improving knowledge and teaching correctly, therefore, increasing compliance adherence therapy. This project implementation fills a gap in practice to promote an understanding and improvement in clinicians' knowledge, behavior, and procedures regarding screening and evaluation. The practice-focused question aligns with this project: Will a staff

education project on sleep apnea improve staff knowledge on compliance therapy adherence for OSA patients? Evidence-based literature will be used in addressing the practice-focused question. Section 3 will describe how the data information will be collected and the practice-focused questions to be thematically analyzed.

Section 3: Collection and Analysis of Evidence

Introduction

OSA is a significant public burden globally and continues as a principal source associated with morbidity and mortality rate. This inevitable challenge is relevant for goal setting plans to achieve the desired outcomes to incorporate educational facilitation. In this quality improvement project, my purpose was to create an academic staff module training program in an outpatient specialty/primary care clinic specializing in OSA treatment. This project fills a gap in practice to promote clinicians' knowledge, attitudes, and procedures regarding screening and treatment.

Practice-Focused Question(s)

Implementing education training programs for the staff may improve knowledge of OSA impacts. This knowledge improvement along with the tools will outline the efficacy of delivering care to a patient who is at risk for OSA. The two screening tools will assist in identifying patients with OSA and treatment recognition. Utilizing this education to staff members can enhance healthcare development by highlighting critical knowledge gaps and interventions. The practice-focused question designed to address this problem is: Will a staff education project on sleep apnea improve staff knowledge on compliance therapy adherence for OSA patients? The previous question will be evaluated by panel experts using a Likert scale (León-Mantero et al., 2020). On behalf of this project, the outcome expectation will be improved health-related quality of knowledge, attitudes, and practices of clinicians related to the proper screening implementation and teaching management on adherence associated with OSA.

Sources of Evidence

In searching the evidence-based literature for the DNP project, the databases searched included the Cumulative Index of Nursing and Allied Health Literature (CINAHL), the Cochrane Database of Systematic review, the Journal of Clinical Sleep Medicine, American Association of Sleep Medicine (AASM), the Center for Disease Control and Prevention (CDC), and PubMed. I searched for research published in the last 5 years, from 2016 to 2021. The initial keywords included *obstructive sleep apnea*, *sleep disorders*, *OSA screening tools*, and *management*. The Walden University manual on staff education was used as a guideline in compiling evidence sources.

According to Patil et al. (2019), promoting sleep health education is important for the effective management of a patient with OSA. Similarly, the AASM supported the promotion of sleep health which improves lives. This professional society advocated that sleep is not only important for optimal health but also enhances the quality of life. As one of the Healthy People 2020, goals for sleep is the treatment of sleep disorders (Healthy People, 2020). The clinical relevance of OSA and its treatment compliance has an impact by providing clinical knowledge and EBP in sleep to prevent long-term health consequences (Maher & Coke, 2021). With the education training, staff can gain understanding to identify patients who are at risk, and once OSA diagnosis is established, proper treatment should be followed. Therefore, knowledge by staff on risk-associated factors should be implicated in the education training where improvement of care can be influenced.

A study by King et al. (2021) discussed the gap in knowledge-to-action with sleep health issues could be alleviated by educating providers in managing the conditions which are an essential part of long-term successful treatment. Improving sleep education for healthcare providers and staff will have positive flow-on effects for translation of EBP in sleep into clinical practice. The two screening tools, such as ESS and STOP-BANG (see Appendices B and C), based on ease of usage, should be utilized for empirical data. The test of STOP questions consists of four *yes/no* self-answers, and BANG adds clinically observed quantities. Positive answers on two out of the four questions of the STOP portion and three out of the eight questions total suggest a high risk for sleep apnea. The ESS determines dozing propensity and daytime sleepiness severity on eight self-administered forms of questions with a score of 10 or higher indicating an excessive daytime sleepiness threshold.

Participants

The participants for implementing this project comprise five experts panel selected for their expertise. The first participant is a director of the facility, board certified both in sleep medicine and neurology for 25 years. The second participant is a senior administrator of the sleep laboratory with 16 years managing the inpatient and outpatient sleep laboratories. The third participant is certified nurse practitioner who works at a bariatric weight loss clinic with more than 10 years of experience. The fourth participant is a certified adult nurse practitioner with 3 years of experience at a cardiology specialty clinic, and the fifth participant is a registered nurse with more than 10 years of experience

and works as a nurse educator in the hospital. The team members needed to agree with the plan, participate conveniently, and read English.

Procedures

The selection methods to be applied in this segment involve incorporating a pretest and posttest design based on the PowerPoint (PPT) created. Evidence-based outcomes were created to identify whether the education was effective (see Alessandri et al., 2017). The quantitative data can be collected and compared before the prescribed intervention (known as pretest) and after the intervention (known as the posttest) and outlines a systematic review relevant to the essential procedures (see Alessandri et al., 2017). The questions created for the pretest and posttest are listed in Appendix D. The initial step is to give the pretest to the participants, which allows us the educator to collect the baseline knowledge of the clinicians' knowledge and practices concerning the OSA screening process and management for the staff education project. Information related to participants demographics also are included in the pretest. The next step is to disseminate the PPT presentation (see Appendix A). The education module provides clinicians with references to understanding the attitudes and behavioral motive and knowledge awareness perception respectively of OSA management (see Ajzen & Manstead, 2007). Finally, the posttest can be provided to the participants, employing the same questionnaire as listed in Appendix D. The posttest evaluates the clinicians' knowledge towards OSA screening methods after the implementation of the education project.

Protections

The DNP researcher must adhere to the highest ethical standard and apply for approval from the Institutional Review Board (IRB) of Walden University before conducting this project. A number was assigned to each panel expert, allowing participant confidentiality. Basic demographics will be included such as gender, age, job role, and clinical experience. It is critically important to obtain consent and inform those participating that no data information will be reported due to confidentiality requirements and regulatory protocol. The DNP committee and I can only access the protected files securely stored in locked files with passwords. Such data files will be deleted after 5 years.

Analysis and Synthesis

For the continuity of the project, the PowerPoint, pretest, and posttest were emailed to the five identified panel members for evaluation and revision. A five-point Likert Scale will be used to validate the educational information of the project. According to feedback from experts, the education module materials were refined. The pretest is now ready to be provided to staff to obtain basic knowledge on OSA and then, after presenting the PowerPoint, a posttest can be administered to compare the improvement of staff knowledge. The results will then be reviewed for score comparison between the pretest and posttest to measure the outcomes. Practice-focused questions related to staff improvement on knowledge and practices of OSA management and screening tools will be analyzed systematically. Analysis of the overall score will be collected to compare the percentile between pretest and posttest to determine the differences. From this, I will be

able to compare the changes in score for improvement in knowledge and to identify questions that might need revisions.

