Fall 2018

Utilizing the Stop-Bang Questionnaire as a Preoperative Assessment Tool in Patients Undergoing Endoscopic Procedures

Emily Randle

UTILIZING THE STOP-BANG QUESTIONNAIRE AS A PREOPERATIVE ASSESSMENT TOOL IN PATIENTS UNDERGOING ENDOSCOPIC PROCEDURES

by

Emily Randle

A Doctoral Capstone Project
Submitted to the Graduate School,
the College of Nursing and Health Professions
and the School of Leadership and Advanced Practice Nursing
at The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Nursing Practice

Approved by:

Dr. Marjorie Geisz-Everson, Committee Chair
Dr. Michong Rayborn
Dr. Mary Jane Collins

Dr. Marjorie Geisz-Everson Committee Chair	Dr. Lachel Story Director of School	Dr. Karen S. Coats Dean of the Graduate School

December 2018

Published by the Graduate School

ABSTRACT

In the world of anesthesia, obstructive sleep apnea (OSA) can cause a conglomeration of post-operative complications. One of the best ways to avoid these complications is to alter one's anesthetic to accommodate the needs of a patient with OSA. The current issue with altering one's anesthetic is that a majority of patients with OSA still remain undiagnosed. My project that will showcase just how many patients have undiagnosed OSA.

The goal of this project was to recognize how many patients were at moderate to high risk for OSA. I did this by providing an in-service on OSA and the STOP-Bang questionnaire to Certified Registered Nurse Anesthetists at a hospital in east-central Mississippi. Certified Registered Nurse Anesthetists (CRNAs) were to incorporate the questionnaire into their preoperative assessments for patients receiving anesthesia in the gastrointestinal laboratory (GI) for one month. Through the data collection, it was determined that approximately 28% of patients (n=223) were considered at moderate to high risk for OSA.

After the completion of the project, it was recommended that a referral program should be implemented for patients that scored a 5 or higher on the STOP-Bang questionnaire. Through the use of the STOP-Bang questionnaire, CRNAs are able to better adapt their choice of anesthetic for patients considered to be moderate to high risk for OSA. This awareness leads to improved patient safety and better patient outcomes.

ACKNOWLEDGMENTS

I would like to thank Drs. Marjorie Geisz-Everson, Michong Rayborn, and Mary Jane Collins. Without their help, I could not have completed this project. To my committee members, I would like to thank you for all the time and effort you put into helping me complete this project. I would also like to thank the hospital and CRNAs who participated in my project. Without their cooperation, it would not have been possible.

DEDICATION

First and foremost, I would like to say thank you to God for blessing me with the most wonderful opportunities and support system. Second, I would like to thank my husband for all of the love and support you have given me over the past three years. I appreciate your understanding more than you know and I love you. I would like to thank my parents. Without them, I would most certainly not be where I am today. Mother, thank you for pushing me to be the best version of myself. Daddy thank you for teaching me that timing is everything in life. You both taught me what it means to live an honest and full life. I would also like to say thank you to the rest of my support system. It is only through God and my family that I was able to successfully complete this Doctoral program with such grace.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

AHI	Apnea-Hypopnea Index
CRNA	Certified Registered Nurse Anesthetists
DNP	Doctor of Nursing Practice
MAC	Monitored Anesthesia Care
OSA	Obstructive Sleep Apnea

CHAPTER I – INTRODUCTION

Background and Significance

Obstructive sleep apnea (OSA) is a syndrome defined by the American Society of Anesthesiologists (2014) as, “periodic, partial, or complete obstruction in the upper airway during sleep” (p. 268). Undiagnosed OSA is progressively becoming a more prominent issue in the practice of anesthesia and is quickly becoming one of the most prevalent sleep-breathing disorders. (Chung, Abdullah, & Liao, 2016a). Many practitioners have recognized a significant increase in surgical patients with undiagnosed OSA due to increased prevalence of patient obesity and diabetes (Chung, Yuan, & Chung, 2008).

