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Implementation of the STOP-BANG Screening Tool in the Primary Care Setting: A Quality Improvement Project

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

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Approval Page

This is to certify that the DNP Project Final Report by

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has been approved by the DNP Project Team on

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for the Doctor of Nursing Practice degree

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Abstract

Significance and Background. There are approximately 25 million adults in the United States with obstructive sleep apnea (OSA). OSA is a sleeping disorder that is caused by periodic airflow blockage during sleep. It has been linked to numerous health problems and within the primary care setting OSA is not routinely screened for at visits. This leads to delayed diagnosis of a serious health issue and the potential for poor health outcomes. The STOP-BANG questionnaire (SBQ) is a simple eight-question tool that is used to screen patients for OSA. The STOP section focuses on snoring, tiredness, observed apnea, and high blood pressure. The BANG section focuses on BMI, age, neck circumference, and male gender. The evidence gathered showed that the SBQ is reliable and sensitive in the detection of obstructive sleep apnea in the primary care setting.

Purpose: To screen patients aged 50 and over with essential hypertension and a BMI (Body Mass Index) of 35 kg/m2 or greater, in a mixed primary care practice over ten weeks using the SBQ for OSA.

Methods: Institute for Healthcare Improvement (IHI) Model for Improvement with the Plan-Do-Study-Act as the tool. Plan-educate and implement the SBQ screening tool within the primary care and cardiology offices. Do- provide education on importance of OSA screening and use of SBQ within setting. Study- data from provider education, completed SBQ screenings and referrals. Act- use gathered data to inform PDSA cycles.

Outcome: Over ten weeks 83 total patients were screened using this tool. 45 or 54.2% were female and 38 or 45.8% were male. Primary care completed 60 referrals and cardiology completed 23. A total of 38 patients accepted sleep referral studies.

Discussion: Providers should be keen to screen patients for OSA as it predisposes them to hypertension, cardiovascular disease, fatigue, and many neurological symptoms. The SBQ questionnaire is a quick and reliable tool which makes it utility in the primary care setting ideal. The use of the SBQ within the primary care setting augments the care given which in turn promotes positive health outcomes especially in a community that have many social and health determinants that impact their quality of life.

Keywords: obstructive sleep apnea; STOP BANG questionnaire; primary care; staff education

Problem Identification and Evidence Review

Description of the Problem

Obstructive sleep apnea (OSA) is a sleeping disorder caused by periodic airflow blockage during sleep (Waseem et al., 2021). There are approximately 25 million adults in the United States with OSA (AASM, 2017). OSA has been linked to diagnoses of hypertension, diabetes, cardiovascular disease, fatigue, neurological symptoms, and increased mortality in individuals (Waseem et al., 2021).

The identified population for this quality improvement (QI) project have many social determinants that impact the way in which they utilize the health care system. This group typically has multiple comorbidities including obesity, hypertension, diabetes, and hyperlipidemia. Currently, there is no formal policy or screening tool for sleep apnea within this setting. Also, primary care providers do not routinely assess patients in the outpatient setting for OSA (Showalter & O'Keefe, 2019). This leads to delayed diagnosis of a serious health issue and potential poor health outcomes (Ononye et al., 2019; Showalter & O'Keefe, 2019). Early identification of OSA limits the cardiovascular ramifications thereby reducing morbidity and mortality within the affected population (Ononye et al., 2019).

The STOP-BANG questionnaire (SBQ) is a simple eight-question screening tool used to assess for OSA in many settings including the primary care setting (Joseph et al., 2018). The SBQ evaluates the following areas: snoring, tiredness, observed apnea, high blood pressure, BMI, age, neck circumference, and male sex (Joseph et al., 2018). The questions are graded equally and are assigned 1 point for each "yes" response (Joseph et al., 2018). Patients with 2 points or less are deemed low risk for OSA, those with 3 or 4 points are at a medium risk and those with 5 points or more are considered high risk (Joseph et al., 2018). Patients identified as

medium to high risk based on SBQ's score should be referred for polysomnography (Delgado-Vargas et al., 2021; Joseph et al., 2018). Polysomnography (PSG) is a sleep study that is used to identify sleep disorders and is considered the gold standard for diagnosis of OSA (Joseph et al., 2018; Showalter & O'Keefe, 2019).

Joseph et al. (2018) compared frequently used tools to assess for OSA. The tools were: the STOP questionnaire, SBQ, Berlin questionnaire, Epworth Sleepiness Scale, Fatigue Severity Scale, and the 4-Variable Screening Tool. The SBQ was found to be the most reliable and sensitive in the detection of OSA in the primary care setting (Joseph et al., 2018). The Spanish version of the SBQ demonstrated reliability (Cronbach's alpha =0.8072) in the detection of OSA (Delgado-Vargas et a., 2021). SBQ is a quick and reliable tool which makes its use in the primary care setting ideal (Delgado-Vargas et al., 202; Ononye et al., 2019).

Clinical Question

In patients over age 50 with essential hypertension and a BMI of 35 kg/m2 or greater (P), does the use of a screening tool (I) compared to no screening tool (C) predict the probability of obstructive sleep apnea (OSA) in the outpatient setting (O)?

Methods for Gathering External and Internal Evidence

External Evidence. Databases searched include CINAHL, CINAHL, MEDLINE, Cochrane, Gale Academic OneFile, Academic Search Premier and Science Direct (see Appendix A). The keywords and alternative keywords searched were sleep apnea, obstructive sleep apnea, screening tools and outpatient. The search was limited to those published in the English language, peer reviewed, academic journals, adults aged 18 and over and published between 2017-2022 (Appendix A). The Rapid Critical Appraisal Tools was used to assess the

applicability and validity of the selected literature (Melnyk & Fineout-Overholt, 2019). Seven articles were chosen for this QI project.

Internal Evidence. Evidence from industry found that the SBQ screening tool was implemented successfully in an urban primary care clinic in Texas in April 2018 (Ononye et al., 2019). The evidence reviewed highlighted the SBQ screening tool as a reliable and valid tool for early identification of OSA, and it provided clinicians with an efficient tool to augment the care provided. Providers at this facility were queried about the current practice for sleep apnea assessment. They reported patients were referred to sleep studies based on complaints of fatigue, insomnia, reports of observed snoring or resistant hypertension. This preliminary data suggests the need for educational sessions on the prevalence of OSA and the use of the SBQ in this primary care setting.

Evidence Appraisal Results and Recommendations

The completed literature review yielded seven articles that centered on OSA screening tool usage (See Appendix B). Level of Evidence (LOE) summaries and outcome synthesis tables on all seven studies support the use of OSA in the outpatient care setting (see Appendix C). The seven studies were three levels IV and four level VI. Reliability and validity of the SBQ screening tool was exhibited with the diagnosis of OSA by PSG in those with a positive screening tool. Joseph et al. (2018) compared various validated screenings and scales and found SBQ to be the most reliable and sensitive screening tool for OSA. Based on the evidence, the recommendation is to implement the SBQ screening tool to help identify and treat OSA. Successful implementation of this tool will (1) increase provider's knowledge about SBQ screening (2) ensure early identification and treatment of OSA (3) improve or eliminate the associated comorbidity and sequelae of OSA.

Project Plan

Project Goals

1. To educate primary care providers about the importance of OSA screening in the primary care setting.
2. To implement the use of SBQ within this setting and track the number of referrals for PSG (sleep studies).
3. To improve patient outcomes through early identification of OSA and therefore reduce the associated comorbidity and sequelae of this disorder.

Framework

The implementation plan of any proposed clinical change must be informed by a conceptual or theoretical framework to improve sustainability (Ross et al., 2018). The Model for Improvement (MFI) formulated by the Institute for Healthcare Improvement (IHI) guided the implementation of this QI project (Institute for Healthcare Improvement, n.d.). This model is frequently used to expedite improvements (Institute for Healthcare Improvement, n.d.). The model has two parts. First, three rudimentary questions are vetted within this model (Armstrong & Sables-Baus, 2020; Institute for Healthcare Improvement, n.d.):

- What are we trying to accomplish? (Identify patients with sleep apnea)
- How will we know that a change is an improvement? (Number of referrals for sleep study)
- What changes can we make that will result in improvement? (Screening patients at visits to identify OSA)

Second, the Plan-Do-Study-Act (PDSA) framework will test the changes in the practice setting (Institute for Healthcare Improvement, n.d.). The cyclic steps of the PDSA allow quick

adaptive changes to be made within a QI project since each cycle informs the next which increases the chance of success (Armstrong & Sables-Baus, 2020). The PDSA framework will address goals 1 and 2 of this QI project.