Summary

A staff education project is a valuable tool that may increase staff awareness in screening and improving compliance therapy. The aim of this project was to promote staff education on OSA and be able to implement the STOP-BANG and ESS screening tools, which take place in an outpatient specialty and primary care clinics that focus on pulmonary, cardiac, and bariatric weight loss clinics treating patients with OSA. The primary sources of evidence-based research were used to address the practice-focused question. The EBP educational module content and delivery will be presented to the staff related to the assessment knowledge and practices of clinicians' perceptions regarding the screening and management of sleep apnea. Data information from pretest and posttest scores will be analyzed to determine if there is a significant change in knowledge improvement, in addition to utilizing the screening tools such as the STOP-BANG and ESS in the project. Section 4 will discuss the findings and implications of the project.

Section 4: Findings and Recommendations

Introduction

OSA is a chronic disorder that is common among both men and women and is recognizable but often unrecognized in healthcare practice. If the disorder is left untreated, OSA can potentially negatively contribute to other comorbidities including hypertension, heart disease stroke, diabetes, and increased risk of motor vehicle crashes. Thus, OSA is not only risky for an individual but also to others. It is critical that staff can assess patients through screening tools to prevent adverse health outcomes and healthcare utilization.

The American Association of Sleep Medicine (AASM) reported that assessment of sleep should be a standard component for sleep promotion in nursing practice (AASM, 2017). This provides evidence-based resources for healthcare providers for the prevention and management of sleep disorders. Screening tools such as STOP-BANG and ESS can identify OSA and are essential to guide sleep assessment severity and aid in referring the patient to a sleep specialist for treatment. This project purpose was to implement an educational project in an outpatient/primary care setting improving compliance of sleep apnea. It is important to enforce an improvement in the knowledge, skills, and practices of staff regarding the screening of sleep apnea to fill a gap in practice setting that could impact patient with sleep disorders.

Findings and Implications

The staff education project is compliant with ethical standards and in accordance with Walden's doctoral education staff manual. Walden's IRB gave permission to this project and determined it complies with requirements regarding scholarly activities. The approval number is entry: Field36532317. The panel members identities were confidentially maintained throughout the project per Walden's university protocol.

The interprofessional collaboration with the five experts panel included: the director of the facility who is board certified in sleep medicine and neurology for the past 25 years, a board certified nurse practitioner (NP) who has specialized in weight loss management since 2008, a board certified NP in cardiology with 3 years of experience, a senior administrator from the sleep lab with 16 years of service in supervision and clinical workflow management, and an experienced nurse educator with 10 years of experience in professional development leader specialist. This panel of experts played an integral role in the knowledge refinement and validation of the PPT presentation. The PPT was rearranged accordingly, based with the topic, and addressed in the heading for each slide such as OSA, background, signs and symptom of OSA, physical assessment examination, comorbidities, rationale for screening, and gold standard diagnosis of OSA. The case studies were placed accordingly so that the flow of teaching was sequential and not confusing to the intended audience. One of the panelists indicated that the pre and post questionnaire should be addressed specifically on each PPT slide. There were two questions that were changed due to not the fact that they were not included in the PPT .

The five panel experts concluded that the PPT presentation was appropriately done based on the information provided and used the five-point Likert scale.

The participants expressed positive feedback, highlighting that sleep apnea knowledge is important and a great learning opportunity for staff in clinical setting. This doctoral education project facilitates social change in terms of knowledge empowerment in sleep health. Recognizing the specific multitudes benefits of sleep education into practices creates and connects to the standardization of potential guidelines modalities. Staff education provides an insightful idea on how it is important to screen patients during the clinical visit. As Table 1 shows, the recommendations from the panel's evaluation were noted by using a Likert scale (see León-Mantero et al., 2020). The Likert Scale using a scale of 1-5 with 5 as being *strongly agree*, 4 *agree*, 3 *neutral*, 2 *disagree*, and 1 *strongly disagree* (Appendix F). Also, the feedback included the change to provide comments. Panel Member 1 stated that I need to be specific on my intended audience, while also recommending that the EBP project should be done prevalently in primary care clinics. Panel Member 2 commented that the main topic in my PPT slide should be clearly addressed and add more images. Similarly, Panel Member 3 indicated that each slide contains effective topics, despite only one per slide. Panel Member 4 suggested that the case study question should be followed by each answer. Panel Member 5 noted that the background of the study should be after the learning objectives.

Table 1*PowerPoint Presentations Validation*

Panel Experts	Likert Scale	Feedback
1	<i>Strongly agree (5)</i>	“Know your intended audience”, “Expand to other clinical site”
2	<i>Strongly agree (5)</i>	“Address each main topic in the PPT slide”, “Add more images”
3	<i>Strongly agree (5)</i>	“One topic each slide”, “Great topic”
4	<i>Strongly agree (5)</i>	“Case studies in sequence like Case 1 study then followed by answer,”
5	<i>Strongly agree (5)</i>	“Background as initial”, “Pre/post question changed in # 6 and 7, specifically intended for medical assistant not nurses”

Recommendations

According to the five panel experts, it is important to integrate relevant topic in the staff education project to effectively captivate the audience participation. For instance, outlining the main topic with each slide would create extra attention, critical to learning points. Feedback received on the education staff project assisted in finalizing the PPT presentation to improve the education. By providing the PPT (Appendix A), the intended audience are equipped with the knowledge and skills needed to address sleep disorders in an outpatient/primary care setting.

The establishment of the PPT presentation contributes to an overall picture of the state of sleep education for staff. Notably, the PPT presents a guideline to the staff, which is physically available, acting as an advantage to increase engagement for the visual learners as compared to an online teaching session. I recommend that the clinical site implement the screening tools (Appendix B and C) to improve safety practices by healthcare clinicians, emphasizing the significance of patient involvement.

Contribution of the Doctoral Project Team

To broaden staff education and professional development, the project team was an initiative led by me, a DNP student, and included guidance from a panel of experts for their known clinical expertise. These combined efforts enhanced organizational goals, promoted the sleep education agenda, and translated EBP into clinical practice. Improving the quality of life includes appropriately screening patient with sleep disorders. The expert panel provided guidelines for refining the PPT staff education training, which was effectively integrated into the project. The collaborative efforts build up a strong foundation for positive effects for sleep health education and training activities. Furthermore, extending this EBP project is a potential plan in an inpatient setting for a continuous process.

Strengths and Limitations of the Project

The project has several strengths including the use of current evidence-based screening tools, a validated and effective means of educating staff in improving compliance adherence. Staff education encourages the clinical staff to increase knowledge and skills, improving the clinical standard of sleep care in the setting. As

described in this paper, the theory of planned behavior structured implication for practice, leading to staff with an enhanced ability to understand the importance of sleep health education. To add on, the project was cost-effective, as not too many materials were printed for evaluation.