OSA is becoming significantly more prevalent due to rising rates of obesity and the aging population in the United States (U.S.) (Vasu, Grewal, & Doghramji, 2012). OSA has many deleterious effects on the human body that can affect everyday life such as daytime somnolence, headaches, increased risk of cardiac arrest, increased risk of a stroke, arrhythmias, hypertension, and diabetes mellitus. OSA also has very significant effects on how patients respond to anesthesia and the medications certified registered nurse anesthetists (CRNAs) give on a daily basis (Vasu et al., 2012). The deleterious effects of OSA cause patients to spend a lot of extra time and money on their health care. The U.S. has estimated that the economic burden of OSA is approximately $149.6 billion dollars per year ("Economic burden of undiagnosed sleep apnea in the U.S. is nearly $150B per year," 2016). Approximately $30 billion of that is simply due to increased health care use and increased costs of medications due to comorbidities related to untreated OSA ("Economic Burden…," 2016). The additional economic burden is due

to motor vehicle collisions, lost productivity, and workplace accidents from daytime somnolence ("Economic Burden…," 2016). The STOP-Bang questionnaire is an effective tool used to recognize undiagnosed patients at risk for OSA (Seet, Chua, & Liaw, 2015). Patients with a STOP-Bang score greater than three are at a greater risk for unexpected intraoperative and postoperative cardiovascular and pulmonary adverse events (Seet et al., 2015).

Problem Statement/Needs Assessment

Patients with OSA are at increased risk for a multitude of perioperative and postoperative complications. Some complications include (a) difficult intubation, (b) hypoxia, (c) hypertension, (d) cardiac arrhythmias, (e) myocardial infarction, (f) pulmonary embolus, and many more (Vasu et al., 2012). Many of the medications CRNAs give on a daily basis cause complications in patients with OSA due to their mechanism of action. The medications that seem to cause the most problems for patients with OSA are anesthetics (i.e. volatile gases and propofol), benzodiazepines, and opioids (Chung et al., 2008). These medications are associated with relaxation of the dilator muscles in the pharynx, which allows for increased collapsibility of the upper airway (Vasu et al., 2012). These medications can cause a decreased response to hypoxia and hypercarbia. Opioids depress the respiratory drive in response to hypercarbia, which results in hypoventilation (Chung et al., 2008). Volatile anesthetics depress the respiratory drive in response to hypoxia, which also results in hypoventilation (Vasu et al., 2012). The combination of these two medications in patients with OSA can be perilous if the CRNA is not aware that the patient has a diagnosis of OSA.

Purpose of the Project

The primary goal of this project was to recognize how many patients receiving sedation for an endoscopic procedure are at moderate to high risk for OSA. Anesthesia providers will incorporate the STOP-Bang questionnaire into their preoperative assessments for patients who will be undergoing endoscopic procedures. A secondary goal of my project is to pass along my results and have someone follow up and create a referral program for patients that are at moderate risk for OSA.

Theoretical Framework

The theoretical framework I chose for my project was the Donabedian Quality-of-Care Framework. The Donabedian framework looks at three categories in order to evaluate the quality of care that was being received. The first aspect of the Donabedian model is structure, which describes where care is being received. For my project, the structure was at a hospital, specifically in the preoperative area in the Gastrointestinal laboratory (GI Lab). The second category was process, which describes how care has been provided and the interaction between the healthcare professional and the patient. My project implemented a new questionnaire for the CRNA to utilize during the preoperative assessment. This questionnaire will determine what patients are at moderate to high risk for OSA. The last component of the Donabedian model is outcome. Outcomes refer to the endpoints related to the intervention that was implemented. The primary outcome of my project was to determine how many patients were at risk for OSA.

Clinical Question

How many people receiving sedation for an endoscopic procedure at a hospital in east-central Mississippi are at moderate to high risk for OSA in 30 days? The purpose of this project is to determine how many patients are considered moderate to high risk for OSA. This question will be answered through the implementation of the STOP-Bang questionnaire over a period of one month.

DNP Essentials

The Doctor of Nursing Practice essentials must be met in some way with any doctoral level nursing project. All of the essentials were met in some form through my project. A detailed summary of how each of the essentials were met are laid out in Appendix A.

Synthesis of the Evidence

For this project, a literature search was performed using PubMed at The University of Southern Mississippi to find articles relating to OSA, anesthetic complications relating to OSA, and the STOP-Bang questionnaire. Keywords included in the search were a combination of the following terms: obstructive sleep apnea, anesthesia, STOP-Bang, practice guidelines, preoperative, perioperative, intraoperative, screening, patient outcome, and sleep-disordered breathing. Of the 574 articles found using PubMed, articles not related to OSA, STOP-Bang, or anesthetic complications were excluded. Articles relating to OSA prevalence and its implications for anesthetists as well as the STOP-Bang questionnaire and its use for preoperative screening were included in this evidence review. The articles were initially screened based on their

abstracts, and 11 articles were selected for this review of the evidence after the exclusions were made. These articles can be located in Appendix B.