Plan Phase. This DNP student will meet with Dr. Luis Rojas (APRN primary care provider), the office manager of the facility and two medical assistants to gain support and project approval for SBQ in this practice. The DNP student will also develop and implement a new OSA practice policy (Appendix D). Project goal #1 will be addressed within this phase.

Do Phase. The implementation phase of this project will see the initiation of SBQ within the outpatient setting. The process will begin with a pre-survey of the knowledge of OSA and its available screening tools among staff. The DNP student will utilize a PowerPoint presentation focused on OSA prevalence, new OSA policy (Appendix D), SBQ tool selection, screening tool (Appendix E and F), guidance on the use of SBQ, and EMR (Electronic Medical Record) (EPIC) documentation. The SBQ smart tool template will be embedded in the EMR (EPIC) by Dr. Rojas. The presentation will be followed by an open question and answer session. Those unable to attend this educational session will be emailed the PowerPoint and handouts. Post-survey assessment of education will be provided to the staff by DNP student to assess staff knowledge related to the new OSA policy, SBQ screening tool, and feedback. The new OSA screening policy will be printed on plain paper and posted on the bulletin board in the main office. The practice mentor and office manager will be emailed a copy for ease of reference and access. Also, staff will be provided with the DNP student's number and email address should questions arise during the process. Chart audits will be conducted to ensure new OSA policy adherence, use of SBQ screen tool and PSG referral. Verbal feedback from the staff and patients will be

collected weekly. This feedback will be used to gauge opinions, barriers to sustainment, facilitators, and staff satisfaction. Project goal #1 will be achieved in this phase.

Study Phase. During this phase, the DNP student will analyze the data and determine improvement significance. The process measures include assessment of staff knowledge before and after receiving education on OSA and new policy. The DNP student will perform periodic audits to measure staff compliance, monitor the number of PSG referrals and display results accordingly. The target goal will be 95% for all patients that fit the criteria for use of the SBQ throughout the project. The DNP student will be onsite periodically to answer questions and concerns and to gather clinical data as applicable. The data will be reviewed by the DNP student, practice mentor and office manager. The data from this phase will be used to inform the next phase within this process.

Act Phase. The DNP student will revise project undertaking based on the information gathered in the first PDSA cycle.

Context

Description of the setting and participants/population. This project was conducted at a private primary care and cardiology office in Fairfield County. Key participants were patients over age 50 with essential hypertension and a BMI of 35 kg/m2 or greater, office providers, the office manager, nurses, and medical assistants.

Project Team and Roles

Luis Rojas, DNP, FNP primary care provider at the private practice and the onsite practice mentor who helped implement this project and offered guidance throughout. The office manager helped with the implementation and identification of PSG referrals in the EHR at the practice. All the medical assistants and providers were instrumental in the completion of the

SBQ tool for all applicable patients. Susan Penque, PhD, APRN, ANP-BC, NE-BC is the DNP project faculty advisor and evidence-based practice expert guiding this project.

Key Stakeholders and Staff Buy-in

Identified stakeholders for this project include all providers, staff members, and applicable patients. The practice mentor expressed interest in the use of the SBQ due to its simplicity, ability to be translated into Spanish and prior successful implementation in other primary care settings. The DNP student conveyed the project goals, implementation, evaluation, and sustainability plans to the providers at this practice. This led to increased project understanding and promoted stakeholder buy-in of the new initiative. The SBQ tool provides clinicians with an effective evidence-based screening tool which promotes better health outcomes (Ononye et al., 2019).

Description of Practice Change

Patients over the age of 50 with essential hypertension and a BMI of 35 kg/m2 are to be screened routinely at visits to help identify OSA. This practice change will be guided by the creation of a policy to implement SBQ within this practice setting. The policy will highlight patient population to be screened, frequency of screenings, when to refer a patient based on SBQ results and where to document in the patient's EMR- acceptance or declination of referral for sleep studies.

Evaluation Plan

To identify the effectiveness of the proposed quality improvement the DNP student will organize collected data using excel spreadsheet. The data will be utilized to create tables, run, and bar charts to note project significance. Also, data collected from the pre-and post-survey of educational input to providers will be used to gauge attainment of project goals.

Barriers to Implementation and Sustainability with Mitigation Plan

Barriers to implementation of this project during conversation with staff and project mentor included (a) lack of knowledge about the existing screening tools for OSA by providers and staff; (b) staff perception of increase in workload; (c) provider preference for a certain screening or method; (d)Lack of knowledge about OSA and its treatment plan; (e) lack of access to polysomnography providers for patients (f) staff resistance to change. Barriers to sustainability may include (a) lack of consistent OSA screening after project conclusion (b) difficulty collecting and reporting the SBQ screening appropriately in the EMR (c) decreased access to PSG/sleep studies due to insurance. Mitigation plans to address barriers include education to staff about the ease of SBQ implementation and its use, electronic versions of SBQ for ease of access, availability of the project improvement manager by phone and email to answer questions.

Timeline

March 2022	Project proposal to Dr. Luis Rojas, APRN, primary care provider
April 2022	DNP project oral presentation to Dr. Penque and Dr. Rojas
April 2022	Met with Dr. Rojas to discuss policy draft and incorporation of the SBQ tool in practice and EMR (EPIC) documentation
June 2022	Pre- and post- intervention staff survey/PowerPoint presentation
June 27, 2022	Implementation of QI project
September 2, 2022	Complete pilot, weekly EMR audit and

Note: EMR- electronic medical record; SBQ- STOP-BANG questionnaire

Resources/Budget

Table 1 displays the projected cost of the project implementation and evaluation. The project manager will spend 5% of full-time equivalent (8 hours per month x 2.5 months = 20

hrs.) managing the entire project. The time will be spent on project education, implementation, reviewing feedback, data collection, chart audits and analysis. Other displayed costs are related to printing supplies. The SBQ smart tool template will be embedded in the EMR (EPIC) by Dr. Rojas at no additional cost.

Table 1.

Cost Analysis

Expense	**Cost**	**Budget**
Printing/Supplies		
Educational handouts (New OSA policy, pre-and post-survey, written feedback etc.)	Staples Hammermill Copy plus 10-ream paper (8x11) = $50.00	$50.00
STOP-BANG Questionnaire		
Educational		
PowerPoint Presentation	$0.00	$0.00
Project Manager	$0.00 (volunteered time)	$0.00
Primary Care Provider assisting with Project/Smart tool implementation in EPIC	$0.00 (volunteered time)	$0.00
Total Budgeted cost	$50.00	$50.00

Note: SBQ- STOP-BANG questionnaire; OSA- Obstructive Sleep Apnea

Dissemination Plan

The dissemination plan of pertinent project findings will be displayed using a poster board display in the main lobby of the primary care facility for patients and staff members. PowerPoint and poster board presentation of project findings will be completed at Sacred Heart University Annual poster board presentation and at Montefiore Medical Center-Moses Division-Annual Research Symposium.

Ethical Review

This project was reviewed and approved by Dr. Luis Rojas a primary care provider, and the office manager. Appendix H illustrates that the requirements for a Quality Improvement criterion have been met. An answer of "yes" to all the items in l-l0 and "no" to all the items in 11-I4. Therefore, this project does not qualify as human subjects' research. However, it requires Sacred Heart University (SHU) Institutional Review Board (IRB) approval which was obtained on May 2nd, 2022 (Appendix P). Additionally, Collaborative Institutional Training Initiative (CITI) modules were completed and submitted as part of the IRB process at SHU (Appendices M, N, O).

Project Implementation

Description of Actual Project Implementation

The implementation of this QI project was guided by the PDSA cycle. Two cycles were completed during the implementation period- June 27 - Sept 2, 2022.

PDSA #1

Plan Phase. The DNP project manager met with Dr. Luis Rojas, the office manager and two medical assistants to gain support for the use of the SBQ in this practice. The DNP project manager developed and implemented the new OSA policy (Appendix D) within this primary care setting. Final approval to implement the project was given by Dr. Luis Rojas and the office manager.