When implementing this project, a perceived barrier to staff education was the inadequate time management within the five panels. Offering adaptive strategies that are efficient over time could be compromising a submission date of PPT validity. The chaotic schedule of outpatient/primary care clinics challenges the limitations of the project design. Due to time constraints, strategic planning for future presentations with larger sample sizes are warranted and should provide ample time for participant recruitment and completion of data analysis.

Section 5: Dissemination Plan

In disseminating the evidence-based project in an outpatient/primary care setting, I collaborated with five experts on the panel for the PPT refinement prior to future disbursement to the intended audience. Despite the individuals' inconsistent availability schedule, having plans for their convenient time was imperative to disseminate the project which required patience and determination to be successful. Meeting the expectations was not always achievable, but in this project, one of the social intentions was an on-time response, leading to the main intention: increasing staff education for quality patient care in within outpatient/primary care settings. The PPT presentation with case scenarios and pre and posttest questionnaires made the project complete. With this DNP project, I am now able to disseminate a well-rounded project that includes: the background, assessment, and diagnosis of OSA that enhances the staff's understanding of the EBP information on OSA.

Analysis of Self

The development of staff education and training on assessing for OSA needs to be incorporated into the current practice. This includes supervised clinical instructions when introduced to staff for knowledge awareness. The core of this project was the leadership role, a great source for enriching nursing education as it can lead others to potentially do the same work and provided me with an insight and an opportunity to demonstrate my knowledge and skills of the importance of sleep apnea screening in patients. As a doctoral-prepared scholar nurse, I am positioned to lead the practice change that dramatically improves efficacy in sleep health not only currently, but also in the

upcoming decade. The EBP project markedly aligns the DNP essentials II and VI as conveyed to clinical safety practice and health care outcomes. The DNP project was a proof of success that I, as a doctoral student, can make a valuable contribution and advocate for implementation in practice settings. Additionally, receiving positive feedback from one of the magnet leaders and the professional leadership development motivated me to pursue the project. In contrast, one of the challenges I encountered was the doubt to present to the director and office manager of the clinic. At first, there was a hesitancy from both the director and manager who were under the impression that the project could affect the patient's data privacy and risks to human subjects, but after educating them about the objectives and ethical standards of the Walden doctoral project, the director asked me to proceed and expand to other target locations.

Summary

The establishment of this DNP evidence-based project is significant to the staff to better comprehend in assessing sleep health for patients with sleep apnea, leading to practice improvement. This positively impacts staff knowledge and skills and the ability to provide care linked within staff education and training developed. The project entailed the introduction, problem statement, nature of the doctoral project, and significance of the study. As detailed in the literature review, staff knowledge education is imperative to improve patient outcomes, making practice more efficient and contribute to optimizing sleep healthcare.

References

- Aardoom, J. J., Loheide-Niesmann, L., Ossebaard, H. C., & Riper, H. (2020). Effectiveness of electronic health interventions in improving treatment adherence for adults with obstructive sleep apnea. Meta-analysis review. *Journal of Medical Internet Research*, 22(2). <https://doi.org/10.2196/16972>
- Ajzen, I., & Manstead, A. S. R. (2007). Changing health-related behaviours: An approach based on the theory of planned behaviour. In M. Hewstone, H. A. W. Schut, J. B. F. De Wit, K. Van Den Bos, & M. S. Stroebe (Eds.), *The scope of Social Psychology: Theory and Applications* (p. 43–63). Psychology Press.
- Alessandri, G., Zuffiano, A., & Perinelli, E. (2017). Evaluating interventions programs with a pretest-post-test design: A structural equation modeling approach. *Frontiers in Psychology*, 8, 223. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5332425/>
- American Academy of Sleep Medicine. (2017). *Economic Burden of Undiagnosed Sleep Apnea in U.S. is nearly \$150B Per Year*. <https://www.aasmnet.org/articles.aspx?id=6426>
- Askland, K., Wright, L., Wozniak, D. R., Emmanuel, T., Caston, J., & Smith, I. (2020). Educational, supportive and behavioural interventions to improve usage of continuous positive airway pressure machines in adults with obstructive sleep apnoea. *The Cochrane Database of Systematic Reviews*, 4(4), CD007736. <https://doi.org/10.1002/14651858.CD007736.pub3>
- Benjafield, A. V., Ayas, N. T., Eastwood, P. R., Heinzer, R., Ip, M., Morrell, M. J.,

Nunez, C. M., Patel, S. R., Penzel, T., Pépin, J. L., Peppard, P. E., Sinha, S., Tufik, S., Valentine, K., & Malhotra, A. (2019). Estimation of the global prevalence and burden of obstructive sleep apnoea: A literature-based analysis. *The Lancet. Respiratory Medicine*, 7(8), 687–698.

[https://doi.org/10.1016/S2213-2600\(19\)30198-5](https://doi.org/10.1016/S2213-2600(19)30198-5)

Centers of Disease Control and Prevention (n.d.a). *Sleep and health*.

<https://www.cdc.gov/healthyschools/sleep.htm>

Centers for Disease Control and Prevention. (n.d.b). *WISQUARS injury data: Web-based Injury Statistics Query and Reporting System*. Retrieved on October 28, 2020

from <http://www.cdc.gov/injury/wisqars>

Chen, C., Wang, J., Pang, L., Wang, Y., Ma, G., & Liao, W. (2020). Telemonitor care helps CPAP compliance in patients with obstructive sleep apnea: A systemic review and meta-analysis of randomized controlled trials. *Therapeutic Advances in Chronic Disease*, 11, 2040622320901625.

<https://doi.org/10.1177/2040622320901625>

Chiu, H. Y., Chen, P. Y., Chuang, L. P., Chen, N. H., Tu, Y. K., Hsieh, Y. J., Wang, Y. C., & Guilleminault, C. (2017). Diagnostic accuracy of the Berlin questionnaire, STOP-BANG, STOP, and Epworth sleepiness scale in detecting obstructive sleep apnea: A bivariate meta-analysis. *Sleep Medicine Reviews*, 36, 57–70.

<https://doi.org/10.1016/j.smrv.2016.10.004>

Chung, F., Abdullah, H. R., & Liao, P. (2016). STOP-Bang Questionnaire: A practical

approach to screen for obstructive sleep apnea. *Chest*, *149*(3), 631–638.

<https://doi.org/10.1378/chest.15-0903>

Gottlieb, D. J., & Punjabi, N. M. (2020). Diagnosis and management of obstructive sleep apnea. A review. *Journal of American Medical Association*, *323*(14), 1389-1400.

Huang, Q. R., Qin, Z., Zhang, S., & Chow, C. M. (2008). Clinical patterns of obstructive sleep apnea and its comorbid conditions: A data mining approach. *Journal of Sleep Medicine: JCSM: Official publication of the American Academy of Sleep Medicine*, *4*(6), 543-550.