Obstructive Sleep Apnea

Obstructive sleep apnea is one of the most, if not the most, common sleep breathing disorder (Chung et al., 2016a; Chung & Elsaid, 2009; Nagappa et al., 2015; Opperer et al., 2016; Proczko et al., 2014; Vasu et al., 2012). Research has estimated that around 70%-90% of patients who present for surgery have undiagnosed OSA, especially in the bariatric population (Chung et al., 2016a; Chung & Elsaid, 2009; Chung et al., 2016b; Nagappa et al., 2015; Seet et al., 2015; Vasu et al., 2012; Wolfe, Pomerantz, Miller, Weiss-Coleman, & Solomonides, 2016). OSA is associated with comorbidities such as cardiovascular disease, hypertension, diabetes, cerebrovascular disease, congestive heart failure, stroke, gastroesophageal reflux disease, as well as neurocognitive changes (Chung & Elsaid, 2016; Chung et al., 2016a; Chung et al., 2016b; Vasu et al., 2012; Wolfe et al., 2016). The majority of patients with OSA remain undiagnosed because the disorder occurs while sleeping, and therefore, many people remain unaware (Vasu et al., 2012). Long-term complications of undiagnosed OSA can be deadly. With rising rates of obesity and the increasing number of surgical procedures being performed these days, it is inevitable that there will continue to be a rise in the number of patients that present for surgery undiagnosed with OSA (Chung et al., 2016b). Patients who have been diagnosed with OSA receive no benefit from their diagnosis if they are not utilizing the proper treatment for OSA. Proper treatment for OSA is continuous positive airway pressure (CPAP) (Chung et al., 2016b).

Anesthetic Complications of OSA

Patients with OSA undergoing surgical procedures that have not been diagnosed have a higher risk of complications that can include hypoxemia, respiratory failure, reintubations, cardiac arrhythmias, pneumonia, pulmonary embolisms, and unanticipated ICU admissions (Seet et al., 2015; Vasu et al., 2012; Wolfe et al., 2016). OSA presents a challenge to CRNAs because of the many deleterious effects anesthetic medications can have on a patient's airway. Surgical patients who have sleep apnea are at a greater risk to have physiological complications related to anesthetic medications used for sedation and the use of opioids (Chung et al., 2008; Chung & Elsaid, 2009; Vasu et al., 2012; Wolfe et al., 2016). Because of the side effects of these medications, sleep apnea patients may exhibit increased incidents of diminished arousal response, decreased ventilator response, and pharyngeal collapse (Chung et al., 2008 & Vasu et al., 2012). Diminished dilator muscle function of the upper airway has a direct correlation to larger doses of general anesthetics and opioids (Chung et al., 2008; Proczko et al., 2014; Vasu et al., 2012; Wolfe et al., 2016). When the dilator muscles of the upper airway collapse, airway obstruction occurs. These dilator muscles collapse much more easily in patients with OSA. Many times this collapsibility exacerbates symptoms associated with sleep apnea leading to a multitude of post-operative complications such as hypoxia, arrhythmias, as well as major cardiac and respiratory complications. (Vasu et al., 2012).

STOP-Bang Questionnaire

The STOP-Bang questionnaire has a relatively high specificity, negative predictive value, and sensitivity for patients with moderate to severe OSA (Vasu et al., 2012). Specificity means that the patient is not diagnosed with OSA and does not have

OSA. Negative predictive value is very similar to specificity, but it describes the percentage of the time the patient does not have OSA and the STOP-Bang result is negative. The sensitivity is related to the percentage of time the STOP-Bang result is positive and the patient does have OSA. Sensitivity and specificity are characteristics of the STOP-Bang questionnaire, while the positive and negative predictive values are related to the prevalence of the disease in the population that is being tested. The accuracy of the STOP-Bang questionnaire was measured according to the apnea-hypopnea index (AHI). AHI measures the number of times a patient becomes apneic in one hour. The STOP-Bang questionnaire had a sensitivity of 83.6% in patients with an AHI greater than 5, 92.9% in patients with an AHI greater than 15, and 100% in patients with an AHI of 30 (Vasu et al., 2012). The negative predictive values were 60.8%, 90.2%, and 100% respectively (Vasu et al., 2012).

Conclusion

OSA can cause considerable complications for patients undergoing procedures that require anesthetics. OSA is one of the most common sleep breathing disorders, which is a major reason why patient's airways obstruct during monitored anesthesia care (MAC) cases (Chung et al., 2016a; Chung & Elsaid, 2009; Nagappa et al., 2015; Opperer et al., 2016; Proczko et al., 2014; Vasu et al., 2012). The anesthetics that are given during MAC cases cause the dilator muscles of the upper airway to collapse, which leads to obstruction of airflow and oxygen desaturation (Chung et al., 2008; Proczko et al., 2014; Vasu et al., 2012; Wolfe et al., 2016). By evaluating patients for OSA prior to endoscopic procedures, anesthesia providers are more aware of the potential complications they could have during the procedure related to OSA. The STOP-Bang

questionnaire has been validated and tested, and it has been proven to be an effective screening tool for OSA.