Do Phase. The implementation phase of this project began with a pre-survey (Appendix E) of the knowledge of OSA and its available screening tools among staff. Pre- and post-surveys were labelled to measure improvement in knowledge after educational input. The DNP student conducted three separate PowerPoint (Appendix F) presentations for staff and students to ensure that most staff would receive this education. For those unable to attend the educational sessions,

they were emailed instructions on how to take and return via email or text the pre- and post-training survey along with the presentation. The PowerPoint presentation focused on prevalence of OSA, the use of the SBQ screening tool in English and Spanish (Appendix G and H), guidance on the use/grading of the SBQ, and EMR (EPIC) documentation. The presentations were followed by open question and answer sessions. A post-survey assessment (Appendix K) of the education provided to the staff by the DNP project manager followed. Also, the staff was provided with the DNP project manager's email address should questions arise during the process. The new OSA screening policy was printed on plain paper and posted on the bulletin board in the main office. Additionally, both the practice mentor and office manager were emailed a copy of the policy for ease of reference and access. A SBQ smart phrase template was embedded in the EMR (EPIC) by Dr. Rojas. The template lists the date of the screening, SBQ score, education provided to the patient, whether the patient accepted or refused the referral and the reason for refusal. The DNP project manager created two boxes (one for each specialty office- primary care and cardiology) as central locations for completed surveys. Surveys were collected on four separate occasions to review OSA policy adherence, use of SBQ screen tool and PSG referral. The project implementation lasted 10 weeks-June 27 - Sept 2, 2022. Chart audits were done to track SBQ utilization in the applicable population and number of referrals. Staff feedback was used to drive interventions. Project goals #1- to educate primary care providers about the importance of OSA screening in the primary care setting and project goal #2- to implement the use of SBQ and track the number of referrals for PSG was achieved in this phase.

STOP-BANG Training Pre-Survey Results. The pre-training survey data (Table 2) collected prior to the SBQ implementation showed the need for OSA screening within this

setting. The data revealed that providers and NP (Nurse Practitioner) students rarely (<25% of the time) screened their patients for OSA. Furthermore, all reported not regularly using a validated OSA screening tool.

Table 2

STOP-BANG Training Pre-Survey Results

		Providers/NP Students	Medical Assistants
Attendance		6	2
Perceived number of patients seen weekly with s/s of OSA			
a.	<10	2	-
b.	10-15	3	2
c.	>15	1	-
Routine OSA screening tool (e.g., SBQ, Berlin, ESS)			
a.	Rarely (<25%)	6	-
b.	Sometimes (25-50%)	0	-
c.	Most of the time (75%)	-	-
d.	All the time (100%)	-	-
Do you use a screening tool? (e.g., SBQ, Berlin, ESS)			
	Yes	0	-
	No	6	-
Suggestions to improve practice screening for OSA.		- EMR smart tool integration in EPIC - Early screening of all suspected patients. - Development of CPT code for sleep apnea screening tool for reimbursement purposes	-Place SBQ forms in patient rooms

Note. OSA= Obstructive Sleep apnea; SBQ= STOP-BANG Questionnaire; ESS- Epworth Sleepiness scale

Post-training Survey results. The data (Table 3) collected immediately after the SBQ implementation PowerPoint presentation revealed that all providers within this primary care setting found the educational input and implementation plan valuable and effective. Moreover, the data also showed that 100% of the providers would implement SBQ in routine screening and none recommended changes to the training presentation.

Table 3

STOP-BANG Training Post-Survey Results

	Providers/NP Students	Medical Assistants
Attendance	6	2
Was the presentation valuable and provided enough information on SBQ?		
Yes	6	2
No	-	-
What section was most valuable?		
a. SBQ Implementation plan	6	2
b. Local problem	1	-
c. Health ramifications	2	-
What changes can be made for implementation training to be more effective?		
None	6	2
How likely are you to use SBQ in practice?	6	2

Note. OSA= Obstructive Sleep apnea; ; SBQ= STOP-BANG Questionnaire

Study Phase. During this phase, the DNP student analyzed the number of SBQ screenings and referrals to determine significance. Data was collected on two separate days over a two-week period- June 27- July 8th, 2022. In the first two weeks, thirty-five screenings were completed for patients that met the criteria. In Week 1- 25 screenings were completed. Week 2- 12 SBQ screenings were done resulting in a 50% decrease from the first week. During the project's second week, 18 patients met the criteria for screening, but only 12 were screened. This decrease could be due to decreased enthusiasm, difficulty collecting and reporting the SBQ screening and the need for more education to both providers and patients. The target goal for this project was 95% compliance.

Act Phase. The decrease in SBQ screenings and referrals highlighted the need for change to ensure outcome measures. The DNP student, practice mentor and office manager recognized the need for additional staff training regarding the applicable demography (aged 50 and over with essential hypertension and a BMI of 35 kg/m2 or greater) and score requirement for PSG referral (intermediate risk- scores ≥ 3). This information was used to inform PDSA #2.

PDSA #2

Plan Phase. The DNP project manager met with Dr. Rojas and the office manager in week 3 of the project to gather ways to increase SBQ screening compliance without the staff perceiving it as an increase in workload. It was decided to staple the SBQ form to all applicable patient intake form once they arrive for office visits. This act will allow ease of access since it is on the form used to take vitals and other pertinent health related information and would serve as a reminder to the APRNs (Advanced Practice Registered Nurse) to document the use of SBQ in the EMR per protocol and order PSG if applicable. Copies of SBQ forms will also continue to remain in the exam rooms. Additionally, more verbal provider education and biweekly text reminder to the practice mentor to be done by the DNP student to ensure sustainability and compliance to QI project.

Do Phase. In week 3 the DNP student edited the SBQ forms (English and Spanish) to highlight when referral should be sent (Appendix I & J). All printed copies of the previous version of the SBQ screening forms were discarded. Verbal education for the front desk medical assistants focused on who the applicable patient population was, how and where to attach the SBQ on the intake form and if applicable, how to help the patient complete the STOP portion of the screening. The providers were re-educated on completing the BANG portion of the form, when to order PSG and how to document in the EMR. Biweekly reminders to practice mentor were done to maintain project momentum.

Study Phase. Periodic audits of the screening form boxes showed an average of 8.3 screenings per week over the 10-week period for 83 completed screenings.

Act Phase. PDSA #2 ends the implementation of SBQ in this practice setting and was deemed a success. The results will be discussed in the evaluation/results section of this paper. The ease of SBQ in the practice setting, number of screenings and referrals helped promote positive health outcomes in this populations. In fact, the SBQ is now regularly used as a standard screening tool in these patients' care. This will undoubtedly lead to early identification and appropriate treatment.

Description of Deviations from Project Plan

Two deviations from the project plan occurred during this project. First, the central location for the screening forms was changed to both the primary and cardiology APRNs offices. This allowed for ease of access. Initially, the plan was to screen patients visiting the primary care APRNs. However, as suggested by the practice manager, many cardiology patients would benefit from the use of SBQ and the cardiology APRNs agreed. Second, the screening forms were placed in the patient rooms, but this proved to be problematic and APRNs forgot to screen patients. In the second PDSA, the decision to staple the SBQ forms to the intake forms allowed appropriate screenings to be completed.