Johns M. W. (1991). A new method for measuring daytime sleepiness: the Epworth sleepiness scale. *Sleep*, *14*(6), 540–545. <https://doi.org/10.1093/sleep/14.6.540>

Jonas, D. E., Amick, H. R., Feltner, C., Weber, R. P., Arvanitis, M., Stine, A., Lux, L., Middleton, J. C., Voisin, C., & Harris, R. P. (2017). *Screening for Obstructive Sleep Apnea in Adults: An Evidence Review for the U.S. Preventive Services Task Force*. Agency for Healthcare Research and Quality (US).

King, S., Damarell, R., Schuwirth, L., Vakulin, A., Chai-Coetzer, C. L., & McEvoy, R. D. (2021). Knowledge to action: a scoping review of approaches to educate primary care providers in the identification and management of routine sleep disorders. *Journal of Clinical Sleep Medicine: JCSM : Official publication of the American Academy of Sleep Medicine*, *17*(11). <https://doi.org/10.5664/jcsm.9374>

León-Mantero, C., Casas-Rosal, J. C., Pedrosa-Jesús, C., & Maz-Machado, A. (2020). Measuring attitude towards mathematics using Likert scale surveys: The weighted average. *PloS one*, *15*(10), e0239626.

<https://doi.org/10.1371/journal.pone.0239626>

Maher, L., & Coke, L. A. (2021). Diagnosis and treatment of obstructive sleep apnea and its impact on cardiovascular disease. *Journal of the American Association of Nurse Practitioners*, 34(2), 389-396.

<https://doi.org/10.1097/JXX.0000000000000632>

Patil, S. P., Ayappa, I. A., Caples, S. M., Kimoff, R. J., Patel, S. R., & Harrod, C. G.

(2019). Treatment of adult obstructive sleep apnea with positive airway pressure: An American Academy of Sleep Medicine systematic review, meta-analysis, and GRADE assessment. *Journal of Clinical Sleep Medicine*, 15(2), 301–334.

<https://doi.org/10.5664/jcsm.7638>

Peppard, P. E., Young, T., Barnet, J. H., Palta, M., Hagen, E. W., & Hla, K. M. (2013).

Increased prevalence of sleep-disordered breathing in adults. *American Journal of Epidemiology*, 177(9), 1006-1014. <https://doi.org/10.1093/ajae/kws342>

U.S. Department of Health and Human Services. (n.d.c). Healthy People 2020. (2010)

https://www.healthypeople.gov/sites/default/files/HP2020_brochure_with_LHI_508_FNL.pdf

Veasey, S. C., & Rosen, I. M. (2019). Obstructive sleep apnea in adults. *The New England Journal of Medicine*, 380(15), 1442–1449.

<https://doi.org/10.1056/NEJMcp1816152>

Zarhin, D., & Oksenberg, A. (2017). Ambivalent adherence and non-adherence to

Continuous positive airway pressure: A qualitative study. *Journal of Clinical Sleep Medicine*, 13 (12), 1375-1384.

Appendix A: EBP Staff Education Module

Adult Obstructive Sleep Apnea(OSA): Background, Assessment, and Diagnosis



01

LEARNING OBJECTIVES FOR STAFF

Know the Dangers

Describe the OSA clinical manifestations and consequences

- Background
- Pathophysiology
- Epidemiology (early estimates)
- Clinical Consequences/Comorbidities

02

Acknowledgment

Recognize the risk factors and physical assessment that increase OSA

- Symptoms
- Physical Examination

03

Diagnosis

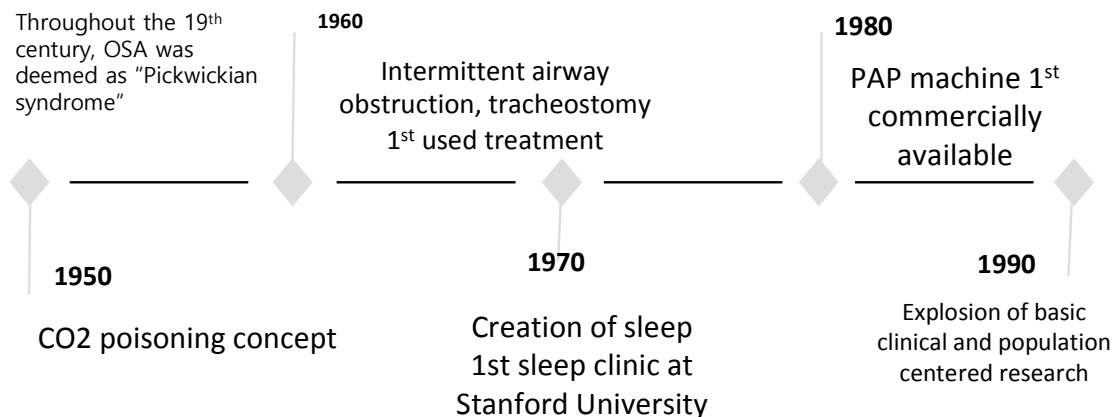
Discuss the screening tools and options for diagnosing OSA

- Rationale
- Screening and Interpretation:
 - STOP-BANG
 - Polysomnogram
 - Home Test

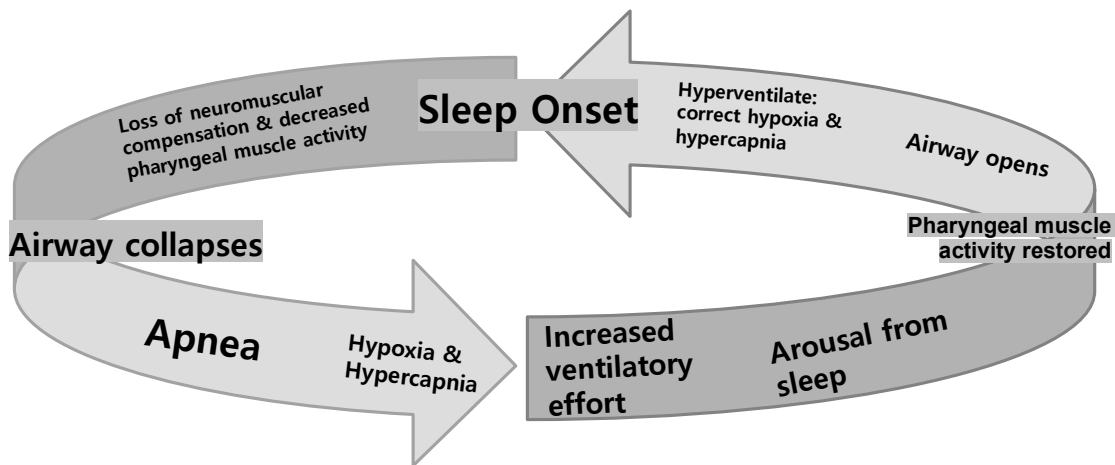
LEARNING OBJECTIVES FOR STAFF

Background

- Obstructive sleep apnea (OSA) is an airway collapse and repeated reduction or cessation of airflow during sleep



Pathophysiology of OSA



Epidemiology (early estimates)

2-4% prevalence among adults

Recent data suggests 30 million people have OSA, but only about 4-5 million are being treated. The undiagnosed costs \$150B.