Summary

Chapter I outlined the background and significance, needs assessment, purpose of the project, theoretical framework, clinical question, DNP essentials, and synthesis of literature for this project. The clinical question was formed using the PICOT format. The next chapter discusses the methodology that was used in this project, which includes the population, methods, and data analysis.

CHAPTER II – METHODOLOGY

The purpose of this doctoral project was to determine how many patients receiving sedation for endoscopic procedures are at risk for moderate to high risk for OSA. CRNAs were presented with a synthesis of current evidence from the literature associated with anesthesia and OSA. The evidence from the literature supports that patients who have undiagnosed OSA are at greater risk for complications from anesthesia perioperatively and post-operatively. With the evidence gathered, an in-service was developed.

Population

The population for my nursing project was CRNAs in a GI laboratory at a hospital in central Mississippi. CRNAs must have agreed to participate and attended an in-service about OSA and the potential anesthetic complications. The overall goal of this project was to determine how many patients receiving sedation for endoscopic procedures were at risk for moderate to high risk for OSA.

Methods

An in-service was held for the CRNAs at the GI laboratory at a hospital in central Mississippi to educate them on OSA and the anesthetic complications that can be associated with OSA. The in-service included information that was compiled during the review of the evidence. CRNAs were asked to start incorporating the STOP-Bang questionnaire into their preoperative assessments. A removable STOP-Bang questionnaire was placed on the preoperative assessment sheets for every patient who had a procedure in the GI laboratory for one month, see Appendix B. CRNAs were asked to deposit each questionnaire that has been completed into a box. These questionnaires did

not contain any patient identifiable data. Data was gathered at the end of each day and a tally was kept of how many patients had a completed STOP-Bang questionnaire. At the end of the month, the number of patients that were at moderate to high risk for OSA was determined. Patients with a score of 0 to 2 were labeled low risk, 3 to 4 mild risk, 5 to 6 moderate risk, and 7 to 8 high risk. This data was passed along to other students who had the opportunity to develop a protocol for sleep laboratory referral based on patient's STOP-Bang score

Data Analysis

The data that was collected during this project was analyzed using Microsoft Excel. The total number of patients with each STOP-Bang score was calculated and placed in Table 1. The percentages for each level of risk were then calculated and placed in Table 2.

Summary

Chapter II outlined the methodology of this project including population, methods, and data analysis. CRNAs utilized the STOP-Bang questionnaire to determine if there were a significant number of patients at moderate to high risk for OSA. The following chapter will discuss the results of this project in further detail.

CHAPTER III – RESULTS

This project determined how many patients were at moderate to high risk for OSA in a GI laboratory at a hospital in central Mississippi. All CRNAs would incorporate the STOP-Bang questionnaire after the in-service and it would then be determined how many patients were at moderate to high risk for a total of 4 weeks in the GI laboratory. The total number of each STOP-Bang score was tabulated, as seen in Table 1. Every patient received the STOP-Bang assessment; however, some questionnaires were not fully completed. Only completed questionnaires were included in the calculations.

Table 1

Number of patients with each STOP-Bang Score

STOP-Bang Score	Number of patients
0	8
1	9
2	48
3	41
4	55
5	26
6	25
7	7
8	4
Total	223

As part of the analysis, percentages for each level of risk for OSA in the patients who came through the GI laboratory were calculated. These percentages are listed below in Table 2. According to the data, a total of 62 patients were considered to be moderate to high risk for OSA. Of the 62 patients who were considered moderate to high risk, 27 of those had previously been diagnosed with OSA.

Table 2

Percentage of patients at risk for OSA

Risk (Score)	Percentage
Low (0-2)	29%
Mild (3-4)	43%
Moderate (5-6)	23%
High (7-8)	5%

Summary

Chapter III reviewed the results from this project. There were N=223 patients who received the STOP-Bang questionnaire during the duration of this project. Of those 223 patients, 28% were considered to be at moderate to high risk for OSA. The next chapter will provide a discussion of this project.

CHAPTER IV - DISCUSSION

This project has shown that OSA is becoming a concern in the field of anesthesia. OSA carries with it several anesthetic implications, and anesthetists should know how to screen for OSA. Through projects like this one, anesthesia providers can be enlightened as to how common OSA is and how to screen for it. The overall goal was to improve patient safety and patient outcomes. Based on the data, OSA has become a much more common issue than many realize. From the questionnaires collected, 28% of the patients were considered moderate to high risk for OSA. A referral program can be implemented for patients who receive a STOP-Bang score that places them in the moderate to high-risk category for OSA.