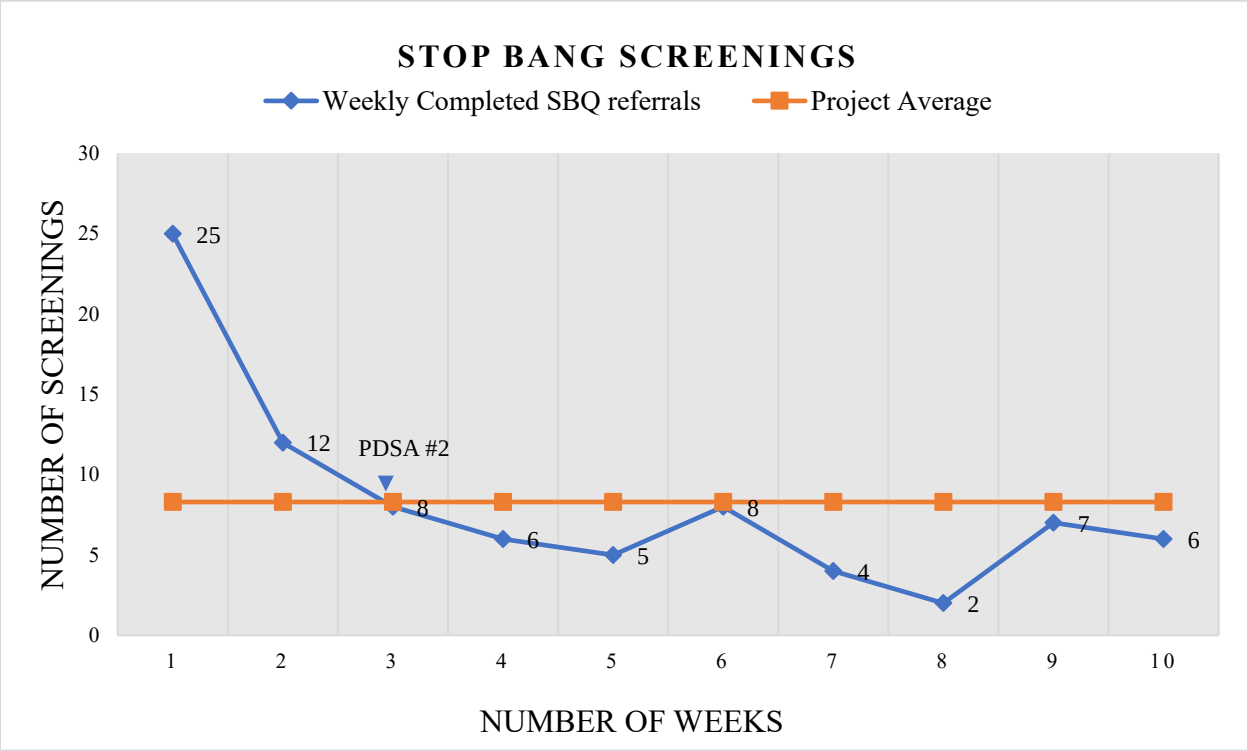
Evaluation/Results

Over the ten-week project period, multiple audits of patient visits were completed for SBQ screening tool utilization in patients over the age of 50 with essential hypertension and a BMI of 35 kg/m2 or greater and project compliance. A total of 83 patients were screened with a weekly average of 8.3% screenings (Figure 1). Although a sharp decline was noted in Weeks 1-2, the remaining weeks remained consistent after the implementation of PDSA #2 (Figure 1). Primary care completed 60 referrals while cardiology completed 23 (Figure 2). As shown in Figure 2, 43 primary care patients scored ≥ 3 and 17 scored <3. Additionally, of the 23 patients

screened by cardiology, 18 had a SBQ score of ≥ 3 and five scored <3 (Figure 2). Also, of the 83 patients, 45 (54.2%) were female and 38 (45.8%) were male (Figure 3). Table 4 shows the total number of referrals by primary care and cardiology and categorized into: patients that declined sleep study referral, those already diagnosed, or had a recent screening and those that accepted the sleep study referral. A total of 38 (28 primary care and 10 cardiology) patients accepted referral for sleep studies (Table 4).

Figure 1

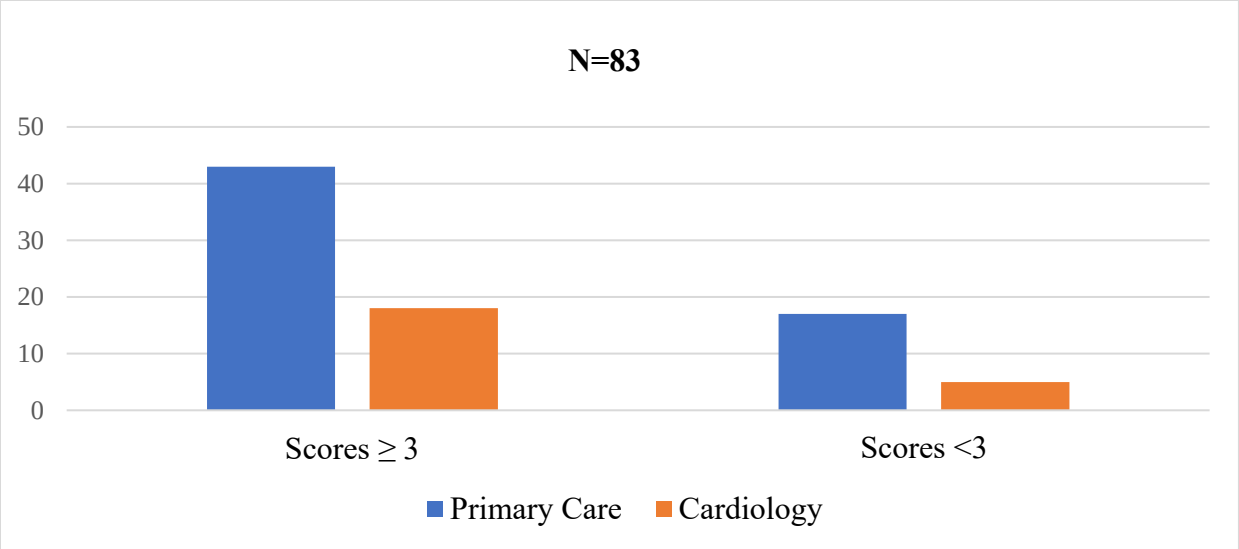
Total SBQ screenings and project weekly average results.



Note. Number of screenings and overall average for ten weeks.

Figure 2

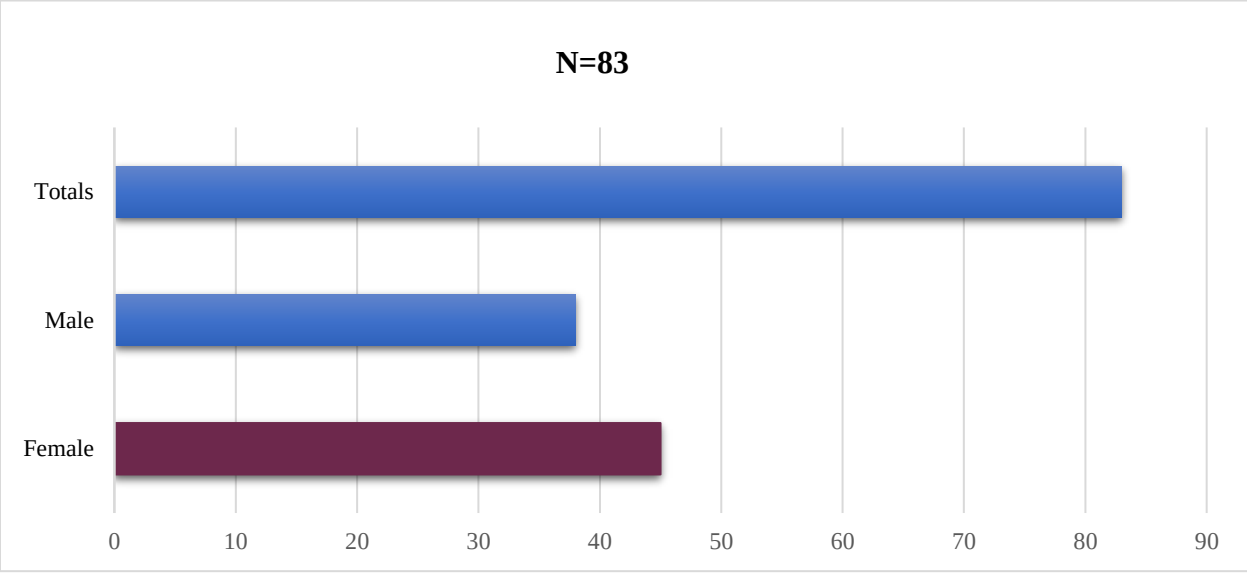
Total SBQ Screenings by Primary Care and Cardiology



Note: SBQ= STOP-BANG Questionnaire; scores ≥ 3 on SBQ- Intermediate OSA risk; scores<3- Low OSA risk

Figure 3

Gender of patients who completed SBQ screenings



Note. Female and male totals and overall number of patients screened with SBQ

Table 4

Referrals by Primary Care and Cardiology

Patients with scores ≥ 3 on SBQ	Primary Care	Cardiology
N=61	43	18
Patients that declined referral	6	7
Patients already diagnosed/had prior recent screening	9	1
Accepted referral	28	10

Note: SBQ= STOP-BANG Questionnaire; scores ≥ 3 on SBQ- Intermediate OSA risk

Process Measures. The process measures include assessment of staff knowledge before and after receiving education on OSA and new policy (Table 2 & 3). The DNP student and practice mentor performing periodic chart and collection box audits to measure staff compliance and monitor the number of sleep study referrals.