4% Of Hospital records reviewed had either a primary or secondary diagnosis of OSA

6% Of Women have AHI > 15/h

13% Of Men have AHI > 15/h

AASM 2017, Peppard 2013, Phillips et al 2015

Essential Features

Episodes

Repetitive episodes of partial (hypopnea) or complete (apnea) upper airway obstruction during sleep

Snoring

Loud snoring, gasps or witnessed apneas

Daytime Symptoms

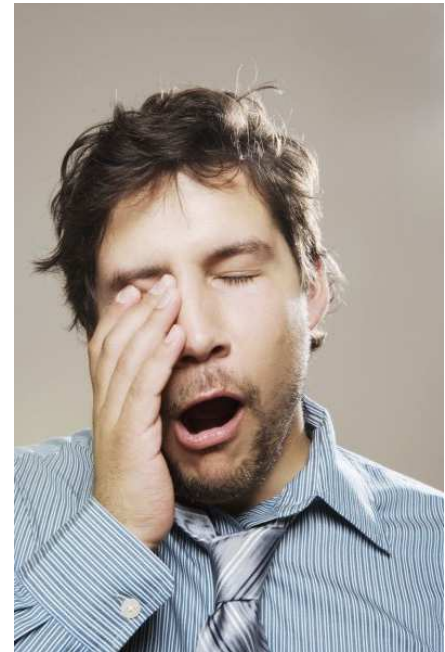
Excessive daytime sleepiness, unrefreshed sleep, morning grogginess, dry mouth



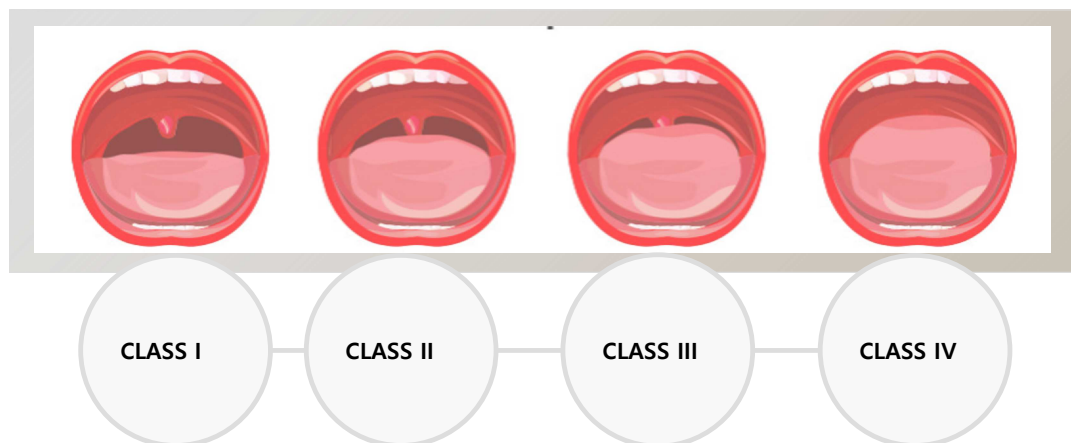
Clinical Assessment

Common Symptoms:

- Excessive day time sleepiness
- Early morning tiredness
- Loud snoring
- Nocturia
- Sleep fragmentation
- Decreased cognitive function



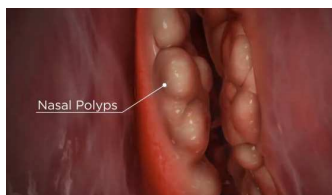
Physical Examination: **Mallampati**



- Oropharyngeal crowding/small posterior pharynx → Mallampati score & Tonsillar enlargement
- Tonsillar pillar impingement → Enlarged, long or swollen uvula & Macroglossia

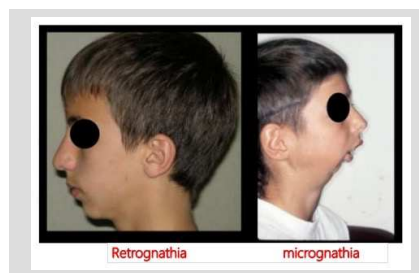
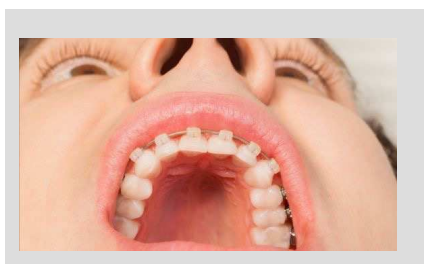
Physical Examination

- Neck collar size
 - 16+ inches in females, 17+ inches in males
- Nasal Passage abnormalities → deviated septum, enlarged turbinates & polyps
- Signs of right heart failure/strain – lower extremity edema, JVD, loud P2