Limitations

The limitations of this project include relying on the CRNAs to fully complete the questionnaire on every patient they assessed and the level of consciousness of the patients coming in for GI procedures. Some questionnaires were not fully completed. Some CRNAs wrote "OSA positive" on the questionnaire despite being educated otherwise in the in-service and would not finish filling out the questionnaire. Another limitation of this project was the level of consciousness of the patients presenting for GI procedures. Some patients were brought to the GI laboratory intubated and sedated. In this population of patients, CRNAs were unable to ask them some of the questions, which resulted in a few incomplete questionnaires as well.

Future Implications

This project has shown that there is a large population of patients who are at moderate to high risk for OSA. These patients present for surgical procedures every day.

With the data collected, the results support the need for a referral program for patients who score 5 or greater on the STOP-Bang questionnaire.

Dissemination

The knowledge obtained from this project can be of great value to the field of anesthesia. Many anesthetists could benefit from up to date education about the anesthetic implications of OSA and education on the increasing incidence of OSA. This project will be disseminated through the digital database, Aquila. The results will be reported to the hospital in which the project was performed, as well as the faculty of the nurse anesthesia program at The University of Southern Mississippi

Conclusion

OSA is known to cause complications in the world of anesthesia. Some type of questionnaire should be implemented as part of a preanesthetic assessment to help anesthesia professionals gauge what risk the patient is at for OSA. The STOP-Bang questionnaire is a validated tool that was used in this project. The results from this project indicated that 28% of patients that received anesthesia in a GI laboratory were considered moderate to high risk for OSA. Utilizing a questionnaire is an easy, inexpensive way to mitigate the increased risk that anesthesia providers face when anesthetizing patients with OSA

APPENDIX A – Literature Matrix

Author/Year/ Title	Design	Sample/ Data Collection	Findings	Limitation	Recommend ations
American Association of Colleges of Nursing/2006/ "The essentials of doctoral education for advanced nursing practice"	Expert opinion/ Commen tary	N/A	Policies and procedures should guide how and by whom sedation is performed. Policies should follow practice laws when determining which medications can be administered by whom and the type of monitoring equipment utilized. Pre-procedure assessments must be performed as well as post-procedure recovery plans implemented.	N/A	Each facility must establish their own policies and procedures regarding sedation practice that aligns with evidence-based practice and abides by practice laws for the disciplines.
American Society of Anesthesiolog ist. (2014, February). Practice guidelines for the perioperative	Expert Opinion	N/A	N/A	Practice guidelines are not intended to replace local institutional policies or to be used as standards	Practice guidelines provide basic recommendat ions that are supported by current literature, expert and practitioner

management of patients with obstructive sleep apnea: An updated report by the American Society of Anesthesiologist task force on perioperative management of patients with obstructive sleep apnea				or absolute requirements and their use cannot guarantee any specific outcome.	opinion, open forum commentary, and clinical feasibility data.
Chung, Abdullah, & Liao. (2016a). STOP-Bang questionnaire: A practical approach to screen for obstructive sleep apnea.	Expert opinion/ Commentary	N/A	STOP-Bang score of 0-2 is low risk and score of 5-8 is high risk for moderate to severe OSA. Score 3-4 requires further examination to ensure proper classification	Self-selection bias	STOP-Bang questionnaire can facilitate efficient allocation of resources in both diagnosing and treating previously unrecognized OSA.
Chung, & Elsaid. (2009). Screening for obstructive sleep apnea before surgery: Why is it important?	Expert opinion	N/A	Perioperative risk of patients with OSA may be reduced by the appropriate screening to detect undiagnosed OSA.	N/A	Incorporating BMI, age, neck size, and gender into the STOP questionnaire with further increase the sensitivity and NPV, especially for

					patients with moderate to severe OSA.
Chung, Memtsoudis, Ramachandran, Nagappa, Opperer, Cozowicz, ... Auckley. (2016b). Society of anesthesia and sleep medicine guidelines on preoperative screening and assessment of adult patients with obstructive sleep apnea	Systematic Review	Data extracted included: type of study, level of evidence, demographics, comorbidities, method of OSA diagnosis, screening tools, types of OSA therapy, types of procedure, intraoperative and postoperative adverse events, hospital readmission rates, mortality after surgery in OSA patients, preparation for surgery, sleep medicine referral,	Patients with OSA are at increased risk for perioperative and postoperative complications.	Questionnaires or other screening processes are imperfect diagnostic tools with low to moderate OSA and tend to over-diagnose.	Institutions should develop a protocol with known or suspected OSA to reduce complications and ensure the best possible patient outcomes.