Outcome Measures. Outcomes measures used to evaluate the success of this project includes the number of SBQ screenings done in the appropriate demography and number of sleep study referrals during the implementation period. Total screenings for this project were 83 and total referrals sent was 38.

Return on Investment

The use of SBQ within this primary care setting has given providers a valid and reliable tool to identify a disorder that has an increased cardiovascular risk to patients. This project has created increased awareness of sleep apnea in the primary care setting. Overall, 83 patients were screened and 38 received referrals for PSG. Those screened, identified, and referred for sleep studies may have improved mortality due to early identification, and therefore reduced financial

burden to the healthcare system. Therefore, this project has provided a return on investment for the resources allocated for this project.

Key Lessons Learned

This project highlighted the importance of patient education and screening for a disease before overt clinical manifestations. A great majority of the patients screened using the SBQ tool were deemed a medium risk or higher (score >3). The recommendation was for sleep study referral. However, many refused the referral while others were indifferent to the recommendation even after medical provider educational input. Therefore, it can be surmised that many of the patients (who have multiple comorbidities) within this primary care office have a false sense of perceived health status, limited health literacy and may perceive health associated cost of the potential diagnosis of OSA as a barrier.

Sustainability

Sustainability is the overarching goal of all evidence-based clinical change. Sustainment is achieved by using elements within the proposed change to achieve and maintain the initial goals (Shelton et al., 2018). The new OSA policy is key towards maintaining sustainability. Feedback from staff and using it to inform changes is another key factor. The simplicity of the SBQ allows patients to autonomously complete the SBQ form with limited input from the staff plays a crucial role in the clinical change continued success. Also, the SBQ smart tool template that is embedded in the EMR enables easy documentation for providers. Project goal #3 - to improve patient outcomes through early identification of OSA and therefore reduce the associated comorbidity and sequelae of this disorder is highlighted in this phase.

Dissemination

Dissemination of project findings will be done internally and externally. Internal dissemination of the ten-week project improvement data will be done via PowerPoint presentation. External dissemination of findings to SHU faculty, practice mentor and students will be done by oral PowerPoint and poster board presentation. An abstract of this project was submitted to the National Association for Healthcare Quality for a poster presentation.

Implications of Project Results to Organization, Practice Community

i. Executive summary (Organization)

There are approximately twenty-five million Americans with OSA. This serious medical condition when left untreated has been linked to hypertension, coronary heart disease, heart attacks, diabetes, and stroke (AASM, 2017). Many patients are unaware of OSA's existence and are not routinely screened during primary care visits. Lack of routine screening among this patient population can lead to increased morbidity and mortality. This project demonstrated the need for implementation of a screening tool for OSA within the primary setting. The goal of project Implementation of the STOP-BANG Screening Tool in the Primary Care Setting is to identify patients with scores ≥ 3 on the screening tool and refer patients for polysomnography (PSG). PSG is the gold standard for OSA detection (Joseph et al., 2018; Showalter & O'Keefe, 2019). OSA has multiple associated comorbidity and sequelae which can be eliminated or reduced with early detection and appropriate treatment.

ii. Poster (DNP program)

The poster presentation for this project will be completed on April 21, 2023. The poster presented will highlight the project background/evidence, project goals, method, OSA screen tool used, results and next steps.

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Appendix A

Description of Evidence Search

The following database searches were conducted; CINAHL, MEDLINE, Cochrane, Gale Academic OneFile, Academic Search Premier and Science Direct. The keywords and alternative keywords searched were sleep apnea, obstructive sleep apnea, screening tools and outpatient. Adding the keywords 'outpatient' narrowed initial searches.

Limits set for this search pertaining to obstructive sleep apnea included English language, peer reviewed, academic journals, adults aged 18 and over and published between 2017-2022. Inclusion criteria for article selection were use of a screening tool, STOP-Bang questionnaire, peer-reviewed studies between 2017-2022, and outpatient/primary care setting.

PICO (Problem, Intervention, Comparison, Outcome) question: In patients over age 50 with essential hypertension and a BMI of 35 kg/m2 or greater, does the use of a screening tool compared to no screening tool predict the probability of obstructive sleep apnea (OSA) in the outpatient setting?

Tables 1 through 6 display the databases, search terms and results of each search.

Table 1.

CINAHL Complete Search Terms and Search Results

Search Terms	Number of hits	Number of articles reviewed	Duplicates	Number of articles selected
Sleep apnea	4, 272	0		
Obstructive sleep apnea	3, 654	0		
Obstructive sleep apnea and screening tools	130	1		0

Obstructive sleep apnea and screening tools and outpatient	9	1		1

Table 2.

Medline Search Terms and Search Results

Search Terms	Number of hits	Number of articles reviewed	Duplicates	Number of articles selected
Sleep apnea	10, 005	0		
Obstructive sleep apnea	8, 674	0		
Obstructive sleep apnea and screening tools	258	5		3
Obstructive sleep apnea and screening tools and outpatient	14	0	5	0

Table 3.

Cochrane Search Terms and Search Results

Search Terms	Number of hits	Number of articles reviewed	Duplicates	Number of articles selected
Sleep apnea	5	0		
Obstructive sleep apnea	5	0	5	
Obstructive sleep apnea and screening tools	0	0		
Obstructive sleep apnea and screening tools and outpatient	0	0		

Table 4.

Gale Academic OneFile Search Terms and Search Results

Search Terms	Number of hits	Number of articles reviewed	Duplicates	Number of articles selected
Sleep apnea	5, 079	0		
Obstructive sleep apnea	4,111	0		

Obstructive sleep apnea and screening tools	133	1	3	1
Obstructive sleep apnea and screening tools and outpatient	8	0	5	0

Table 5.

Academic Search Premier Search Terms and Search Results

Search Terms	Number of hits	Number of articles reviewed	Duplicates	Number of articles selected
Sleep apnea	5,458	0		
Obstructive sleep apnea	4,869	0		
Obstructive sleep apnea and screening tools	128	3	13	1
Obstructive sleep apnea and screening tools and outpatient	10	1	6	0

Table 6.

Science Direct Search Terms and Search Results

Search Terms	Number of hits	Number of articles reviewed	Duplicates	Number of articles selected
Sleep apnea	1,862	0		
Obstructive sleep apnea	1,420	0		
Obstructive sleep apnea and screening tools	58	1	4	1
Obstructive sleep apnea and screening tools and outpatient	2	0	1	0

Appendix B

Evidence Appraisal

Search Question in PICO format: In patients over age 50 with essential hypertension and a BMI of 35 kg/m2 or greater, does the use of a screening tool compared to no screening tool predict the probability of obstructive sleep apnea (OSA) in the outpatient setting?

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
1	Sreedharan (2021)	To assess the use of STOP-Bang questionnaire as a screening tool for OSA in the outpatient cardiovascular setting.	Prospective study Level IV	-N=120 -Outpatient setting	-Cardiovascular patients. -High risk for OSA -Snoring -Normal- <5 apnea-hypopnea index (AHI). Mild OSA- AHI 5-15 per hr. Moderate OSA- AHI 15-30 per hr. Severe OSA- AHI >30 per hr.	- Bivariate analysis STOP-BANG questionnaire	STOP-BANG scores 3 or above had a sensitivity of 75% in predicting OSA.	Gave information about the implementation of STOP-BANG questionnaire usage in the outpatient setting.