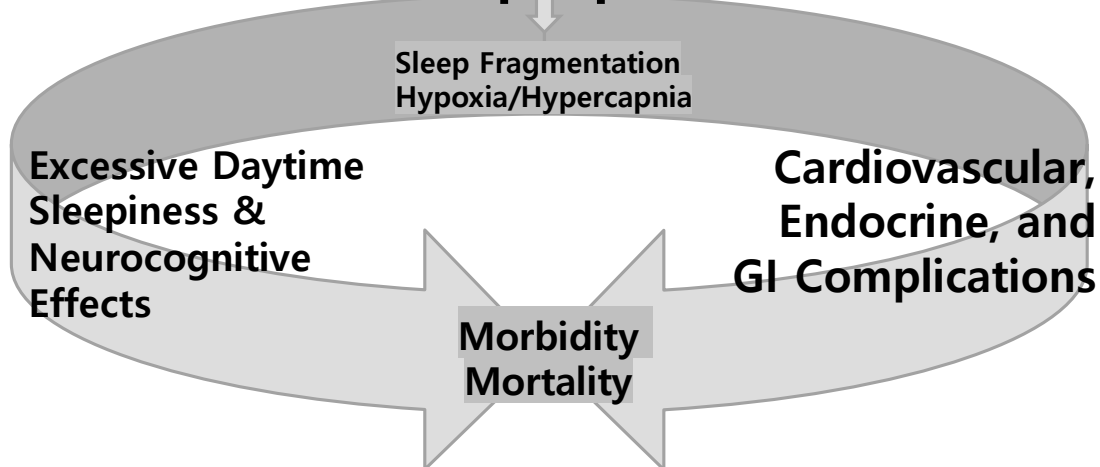


Physical Examination: **Craniofacial abnormalities**

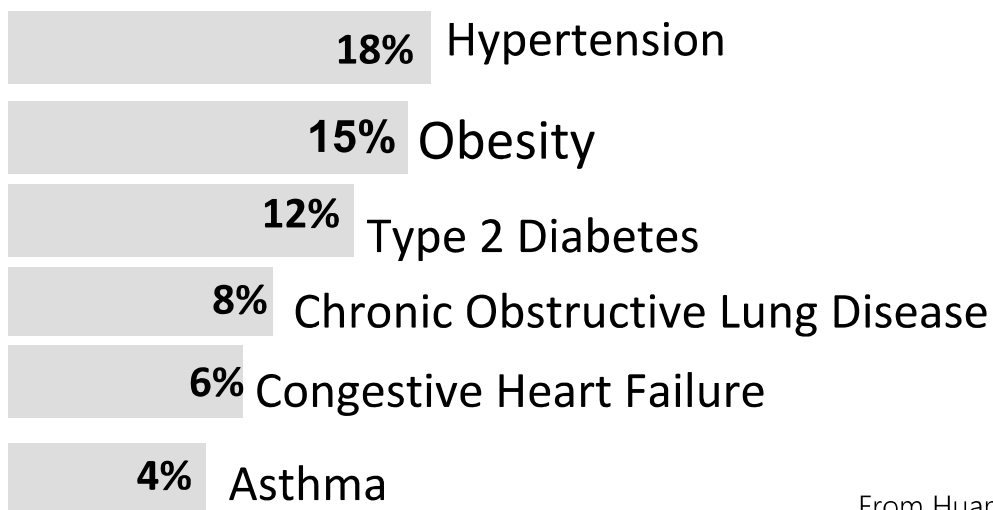
- Retrognathia (caved-in jaw)
- Micrognathia (small jaw)
- Arched palate (tall roof of mouth)



Clinical Consequences of **Sleep Apnea**

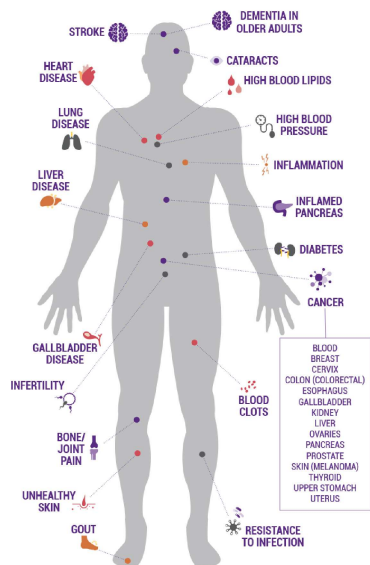


Comorbidities Associated with OSA



From Huang et al 2008

MEDICAL COMPLICATIONS OF OBESITY



LSU's Pennington Biomedical Research Center, 2019

Peppard et al 2013

Obesity

- Obesity in the U.S contributes to OSA prevalence
- Weight gain worsens OSA, while decreased weight reduces OSA severity
- Obese individuals with larger neck circumference are 1.5x more likely to have AHI > 15

Cardiac-Associated Features

Prevalence	Gender	Age	BMI 30-39.9	BMI ≥40
17%	Male	50-70	29%	56%
10%	Male	30-49	17%	55%
9%	Female	50-70	14%	33%
3%	Female	30-49	3%	18%

Peppard et al 2013

Rationale for OSA Screening



- Improve knowledge of the staff on sleep apnea
- Teach patients on correct adherence to managing OSA
- Enhance clinical practice
- Detect early identification of OSA & prevent adverse negative effects

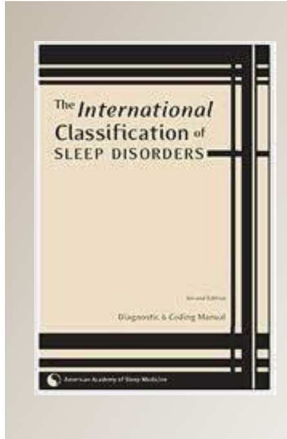
Epworth Sleepiness Scale (ESS)

- Developed by Murray Johns at the Epworth Hospital in Melbourne.
- The questionnaire consists of 8 questions that measures daytime sleepiness and address daily activities.
- A total score of 10 or more suggests pathologic sleepiness, requiring further evaluation and treatment.
- Self-reported, practical, and useful tool to predict OSA.

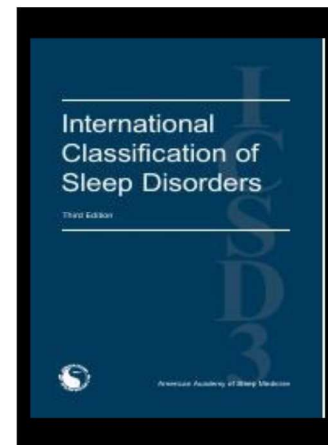
STOP-BANG QUESTIONNAIRE

- Developed by Dr. Frances Chung from University of Toronto.
- Consists of 8 questions addressing **S**noring, **t**iredness or fatigue, **o**bservation of cessation of breathing, blood **p**ressure, obesity or being overweight, measured by **B**MI, **a**ge, **n**eck circumference, and **g**ender.
- Scores are based on affirmative answers totaling a single number.
 - 0 – 2 → Low risk , 3 – 4 → Moderate risk, 5 – 8 → High risk
- Concise, simple, and easy to use screening tool for Obstructive sleep apnea (OSA), high sensitivity level.

OSA Diagnostic Criteria



Detailed diagnostic criteria can be found in the International Classification of Sleep Disorders, 3rd edition (ICSD-3)



Polysomnogram (PSG)

- "GOLD STANDARD"

- Recommended if comorbid conditions or suspicion of other sleep disorders

- More data obtained

- More expensive



OSA Testing Sleep Study

Home Sleep Apnea Test

- Recommended if high pretest probability of OSA in a symptomatic patient

- Less data obtained

- Cheaper



OSA Diagnostic Criteria : Polysomnogram or at-home OSA testing

- 5 or more obstructive events (greater than 10 seconds) in the following:
 - Per hour of sleep(PSG) or recording time (HSAT), Respiratory effort related arousals, and obstructive or mixed apneas or hypopneas