		and CPAP therapy			
Chung, Yuan, & Chung. (2008, November). A systematic review of obstructive sleep apnea and its implications for anesthesiologists	Systematic Review	Articles were classified according to level of evidence.	There is a frequent prevalence of undiagnosed OSA. OSA is associated with other comorbidities that negatively affect perioperative outcomes; therefore, it may be difficult to separate the impact of OSA per se from the other associated conditions.	N/A	More high-level evidence is needed to determine whether the perioperative risks of OSA patients could be reduced by appropriate screening to detect undiagnosed OSA.
Nagappa, Liao, Wong, Auckley, Ramachandran, Memtsoudis, ... Chung. (2015, December 14). Validation of the STOP-Bang questionnaire as a screening tool for obstructive sleep apnea among different	Systematic Review	Clinical data extracted include age, gender, BMI, neck circumference, STOP-Bang score, mean AHI/RDI, and minimum SpO_2.	Given the relatively high prevalence of undiagnosed and untreated OSA and its associated comorbidities, a simple and effective OSA screening tool is essential. The STOP-Bang questionnaire can fulfill this need given that it is a	Non-English studies were excluded. There was a lot of variability in target populations among the different studies.	The STOP-Bang questionnaire has been validated to be an excellent screening tool for OSA and can identify patients at high risk of undiagnosed OSA.

populations: A systematic review and meta-analysis.			short, practical, and straight-forward test.		
Opperer, Cozowicz, Bugada, Mokhlesi, Kaw, Auckley... Memtsoudis. (2016, May). Does obstructive sleep apnea influence perioperative outcome? A qualitative systematic review for the society of anesthesia and sleep medicine task force on preoperative preparation of patients with sleep-disordered breathing	Systematic Review	N/A	Studies suggest that OSA increases the risk of postoperative complications.	Too broad of a review of the literature. The control groups were not defined well (patients in the control group could have had undiagnosed OSA).	Screening patients preoperatively for OSA is key to preventing postoperative complications
Proczko, Stepaniak, Quelerij, van der Lely, Smulders, Kaska, & Hamad. (2014). STOP-Bang and the effect on patient	Retrospective case series	Patients were divided into 3 groups: Group A – Patients with OSA (diagnosed with	Morbidly obese patients diagnosed with OSA that use CPAP have fewer perioperative complications and shorter LOS than	Retrospective – can show an association but not causality. Study population is relatively small.	Patients meeting at least 3 STOP-Bang criteria can expect a higher risk of postoperative complications and an increased

outcome and length of hospital stay when patients are not using continuous positive airway pressure		PSG) These patients use CPAP at home pre & postoperatively. Group B – Patients not diagnosed with OSA after PSG but met 3 of the STOP-Bang criteria Group C – Patients scoring 1-2 items on the STOP-Bang questionnaire that do not use CPAP at home	patients that meet at least 3 STOP-Bang criteria who are using CPAP		LOS than patients using CPAP.

Seet, Chua, & Liaw. (2015). High STOP-Bang questionnaire scores predict intraoperative and early postoperative adverse events	Retrospective Cohort Study	Information obtained from preoperative assessment included age, gender, BMI, comorbidities, type of surgery, STOP-Bang questionnaire scores, and ethnicity. They compared this information to unexpected perioperative adverse events.	Patients with high STOP-Bang scores had an increased risk of unexpected intraoperative and postoperative adverse events.	Due to a study being done retrospectively, important data and biases could have affected the outcomes.	The STOP-Bang score may be used as a novel preoperative risk stratification tool.
Vasu, Grewal, & Doghramji. (2012). Obstructive sleep apnea syndrome and perioperative complications : A systematic review of the literature	Systematic Review	N/A	Majority of patients with OSA are undiagnosed, and therefore unaware of their OSA at the time of surgery. Sedation, anesthesia, opioids, and REM sleep have been shown to cause	N/A	Screening questionnaires have been shown to identify high-risk patients. There should be a standard protocol for the perioperative management of high-risk OSA patients in order to reduce the

			worsening of OSA in the perioperative period.		risks of complications.
Wolfe, Pomerantz, Miller, Weiss-Coleman, & Solomonides. (2016). Obstructive sleep apnea: Preoperative screening and postoperative care	Clinical Review	N/A	STOP-Bang questionnaire is shown to be accurate at predicting moderate to severe OSA in surgical patients.	N/A	Use of STOP-Bang questionnaire should become part of every adult preoperative examination.