2	Delgado-Vargas (2021)	Assess the use of the Spanish version of the STOP-BANG questionnaire.	Descriptive study Level VI	N=193 patients, University Hospital, Spain	Patients with and without OSA Normal- <5 apnea-hypopnea index (AHI). Mild OSA- AHI 5-15 per hr. Moderate OSA- AHI 15-30 per hr. Severe OSA- AHI >30 per hr.	STOP-BANG questionnaire	-A statistical difference was found between patients that had OSA and those without. -Cronbach α coefficient in the sample was 0.8072.	Gave information about the Spanish version of the STOP-BANG questionnaire.
3	Waseem (2021)	Performance of the STOP-BANG questionnaire among different ethnic groups.	Prospective Cohort study, Level IV	N=1,205 Multi-center, home apnea testing.	-Patient with known cardiovascular risk. -Patients 45 years and older Normal- <5 apnea-hypopnea index (AHI). Mild OSA- AHI 5-15 per hr. Moderate OSA- AHI 15-30 per hr. Severe OSA- AHI >30 per hr.	STOP-BANG questionnaire -Stata/SE 14.2 - Kruskal-Wallis test and Wilcoxon rank-sum test	Moderate to severe OSA may be missed in certain ethnicities with lower BMI.	Gave information about the use STOP-BANG questionnaire among different ethnicities and recommendations for BMI thresholds among

								various ethnic groups.
4	Showalter (2019)	To implement an OSA screening tool in the primary care setting.	Quality improvement study Level VI	N=32 Primary care clinic	Normal- <5 apnea-hypopnea index (AHI). Mild OSA- AHI 5-15 per hr. Moderate OSA- AHI 15-30 per hr. Severe OSA- AHI >30 per hr.	STOP-BANG questionnaire.	OSA screening is warranted in the outpatient setting especially for those with a diagnosis of hypertension.	Highlights how under-diagnosed OSA is in the primary setting.
5	Joseph (2018)	Review of the most common OSA screening tools	Review article Level VI	No sample size-review article.	The STOP questionnaire, STOP-Bang questionnaire, Berlin questionnaire, Epworth Sleepiness Scale, Fatigue Severity Scale, and the 4-Variable Screening Tool.	All tools and questionnaires were reviewed separately	Highlights STOP-BANG as the most sensitive screening tool for OSA.	Highlights STOP BANG reliability and accuracy among different population groups in various studies.

6	Mustač (2019)	To examine the difference in STOP-BANG questionnaire scores for patients with hypertension versus those without to gauge this screening tool efficacy.	Cross-sectional Study Level IV	N= 49, Outpatient tertiary healthcare center	-STOP-Bang questionnaire Obese – BMI>30kg.m2.	-Welch t-tests	Patient with hypertension had significantly higher score on STOP questionnaire than patients without hypertension: t(24)=-3.32; p=.003	STOP-BANG questionnaire is an effective tool in obese hypertensive patients.
7	Ononye, (2019)	To implement an OSA protocol in the primary care setting	Quality improvement project Level VI	N=187, Urban primary care clinic	STOP-Bang questionnaire, Adults 40 and older	- IBM SPSS Statistics 20.0.	STOP-BANG questionnaire as a reliable tool to identify moderate to severe OSA.	Identification of OSA in the primary setting could be missed without tool implementation.

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Appendix C

Level of Evidence Synthesis Table

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

Outcomes Synthesis Table

Article Number	1	2	3	4	5	6	7
STOP-BANG Questionnaire	+	+	+	+	+	+	+
STOP-BANG screening tool among certain ethnic groups	-	+	+	-	-	-	-
STOP-BANG + Outpatient Setting	+	-	+	+	-	+	+

+ (provided information); - (no information provided)

References (In numerical order)

Sreedharan, S., Mitta, N., Unnikrishnan, K., Paul, R., Pillai, V., Sreedharan, S. E., & Unnikrishnan, K. P. (2021). Preoperative screening for obstructive sleep apnea in cardiovascular patients - How useful is STOP-BANG questionnaire in the Indian context? *Annals of Cardiac Anaesthesia*, 24(3), 308–312. https://doi-org.sacredheart.idm.oclc.org/10.4103/aca.ACA_132_20

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Appendix D

Sleep Apnea Screening Policy

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Title: Obstructive Sleep Apnea Screening Tool

Policy:

All patients over 50 with hypertension and BMI 35 kg/m2 are to be assessed for obstructive sleep apnea (OSA) using the STOP-BANG Questionnaire (SBQ) at each visit or at least twice yearly unless diagnosed before via sleep studies.

Purpose and Intent:

a. To guide the primary care providers in the assessment of obstructive sleep apnea

b. Identify patients at risk for OSA

c. Facilitate referral to polysomnography (PSG) to optimize patient care.

Applicability: This policy is applicable to Advanced Cardiovascular Specialists (Primary care division), 439 Mill Hill Avenue, Bridgeport, CT.

I. <u>Definitions</u>:

A. OSA – Obstructive Sleep Apnea

B. SBQ- STOP-BANG Questionnaire

C. BMI – Body Mass Index

D. EMR – Electronic Medical Record

E. LIP - Licensed Individual Practitioner (MD's, Nurse Practitioners)

F. PSG- Polysomnography

II. General instructions:

a. Assessment

1. All patients over 50 with a history of hypertension and BMI of 35 kg/m2 or greater to be assessed for OSA using SBQ at each visit unless diagnosed.

i. SBQ assessment areas: Snoring, Tiredness, Observed Apnea, (High) Pressure, BMI 35 kg/m2 or greater, Age: >50, Neck Circumference: greater than 16 inches and Gender: Males.

ii. SBQ Scoring

- **Low risk:** Yes to 0-2 questions
- **Intermediate risk:** Yes to 3-4 questions
- **High risk:** Yes to 5-8 questions

III. Effective date

This policy statement is effective immediately upon the adoption date, June 27, 2022.

IV. Suggested Recommendations to LIP

1. Document OSA SBQ questionnaire score in the patient's EMR in the appropriate section.
2. Refer patients with a score of 3 or greater for PSG (sleep studies).
    a. Document reason(s) for patient's refusal to accept sleep study referral.

Appendix E

Training Pre-Survey

Implementation of STOP-BANG Screening Questionnaire in the Primary Care Setting

This questionnaire is designed to be completed by providers within this setting. The questions measure knowledge about OSA, and screen tools perceptions.

1. **What is you occupation/job title?**
    a) Medical Assistant
    b) Nurse Practitioner
    c) Nurse
    d) Other
2. **How many patients are seen in this practice per week that exhibit signs and symptoms of obstructive sleep apnea (OSA)?**
    a) <10
    b) 10-15
    c) >15
3. **Do you routinely screen patients for OSA using a screening tool (STOP-BANG, Epworth Sleepiness scale (ESS), Berlin etc.)**
    a) Rarely (<25%)
    b) Sometimes (25-50%)
    c) Most of the time (75%)
    d) All the time (100%)
4. **What screening tool do you utilize and why? (Ease, reliability etc.)**

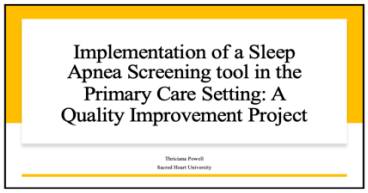
.

5. **What suggestions do you have to improve the screening of patients at high risk for OSA?**

.

Appendix F

Provider PowerPoint Education (Pre-Implementation)



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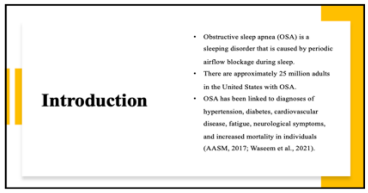

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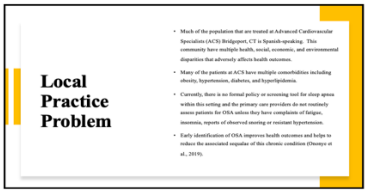

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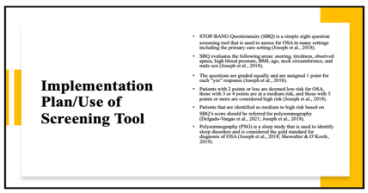

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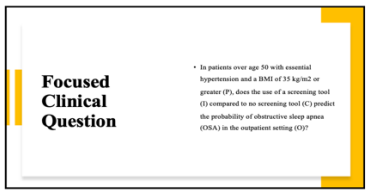

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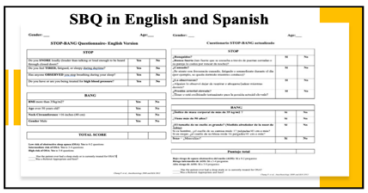

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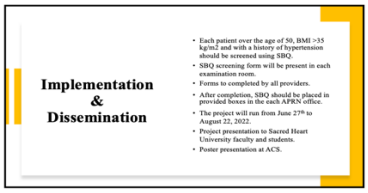