AHI

0 - 4.9

5 – 14.9

15 – 29.9

>= 30

OSA Severity

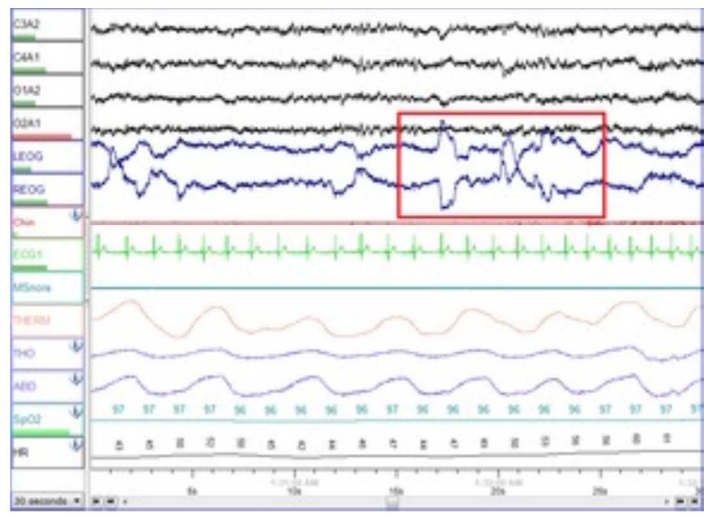
Normal

Mild

Moderate

Severe

Obstructive Apnea



- During an obstructive apnea, the airflow signal is reduced by more than at least 90% for 10 seconds or longer

Hypopnea



Nasal pressure (NPPE), naso-oral thermistor (N/O), thoracic effort (THOR), abdominal effort (ABD), oxygen saturation (SpO2), plethysmography (Pleth)

- During an obstructive hypopnea, the airflow signal is reduced by $\geq 30\%$ PLUS $\geq 3\%$ drop in oxygen saturation or an arousal. Rule 1A

- Alternatively, a 30% reduction in amplitude and $\geq 4\%$ drop in oxygen saturation can be used. Rule 1B

Case Study 1

A 40-year-old woman with hypertension, dyslipidemia, and obesity (BMI 34 kg/m²) has been struggling with progressive dyspnea. She also endorses snoring and witnessed apneas during sleep. She was diagnosed 8 years ago with OSA (AHI 4%, 25 events/hour, oxygen saturation [O₂] nadir 80%) but was noncompliant with CPAP therapy. A transthoracic echocardiogram (TTE) shows symmetric left ventricular hypertrophy (LVH) and pulmonary hypertension of moderate severity. *Which of the following informs her about her relationship between OSA and pulmonary hypertension?*

- A. Severe pulmonary hypertension is a common consequence of untreated OSA
- B. Untreated OSA causes mild pulmonary hypertension only when COPD, ILD, and/or daytime hypoxemia are also present
- C. Hypocapnia is the primary mechanism behind the development of pulmonary hypertension due to OSA
- D. Pulmonary arterial pressures can be lowered by CPAP treatment in OSA

Case Study 1 Answer: D

Effective treatment for OSA can eliminate the impact of nocturnal pulmonary arterial hypertension (PAH). Studies have demonstrated improvement in PA pressures after tracheostomy and with compliant use of effective CPAP. The prevalence of pulmonary hypertension in OSA has been estimated between 15% and 70%. Although mild PAH can be seen in OSA without the coexistence of underlying COPD and/or daytime hypoxemia, coexistent COPD/ILD and daytime hypoxemia is far more common when severe PAH is present. Several mechanisms have been identified that contribute to the development of nocturnal PAH: changes in cardiac output, lung volumes, left ventricular diastolic function, pulmonary circulation compliance and factors resulting in pulmonary arteriole vasoconstriction such as alveolar hypoxemia and hypercapnia.

Case Study 2

A 64-year-old woman presents for an evaluation of chronic insomnia. Her bedtime schedule is 8:30 pm each night, then to be on phone for 15-20 minutes daily, and lastly, watches television in bed but does not fall asleep until 11:00 PM. She reports 0-2 awakenings each night without any difficulty resuming sleep. She wakes up at 5:30 AM spontaneously and does not feel rested upon awakening from sleep. She denies excessive daytime sleepiness. Self-medication with over-the-counter sleeping pills were tried but were not effective. She denies symptoms of depression.

Which of the following would be most helpful in this case?

- A. Bright light exposure in the morning
- B. Recommend over the counter melatonin 5 mg before bed, instead of prescription sleep aid
- C. Education about sleep hygiene
- D. Prescribe Zaleplon 5 mg at bedtime as needed
- E. Watch TV for no more than 30 minutes before bed

Case Study 2 Answer: C

Up to 30% of patients evaluated for insomnia have inadequate sleep hygiene. Napping during day, spending excessive time in bed awake and activities such as watching T.V, can contribute to and perpetuate insomnia. Educating the patient about improving sleep hygiene is an important aspect of the behavioral treatment for insomnia. If the poor sleep hygiene is not addressed, the potential effectiveness of behavioral treatments in the future can be reduced.

Good sleep hygiene practices include:

- Limited caffeine consumption until noon
- No exercise within 2 hours of bedtime
- Use of the bed only for sleep and sex (avoid excessive time in bed)
- Maintaining regular waking times
- Quiet and cool environment in the bedroom
- Avoidance of stimulating activity near bedtime
- Avoidance of napping if sleep maintenance is a problem
- Face of alarm clock should not be visible from bed

Choice A is incorrect since patient does not have delayed sleep phase. Both choices B and D are incorrect because pharmacological treatment is not the right option. Choice E is incorrect since watching TV in bed can perpetuate the insomnia.

References

- American Academy of Sleep Medicine. (2017). *Economic Burden of Undiagnosed Sleep Apnea in U.S. is nearly \$150B Per Year*. <https://www.aasmnet.org/article.aspx?>
- Centers of Disease Control and Prevention (2019). US Department of Health and Human Services. Sleep and Health. <https://www.cdc.gov/healthyschools/sleep.htm>
- Chen, C., Wang, J., Pang, L., Wang, Y., Ma, G., & Liao, W. (2020). Telemonitor care helps CPAP compliance in patients with obstructive sleep apnea: a systemic review and meta-analysis of randomized controlled trials. *Therapeutic Advances in Chronic Disease*, 11, 2040622320901625. <https://doi.org/10.1177/2040622320901625>
- Chung, F., Abdullah, H. R., & Liao, P. (2016). STOP-Bang Questionnaire: A practical approach to screen for obstructive sleep apnea. *Chest*, 149(3), 631–638. <https://doi.org/10.1378/chest.15-0903>
- Gottlieb, D. J., & Punjabi, N. M. (2020). Diagnosis and management of obstructive sleep apnea. A review. *Journal of American Medical Association*, 323(14),1389-1400.
- Huang, Q. R., Qin, Z., Zhang, S., & Chow, C. M. (2008). Clinical patterns of obstructive sleep apnea and its comorbid conditions: a data mining approach. *Journal of Clinical Sleep Medicine : JCSM : official publication of the American Academy of Sleep Medicine*, 4(6), 543–550.
- Peppard, P. E., Young, T., Barnett, J. H., Palta, M., Hagen, E. W., & Hla, K. M. (2013). Increased prevalence of sleep-disordered breathing in adults. *American Journal of Epidemiology*, 177(9), 1006–1014. <https://doi.org/10.1093/aje/kws342>
- Phillips, B., Gozal, D., & Malhotra, A. (2015). What Is the future of sleep medicine in the United States?. *American Journal of Respiratory and Critical Care Medicine*, 192(8), 915–917. <https://doi.org/10.1164/rccm.201508-1544ED>

Appendix B: Epworth Sleepiness Scale (ESS)

How likely are you to doze off or fall asleep in the following situations, in contrast to just feeling tired?