APPENDIX B – Doctor of Nursing Practice Essentials

Doctor or Nursing Essentials	How the Essential is Achieved
I. Scientific Underpinning for Practice	This project utilizes current scientific research regarding the STOP-Bang questionnaire and recognizes it's validation through multiple studies.
II. Organizational and Systems Leadership for Quality Improvement and Systems Thinking	The goal of this project is to create a systems change within a hospital to increase the usage of the STOP-Bang questionnaire which would lead to better patient outcomes.
III. Clinical Scholarship and Analytical Methods for Evidence-Based Practice	This essential was met through a synthesis of the literature. Analytical methods were used to recognized desirable data and also to eliminate undesirable literature.
IV. Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care	The aim of this project is a practice change in CRNAs to increase usage of the STOP-Bang questionnaire. The evidence for this project resulted from the use of technology to research the effectiveness of the STOP-Bang questionnaire.
V. Health Care Policy for Advocacy in Health Care	If CRNAs increase usage of the STOP-Bang questionnaire, it could lead to better patient outcomes. This project could lead to future research and the development of a policy regarding implementation of the STOP-Bang questionnaire in preoperative assessments.
VI. Interprofessional Collaboration for Improving Patient and Population Health Outcomes	This project relies on effective communication between myself and the CRNAs that participate in my project. Effective communication between anesthesia providers leads to improved patient outcomes.
VII. Clinical Prevention and Population Health for Improving the Nation's Health	Intraoperative and postoperative adverse effects are a greater risk in patients with OSA. Recognizing patients at high risk for OSA prior to providing anesthesia can decrease some risks associated with anesthesia.
VIII. Advanced Nursing Practice	The analysis of evidence, the synthesis of data, the presentation of the synthesized data, and the assessment of

	the impact of the information once provided to CRNAs are all expected of the advanced practice nurse.

APPENDIX C – IRB Letters of Approval

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI

COLLEGE OF NURSING
School of Leadership & Advanced Nursing Practice
118 College Drive #5095 | Hattiesburg, MS 39406-0001
Phone: 601.266.5462 | Fax: 601.266.5927 | nursing@usm.edu |
www.usm.edu/nursing

10/24/17

To Whom It May Concern:

The doctoral capstone project submitted to IRB by Emily Randall has been reviewed by Bonnie Harbaugh, Ph.D., RN, who is a College of Nursing representative of The University of Southern Mississippi Institutional Review Board. The project is a quality improvement project that does not involve human subjects' data collection. Since the DNP project does not require individual data collection nor consent, it does not require IRB Approval.

In this DNP project, proper protection of organizational data will be adhered to by Ms. Randle and her advisor, Dr. Marjorie Everson. If Ms. Randle's project changes to include Human Subjects, she will notify her DNP project advisor, and apply for IRB approval.

Sincerely,

Bonnie Lee Harbaugh, PhD, RN

Bonnie Lee Harbaugh, Ph.D., RN
USM IRB Member
College of Nursing Representative
Professor and Chair
Department of Systems Leadership and Health Outcomes
College of Nursing
The University of Southern Mississippi
Bonnie.Harbaugh@usm.edu
601-266-5250

[redacted]
Anderson Regional Medical Center
2124 14th Street
Meridian, MS 39301

Re: Emily Randle IRB Letter of Support

To the Institutional Review Board at the University of Southern Mississippi,

It is my pleasure to supervise Emily Randle, SRNA during her clinical experience at our facility. I am writing this letter of support for Ms. Randle regarding her capstone project entitled: *Utilizing the Stop-Bang Questionnaire as a Preoperative Assessment Tool in Patients Undergoing Endoscopic Procedures*.

I understand that Emily Randle is a doctoral student in the nurse anesthesia program at the University of Southern Mississippi with a tentative graduation date of December 2018. This letter of support will be included in the University of Southern Mississippi IRB application.

It is my understanding that once USM IRB approval is received, Ms. Randle will offer an educational opportunity with the CRNA staff at Anderson Regional Medical Center and then begin her study. She has explained to me that participation is completely anonymous and voluntary. I am also aware that there will be no penalty for withdrawal from the study at any point.

I am looking forward to learning the results of her research and the potential impacts on clinical anesthesia practice. In conclusion, I fully support the efforts of Emily Randle as she seeks to expand the body of knowledge for nurse anesthesia practice and promote patient safety and improved patient outcomes.