7

8

Appendix G

STOP-BANG Questionnaire- English Version (PDSA cycle #1)

Gender: ___ **Age: ___**

STOP		
Do you **SNORE** loudly (louder than talking or loud enough to be heard through closed doors?	**Yes**	**No**
Do you feel **TIRED,** fatigued, or sleepy during daytime?	**Yes**	**No**
Has anyone **OBSERVED** you stop breathing during your sleep?	**Yes**	**No**
Do you have or are you being treated for **high blood pressure**?	**Yes**	**No**

BANG		
BMI more than 35kg/m2?	**Yes**	**No**
Age over 50 years old?	**Yes**	**No**
Neck Circumference >16 inches (40 cm)	**Yes**	**No**
Gender Male	**Yes**	**No**

TOTAL SCORE		

Low risk of obstructive sleep apnea (OSA): Yes to 0-2 questions
Intermediate risk of OSA: Yes to 3-4 questions
High risk of OSA: Yes to 5-8 questions

_____ Has the patient ever had a sleep study or currently treated for OSA?
_____Was a Referral Appropriate and Sent?

Chung F. et al., Anesthesiology 2008 and BJA 2012

Appendix H

Cuestionario STOP-BANG actualizado (PDSA cycle #1)

Gender: ___ **Age:__**

STOP		
¿Ronquidos? ¿**Ronca fuerte** (tan fuerte que se escucha a través de puertas cerradas o su pareja lo codea por roncar de noche)?	**Sí**	**No**
¿Cansado? ¿Se siente con frecuencia cansado, fatigado o somnoliento durante el día (por ejemplo, se queda dormido mientras conduce)?	**Sí**	**No**
¿Lo observaron? ¿Alguien lo observó dejar de respirar o ahogarse/jadear mientras dormía?	**Sí**	**No**
¿Presión arterial elevada? ¿Tiene o está recibiendo tratamiento para la presión arterial elevada?	**Sí**	**No**

BANG		
¿Índice de masa corporal de más de 35 kg/m2 ?	**Sí**	**No**
¿**Tiene más de 50 años?**	**Sí**	**No**
¿El tamaño de su cuello es grande? (Medido alrededor de la nuez de Adán) Si es hombre, ¿el cuello de su camisa mide 17 pulgadas/43 cm o más? Si es mujer, ¿el cuello de su blusa mide 16 pulgadas/41 cm o más?	**Sí**	**No**
Sexo = ¿Masculino?	**Sí**	**No**

Puntaje total		

Bajo riesgo de apnea obstructiva del sueño (AOS): Sí a 0-2 preguntas
Riesgo intermedio de AOS: Sí a 3-4 preguntas
Alto riesgo de AOS: Sí a 5-8 preguntas

_____ Has the patient ever had a sleep study or currently treated for OSA?

_____Was a Referral Appropriate and Sent?

Chung F. et al., Anesthesiology 2008 and BJA 2012

Appendix I

STOP-BANG Questionnaire- English Version (PDSA #2)

Gender: ___ **Age:___**

STOP		
Do you **SNORE** loudly (louder than talking or loud enough to be heard through closed doors? or Does your sleeping partner tell you that you snore?	**Yes**	**No**
Do you feel **TIRED,** fatigued, or sleepy during the daytime?	**Yes**	**No**
Has anyone **OBSERVED** you stop breathing during your sleep?	**Yes**	**No**
Do you have or are you being treated for **high blood pressure**?	**Yes**	**No**

BANG		
BMI more than 35kg/m2?	**Yes**	**No**
Age over 50 years old?	**Yes**	**No**
Neck Circumference >16 inches (40 cm)	**Yes**	**No**
Gender Male	**Yes**	**No**

TOTAL SCORE		

Low risk of obstructive sleep apnea (OSA): Yes to 0-2 questions
Intermediate risk of OSA: Yes to 3-4 questions **(PLEASE SEND REFERRAL FOR SLEEP STUDY)**
High risk of OSA: Yes to 5-8 questions

_____ Has the patient ever had a sleep study or is currently treated for OSA?3
_____Was a Referral Appropriate and Sent?

Chung F. et al., Anesthesiology 2008 and BJA 2012

Appendix J

Cuestionario STOP-BANG actualizado (PDSA #2)

Gender: ___ **Age:___**

STOP		
¿Ronquidos? ¿**Ronca fuerte** (tan fuerte que se escucha a través de puertas cerradas o su pareja lo codea por roncar de noche)?	**Sí**	**No**
¿Cansado? ¿Se siente con frecuencia cansado, fatigado o somnoliento durante el día (por ejemplo, se queda dormido mientras conduce)?	**Sí**	**No**
¿Lo observaron? ¿Alguien lo observó dejar de respirar o ahogarse/jadear mientras dormía?	**Sí**	**No**
¿Presión arterial elevada? ¿Tiene o está recibiendo tratamiento para la presión arterial elevada?	**Sí**	**No**

BANG		
¿Índice de masa corporal de más de 35 kg/m2 ?	**Sí**	**No**
¿**Tiene más de 50 años?**	**Sí**	**No**
¿El tamaño de su cuello es grande? (Medido alrededor de la nuez de Adán) Si es hombre, ¿el cuello de su camisa mide 17 pulgadas/43 cm o más? Si es mujer, ¿el cuello de su blusa mide 16 pulgadas/41 cm o más?	**Sí**	**No**
Sexo = ¿Masculino?	**Sí**	**No**

Puntaje total		

Bajo riesgo de apnea obstructiva del sueño (AOS): Sí a 0-2 preguntas
Riesgo intermedio de AOS: Sí a 3-4 preguntas **(PLEASE SEND REFERRAL FOR SLEEP STUDY)**
Alto riesgo de AOS: Sí a 5-8 preguntas

_____ Has the patient ever had a sleep study or is currently treated for OSA?
_____Was a Referral Appropriate and Sent?

Chung F. et al., Anesthesiology 2008 and BJA 2012

Appendix K

Training Post-Survey

Implementation of STOP-BANG Screening Questionnaire in the Primary Care Setting

This questionnaire is designed to be completed by providers within this setting. The questions measure knowledge about OSA, and screen tools perceptions after the OSA screening implementation PowerPoint presentation.

1. **What is you occupation/job title?**
    e) Medical Assistant
    f) Nurse Practitioner
    g) Nurse
    h) Other
2. **Was the presentation valuable to your practice and provides enough information about the STOP-BANG questionnaire?**
    a) Yes
    b) No, please explain. .

    .

3. **What section(s) of the training was most effective and why?**

    '

4. **What changes should be made to make the implementation training more effective?**
    .

    .

5. **How likely are you to use the STOP-BANG screening tool in practice?**
    a) Very unlikely
    b) Somewhat likely
    c) Unlikely
    d) Somewhat likely
    e) Very likely

Appendix L

Differentiating Quality Improvement and Research Activities Tool

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

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

Appendix M

CITI Modules

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Thriciana Powell (ID: 11055171)
- **Institution Affiliation:** Sacred Heart University, Inc. (ID: 2025)
- **Institution Email:** powell-findlayt@mail.sacredheart.edu
- **Institution Unit:** School of Nursing
- **Phone:** 9146232147

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Record ID:** 48605633
- **Completion Date:** 23-Apr-2022
- **Expiration Date:** 22-Apr-2025
- **Minimum Passing:** 80
- **Reported Score*:** 97

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and Its Principles (ID: 1127)	23-Apr-2022	3/3 (100%)
Students in Research (ID: 1321)	23-Apr-2022	5/5 (100%)
History and Ethical Principles - SBE (ID: 490)	23-Apr-2022	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	23-Apr-2022	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	23-Apr-2022	5/5 (100%)
Assessing Risk - SBE (ID: 503)	23-Apr-2022	4/5 (80%)
Informed Consent - SBE (ID: 504)	23-Apr-2022	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	23-Apr-2022	4/5 (80%)
Research with Prisoners - SBE (ID: 506)	23-Apr-2022	5/5 (100%)
Research with Children - SBE (ID: 507)	23-Apr-2022	5/5 (100%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	23-Apr-2022	5/5 (100%)
International Research - SBE (ID: 509)	23-Apr-2022	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	23-Apr-2022	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	23-Apr-2022	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	23-Apr-2022	4/4 (100%)
Conflicts of Interest in Human Subjects Research (ID: 17464)	23-Apr-2022	5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?kef58d559-6084-4b0f-882f-8692f2b6be7f-48605633