This refers to your usual way of life in recent times.

Even if you haven't done some of these activities recently, try to work out how they would have affected you.

Use the following scale to choose the most appropriate number for each situation

0	would never doze	2	moderate chance of dozing
1	slight chance of dozing	3	high chance of dozing

It is important that you put a number (0-3) in each of the brackets

SITUATION	CHANCE of DOZING
Sitting and reading	()
Watching TV	()
Sitting inactive in a public place (eg theatre or a meeting)	()
As a passenger in a car for an hour without a break	()
Lying down to rest in the afternoon when circumstances permit	()
Sitting and talking to someone	()
Sitting quietly after lunch without alcohol	()
In a car, while stopped for a few minutes in traffic	()
	<u> </u> /24 TOTAL

Results:

Normal (0-10) EDS(>10) High level(16+)

Appendix C: Stop-Bang Questionnaire

<p>Snore Tired Observe for apnea Pressure high blood Body mass index >35kg/m² Age >50 years old Neck size Gender</p>	Yes	No	Snoring?
	<input type="radio"/>	<input type="radio"/>	Do you snore loudly (loud enough to be heard through closed doors or your bed partner elbows you for snoring at night)?
	Yes	No	Tired?
	<input type="radio"/>	<input type="radio"/>	Do you often feel tired, fatigued, or sleepy during the daytime (such as falling asleep during driving)?
	Yes	No	Observed?
	<input type="radio"/>	<input type="radio"/>	Has anyone observed you stop breathing or choking/gasping during your sleep?
	Yes	No	Pressure?
	<input type="radio"/>	<input type="radio"/>	Do you have or are being treated for high blood pressure?
	Yes	No	Body mass index more than 35 kg/m²?
	<input type="radio"/>	<input type="radio"/>	
Yes	No	Age older than 50 years?	
<input type="radio"/>	<input type="radio"/>	Neck size large? (measured around Adam's apple)	
Yes	No	For male, is your shirt collar 17 inches or larger?	
<input type="radio"/>	<input type="radio"/>	For female, is your shirt collar 16 inches or larger?	
Yes	No	Sex = male?	
<input type="radio"/>	<input type="radio"/>		

Appendix D: Pretest and Posttest Questions

1. Signs and symptoms of OSA includes which of the following?
 - a. Loud snoring, gasps or witnessed apnea
 - b. Difficulty falling asleep
 - c. Headache in the evening
 - d. Nighttime sleepiness

2. What is the gold standard for the diagnosis of OSA?
 - a. Nocturnal Polysomnography (nPSG)
 - b. STOP-Bang Questionnaire
 - c. Home sleep apnea testing (HSAT)
 - d. All of the above

3. Which of the following physical examination increases the risk of OSA in adults?
 - a. Neck size of 15 inches in man
 - b. BMI of 24 in women
 - c. Retrognathia, Micrognathia, and arched palate
 - d. Class 1 Mallampati Score

4. The spouse of a patient tells the nurse that during sleep, the patient's respiration ceases for 10 seconds. This happens repeatedly during the night. As a result, the patient feels sleepy throughout the day. What is the condition known as?
 - a. Insomnia
 - b. Apnea
 - c. Hypopnea
 - d. Hypercapnia

5. A nurse assesses a client who reports waking up feeling tired, even after 8 hours of good sleep. Which action should the nurse take first?
 - a. Contact the provider for a prescription for sleep medication.
 - b. Tell the client not to drink beverages with caffeine before bed.
 - c. Ask the client if he or she has ever been evaluated for sleep apnea.
 - d. Educate the client to sleep upright in a reclining chair.

6. Which of the following are comorbidities associated with OSA?
 - a. Chronic obstructive disease
 - b. Diabetes Mellitus
 - c. Hypertension
 - d. All of the above

7. When assessing a client for obstructive sleep apnea (OSA), the most common screening tools are:
 - a. STOP-BANG

- b. ESS
 - c. None of the above
 - d. Both a and b
8. The following statements are TRUE of adult obstructive sleep apnea EXCEPT:
- a. Severity of untreated OSA tends to progress over time
 - b. Severity of OSA correlates well with symptomatic sleepiness
 - c. Severity of Oxygen desaturation correlates poorly with symptomatic sleepiness
 - d. Severity of OSA correlates with neck circumference independent of BMI
9. Apnea hypopnea index (AHI) index is the total number of events to indicate the severity of sleep apnea. What is the normal AHI index?
- a. 0-4.9 per hour of sleep
 - b. 5-14.9 per hour of sleep
 - c. 15-29.9 per hour of sleep
 - d. >30 per hour of sleep
10. A patient with severe obstructive sleep apnea (AHI=52) say he cannot tolerate CPAP usage. He feels smothered and anxious when wearing it. He has used CPAP 4 times in the last 30 days for an average of 18 minutes per day. What is the best course of action?
- a. Stop CPAP and refer for a dental appliance
 - b. Stop CPAP and refer for hypoglossal nerve stimulation
 - c. Prescribe Zolpidem to help sleep through it
 - d. Discuss graded exposure use CPAP everyday while awake and slowly increase usage over time

Appendix E: Answers to Pretest and Posttest

1. a. loud snoring, gasps or witnessed apnea
2. a. Nocturnal Polysomnogram (nPSG)
3. c. Retrognathia, micrognathia, and arched palate
4. b. Apnea
5. c. Ask the client if she or he has ever been evaluated for sleep apnea
6. d. all of the above
7. d. both and b
8. c. Severity of Oxygen desaturated correlates poorly with symptomatic sleepiness
9. a. 0-4.9 per hour of sleep
10. d. Discuss graded exposure, use CPAP everyday while awake and slowly increase usage over time

Appendix F: Likert Scale for Panel Members

Directions: Circle the most appropriate number for each statement	Comments	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
Learning Objectives are clear		1	2	3	4	5
PowerPoint contains reliable information about Obstructive Sleep Apnea		1	2	3	4	5
PowerPoint has potential to precisely improve staff knowledge		1	2	3	4	5
Pictures, charts, diagrams, and details are relevant.		1	2	3	4	5
Screening tools mentioned are applicable to Obstructive Sleep Apnea.		1	2	3	4	5
I learnt from the PowerPoint Presentation, and I am satisfied.		1	2	3	4	5