Sincerely,

[redacted]
Anderson Regional Medical Center
Meridian, MS 39301
601-604-1617

STOP-Bang Questionnaire

- **S**noring ☐ YES ☐ NO
- **T**ired (Somnolence) ☐ YES ☐ NO
- **O**bserved Apnea ☐ YES ☐ NO
- **P**ressure (HTN) ☐ YES ☐ NO
- **B**MI (>35kg/m^2) ☐ YES ☐ NO
- **A**ge (>50 yrs old) ☐ YES ☐ NO
- **N**eck size (>40 cm/15.75in) ☐ YES ☐ NO
- **G**ender (Male?) ☐ YES ☐ NO

REFERENCES

American Association of Colleges of Nursing (AACN). (2006). *The essentials of doctoral education for advanced nursing practice*. Retrieved from http://www.aacn.nche.edu/dnp/Essentials.pdf

American Society of Anesthesiologist. (2014, February). Practice guidelines for the perioperative management of patients with obstructive sleep apnea: An updated report by the American Society of Anesthesiologist task force on perioperative management of patients with obstructive sleep apnea. *Anesthesiology*, *120*(2), 268-286.

Chung, F., Abdullah, H., & Liao, P. (2016a). STOP-Bang questionnaire: A practical approach to screen for obstructive sleep apnea. *CHEST*, *149*(3), 631-638. http://dx.doi.org/10.1378/chest.15-0903

Chung, F., & Elsaid, H. (2009). Screening for obstructive sleep apnea before surgery: Why is it important?. *Current Opinion in Anaesthesiology*, *22*, 405-411. http://dx.doi.org/10.1097/ACO.0b013e32832a96e2

Chung, F., Memtsoudis, S. G., Ramachandran, S. K., Nagappa, M., Opperer, M., Cozowicz, C., ... Auckley, D. (2016b). Society of anesthesia and sleep medicine guidelines on preoperative screening and assessment of adult patients with obstructive sleep apnea. *Anesthesia & Analgesia*, *123*(2), 452-473. http://dx.doi.org/10.1213/ANE.0000000000001416

Chung, S. A., Yuan, H., & Chung, F. (2008, November). A systematic review of obstructive sleep apnea and its implications for anesthesiologists. *Ambulatory Anesthesiology*, *107*(5), 1543-1563. http://dx.doi.org/10.1213/ane.0b013e318187c83a

Economic burden of undiagnosed sleep apnea in U.S. is nearly $150B per year. (2016). Retrieved from http://www.aasmnet.org/articles.aspx?id=6426

Nagappa, M., Liao, P., Wong, J., Auckley, D., Ramachandran, S. K., Memtsoudis, S., ... Chung, F. (2015, December 14). Validation of the STOP-Bang questionnaire as a screening tool for obstructive sleep apnea among different populations: A systematic review and meta-analysis. *PLOS ONE*. http://dx.doi.org/10.1371/journal.pone.0143697

Opperer, M., Cozowicz, C., Bugada, D., Mokhlesi, B., Kaw, R., Auckley, D., ... Memtsoudis, S. G. (2016, May). Does obstructive sleep apnea influence perioperative outcome? A qualitative systematic review for the society of anesthesia and sleep medicine task force on preoperative preparation of patients with sleep-disordered breathing. *Anesthesia & Analgesia*, *122*(5), 1321-1334. http://dx.doi.org/10.1213/ANE.0000000000001178

Proczko, M. A., Stepaniak, P. S., Quelerij, M., van der Lely, F. H., Smulders, J. F., Kaska, L., & Hamad, M. A. (2014). STOP-Bang and the effect on patient outcome and length of hospital stay when patients are not using continuous positive airway pressure. *Journal of Anesthesia*, *28*, 891-897. http://dx.doi.org/10.1007/s00540-014-1848-0

Seet, E., Chua, M., & Liaw, C. M. (2015). High STOP-Bang questionnaire scores predict intraoperative and early postoperative adverse events. *Singapore Medical Journal*, *56*(4), 212-216. http://dx.doi.org/10.11622/smedj.2015034

Vasu, T. S., Grewal, R., & Doghramji, K. (2012). Obstructive sleep apnea syndrome and perioperative complications: A systematic review of the literature. *Journal of Clinical Sleep Medicine*, *8*(2), 199-207. http://dx.doi.org/10.5664/jcsm.1784

Wolfe, R. M., Pomerantz, J., Miller, D. E., Weiss-Coleman, R., & Solomonides, T. (2016). Obstructive sleep apnea: Preoperative screening and postoperative care. *Journal of the American Board of Family Medicine*, *29*, 263-275. http://dx.doi.org/10.3122/jabfm.2016.02.150085