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

Appendix N

CITI Modules

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2

COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Thriciana Powell (ID: 11055171)
- **Institution Affiliation:** Sacred Heart University, Inc. (ID: 2025)
- **Institution Email:** powell-findlayt@mail.sacredheart.edu
- **Institution Unit:** School of Nursing
- **Phone:** 9146232147

- **Curriculum Group:** Responsible Conduct of Research for Administrators
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 48011753
- **Completion Date:** 21-Mar-2022
- **Expiration Date:** N/A
- **Minimum Passing:** 80
- **Reported Score*:** 100

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Collaborative Research (RCR-Basic) (ID: 16598)	21-Mar-2022	5/5 (100%)
Conflicts of Interest (RCR-Basic) (ID: 16599)	21-Mar-2022	5/5 (100%)
Financial Responsibility (ID: 16601)	21-Mar-2022	5/5 (100%)
Mentoring (RCR-Basic) (ID: 16602)	21-Mar-2022	5/5 (100%)
Data Management (RCR-Basic) (ID: 16600)	21-Mar-2022	5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?kb2cb2c18-13e3-4ce3-9b25-b1e91d1ce44b-48011753

Collaborative Institutional Training Initiative (CITI Program)
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Appendix O

CITI Modules

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2

COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Thriciana Powell (ID: 11055171)
- **Institution Affiliation:** Sacred Heart University, Inc. (ID: 2025)
- **Institution Email:** powell-findlayt@mail.sacredheart.edu
- **Institution Unit:** School of Nursing
- **Phone:** 9146232147

- **Curriculum Group:** Conflict of Interest mini-course
- **Course Learner Group:** Conflict of Interest
- **Stage:** Stage 1 - Stage 1

- **Record ID:** 48011754
- **Completion Date:** 21-Mar-2022
- **Expiration Date:** 20-Mar-2026
- **Minimum Passing:** 80
- **Reported Score*:** 100

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Financial Conflicts of Interest: Overview, Investigator Responsibilities, and COI Rules (COI-Basic) (ID: 15070)	21-Mar-2022	5/5 (100%)
Institutional Responsibilities as They Affect Investigators (COI-Basic) (ID: 15072)	21-Mar-2022	5/5 (100%)
Conflicts of Commitment and Conscience (COI-Basic) (ID: 15073)	21-Mar-2022	5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?k0ab56893-fa57-4691-8ccf-7d3eaef03b8b-48011754

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
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Web: https://www.citiprogram.org

Appendix P

Sacred Heart Institutional Review Board Approval

From: Taber, Prof. Christopher B. <taberc@sacredheart.edu>
Sent: Monday, May 2, 2022 11:46 AM
To: Penque, Prof. Susan l. <penques@sacredheart.edu>
Cc: Londo, Madeline C. <londom@mail.sacredheart.edu>; Alp, Feride F. 'Funda' <alpf1@sacredheart.edu>; Yolen, Nina <yolenn@sacredheart.edu>
Subject: IRB#220502A - Exempt Status Request

Dear Applicant,
Thank you for your submission to the IRB requesting exempt review. Based on the application submitted, the IRB is pleased to approve your submission and we wish you great success in your research.

Sincerely,
Christopher Taber
Chair, IRB

Christopher B. Taber, PhD, CSCS, USAW2, EP-C, PES
Director, Exercise and Sport Science M.S. Program
Assistant Professor
College of Health Professions
Sacred Heart University
(203) 396-6342

To learn more about the M.S. in Exercise and Sport Science program, click here.

To see where our M.S. alumni are working, click here.

Doctor of Nursing Practice Project Roadmap

Student Name: Thriciana Powell

Project Title: Implementation of the STOP-BANG Screening Tool in the Primary Care Setting

Project Mentor: Susan Penque, PhD, APRN, ANP-BC, NE-BC

Practice Mentor: Luis Rojas, DNP, APRN, FNP

	Doctor of Nursing Practice Project Roadmap	
Component	**Definition**	**Date Done**
Phase 1: Problem Identification and Evidence Review		
Clinical Inquiry including background and significance of problem	Describe local problem and its significance. Include data to frame local problem.	3/18/22
Organizational priority	Summarize information that supports topic/problem is an organizational priority.	3/18/22
Searchable Question	Write a focused, searchable question using an established method (e.g. PICO).	3/18/22
Evidence search	External evidence ● Summarize search strategy (e.g. databases, keywords, filters/limits, criteria for article selection, tools for critical appraisal). Include practice-based evidence (e.g. evidence-based solutions that experts/other health systems have implemented to address practice problem).	3/20/22
	Internal evidence ● Summarize applicable unit/community/department/hospital/organizational level data or data required for national entities (e.g. CMS, NDNQI, AHRQ).	3/20/22
	Perform needs assessment if applicable.	3/20/2022
Evidence appraisal, summary, and recommendations	Organize evidence that answers focused clinical question in a clear concise format (e.g. table or matrix).	3/21/22
	Appraise literature for quality and applicability of evidence using established method (e.g. Johns Hopkins Nursing EBP Research Evidence Appraisal Tool, Joanna	3/21/22

	Briggs Institute Critical Appraisal Tools, Fuld Institute for EBP critical appraisal tools etc.).	
	State recommendations(s) and link to evidence strength and quality and risk/benefits.	3/22/22
Phase 2: Project Planning		
Project goals	State intended, realistic outcomes of project using established method (e.g. SMART criteria).	4/12/22
Framework	Select framework/model to guide implementation (e.g. EBP model, QI framework, Change model).	4/12/22
Context	Describe project setting and participants or population, or other elements that are central to where the change will occur.	4/12/22
Key stakeholders	Identify agencies, departments, units, individuals needed to complete the project and/or affected by project, and strategies to gain buy-in.	4/12/22
Practice change/intervention	Provided detailed description of practice change or intervention (e.g. new or revised policy).	4/12/22
Evaluation	Summarize plan for evaluating the effectiveness of the practice change. Identify applicable process and outcome data to be collected/tracked and tools to do this. Identify the methods for analyzing/interpreting the data (e.g. control, run or Pareto charts).	4/20/22
Possible barriers to implementation	Identify possible barriers and implementation strategies to mitigate these barriers.	4/20/22
Sustainment	Identify strategies to sustain the change.	4/20/22
Timeline	Create a realistic timeline for project completion.	4/20/22
Resources	Identify all resources (e.g. indirect and direct) needed to complete the project.	4/20/22
Ethical merit	Identify and obtain the required review and approval needed for implementation (e.g. institution, community agency, IRB).	5/02/22
Phase 3: Implementation		
Implement project	Carry out the project using selected implementation framework/model.	6/27/2022
	Track any deviations/changes from the project plan.	Completed on 9/02/22
Phase 4: Evaluation		

Results/Interpretation	Using an established method (e.g. run or control charts) display data and interpret project outcomes.	Complete 9/22
	Report evaluation of the effectiveness of the practice change, including extent the practice change was implemented (process outcome) and extent to which the desired outcome(s) were achieved.	Complete by 9/22
Return on investment	Identify the final resources that were used to implement the project. Calculate and report the return on investment.	Complete by 10/22
Phase 5: Dissemination		
Traditional	Disseminate to the project setting in a manner meaningful to them (e.g. executive report, poster, presentation at a meeting, poster with QR code to access details of project, etc.)	Complete by 5/1/23
	Disseminate in the format required by the academic institution (e.g. poster, public presentation) and	
	Prepare final project write-up using established reporting guidelines (e.g. EPQA, SQUIRE) and academic institution requirements.	
Non-traditional	Develop a website to display project, use personal or program social media (e.g. Twitter, Facebook) to share project information.	N/A

PICO, Population, Intervention, Comparison, Outcome; **CMS**, Center for Medicaid and Medicare Services; **NDNQI**, National Dataset of Nursing Quality Indicators; **AHRQ**, Agency for Healthcare Research and Quality; **SMART**, specific, measurable, attainable, relevant, timely; **IRB**, Institutional Review Board; **EPQA**, Evidence-Based Practice Process Quality Assessment Guidelines; **SQUIRE,** Standards for QUality Improvement Reporting Excellence