Increasing Identification of Stroke Risk in Atrial Fibrillation Patients

by

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Abstract

Atrial Fibrillation (AF) is known to be a significant risk factor for ischemic stroke, as well as other thromboembolic events. Patients with (AF) are at increased risk of arterial thromboembolism. The DNP Quality Improvement (QI) project used the screening tool CHA2DS2-VASc to identify AF patients who are at low, moderate, or high risk for embolic disease and stroke at a North Carolina primary health care setting. This project directly impacted outpatient health care with achieving better care quality outcomes for the AF patient population. The nurse practitioner care model, which targets quality initiative care provision to patients with cardiovascular illnesses, provided the theoretical underpinning for this QI project in order to meet the goals of the Institute of Health Improvement Triple Aim. Using CHA2DS2-VASc as a screening tool in this QI project helped to identify risk factors for AF patients. Of the 50 patients with AF screened, 82% were at moderate to high risk for stroke and met eligibility for oral anticoagulation therapy. As a result, the CHAD2DS2-VASc screening tool is incorporated into the electronic health record ensuring adherence and sustainability.

Keywords: Identification, atrial fibrillation, CHA2DS2-VASc, quality improvement, risk factor

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Chapter One: Overview of the Problem

About 49 million people 65 years and older live in the United States (United States Census Bureau, 2018). This population has more atrial fibrillation (AF) and stroke than any other age group (Center for Disease Control and Prevention [CDC], 2017). AF is a significant risk factor for ischemic stroke. Both AF and stroke are leading health morbidity and mortalities in those 65 years and older. This chapter outlined the background and significance of the problem of AF patients who are at risk for stroke. With a question guiding inquiry, this chapter discussed the population, intervention, comparison, and outcome of the interventions for stroke. This chapter concludes with summarized statements.

Background Information

In a cross-section analysis, Rozen et al. (2018) examined in their cross-sectional analysis study of emergency department (ED) visits for AF from 2007 to 2014 and noted that AF occurs more frequently in adults 65 and older. Research indicates that AF caused 15–20% of ischemic strokes annually in the United States (CDC, 2017). It is an independent risk factor for stroke that occur undetected at times, in patients 65 years and older (Turakhia et al., 2018). According to Boehme, Esenwa, & Elkind (2017), about 28% of this population in the United States (US) suffered an ischemic stroke (Boehme, Esenwa, & Elkind, 2017) with debilitating consequences for the patients, healthcare system, and taxpayers. Debilitating consequences of stroke are associated with memory loss, dementia, gait impairment, and functional disability (Boehme, Esenwa, & Elkind, 2017). Stroke is a leading cause of death, long-term disability, reduced mobility, and poor quality of life in more than half of adult survivors 65 and over (CDC, 2017).

In the US, about 750,000 hospitalizations, with mortality of about 130,000 deaths occur yearly among AF patients (CDC, 2017). Whereas AF costs in the United States are about $6

billion each year, the resulting stroke is estimated at $34 billion each year in health care services, medicines, and missed days of work (Boehme, Esenwa, & Elkind, 2017). Per capita, ischemic stroke cost the taxpayer about $14,000 to $20,000 yearly in healthcare cost (United States Census Bureau, 2018). Despite the financial and health burden of AF and stroke in the United States, in those ≥ 65 years, several of them have undetected and undiagnosed AF (Turakhia et al., 2018), thereby creating a healthcare gap in this population. Increasing trends from the aging U.S. population suggest that there is a need for clinical implementation of practical strategies directed at improving the detection and prevention of AF and Stroke (Rozen et al., 2018) among the ≥65 population.

Large observational cohort studies indicate that AF, increased stroke and systemic embolism occur with increased morbidity and mortality if no oral anticoagulation (OAC) is prescribed (Morillo, Banerjee, Perel, Wood & Jouven, 2017). In a southeastern North Carolina (NC) primary outpatient care clinic with 12,000 active patients, 90% are adults, and 3,279 patients are ≥ 65 years and older. Data revealed that this primary care practice has no standardized screening process to identify stroke risks in patients with AF so that therapeutic intervention provided to prevent stroke. Many of these patients are at risk for thromboembolic disease due to unidentified stroke risks or untreated AF. For this reason, a quality improvement (QI) was conducted, which aimed to identify patient risk factors for stroke in this primary care clinic. The QI was conducted with an evidenced-based risk assessment and stratification screening tool CHA2DS2-VASc to bridge that gap in health care in the clinic (see Appendix C). Chart reviews and data were collected for evaluation. This project increased screening adherence by providers and increased identification of risk for stroke in AF patients who are ≥ 65 years. The QI project helped to provide intervention for stroke with OAC and lifestyle modification.

The Significance of Clinical Problem

AF is one of the most common disorders of cardiac rhythms. Virchow's triad indicated that vascular dysfunction, coagulation factors, and stasis of blood in the heart vessels (Yamashita, 2016) lead to a thromboembolic event (see Appendix D). Patients with AF have increased risk of arterial thromboembolism and ischemic stroke (Kamel, Okin, Elkind, & Iadecola, 2016). According to Chen et al. (2013), AF increased the risk of stroke five-times and contributed to about 15% of all stroke. AF and ischemic stroke management are complicated and expensive; for that reason, detection through screening and identification of risk factors bridges the gap in care. As Rozen et al. (2018) discussed the clinical need to implement strategies to detect and prevent stroke is required.

A primary care clinic in southeastern NC had no standardized process of identifying risk factors for stroke; for that reason, a quality improvement project conducted helped to bridge that gap in care. The QI utilized the CHA2DS2-VASc tool, according to the Clinical Practice Guidelines of American Heart Association/American College of Cardiology/American Heart Association Task Force/Heart Rhythm Society (AHA/ACC/HRS) (January et al., 2019). The tool identified risk factors in AF patients who are at low, moderate, or high risk for stroke and embolic disease. The QI project recommended intervention for stroke prevention. The use of the screening tool increased staff adherence to screening and identification, improved quality of care for the AF patient, and prevented stroke in the AF patient population.

CHA2DS2-VASc screening tool used in the project directly increased the number of patients identified by stratifying stroke and thromboembolism risk. This standardized process directly improved the identification of patient's risk to prevent stroke. The process increased provider adherence to screening AF patients at risk and provider compliance with using the

evidenced-based screening tool, CHA2DS2-VASc, according to the AHA/ACC/HRS (January et al., 2019). Further, this quality improvement indirectly improved the quality of patient care. The QI implemented by the DNP graduate and providers impacted patient health, satisfaction, and quality of life by achieving better health outcomes for AF patients at risk for stroke.

Question Guiding Inquiry (PICO)

Population. The QI project targeted the healthcare providers who see patients at the primary care clinic, including an experienced Physician, Nurse Practitioner (NP), and Physician Assistant (PA). The providers utilized the evidenced-based screening tool CHA2DS2-VASc and screened AF patients at risk for stroke. In using the tool, the providers screened the patients and increased adherence to using the tool and screening for risk factors. Using the tool also increased the identification of AF patients at risk for stroke. In the QI project, the providers focused and screened all patients with a diagnosis of AF who were 65 years and older in a primary care clinic in southeastern NC. The QI project improved provider screening and scoring of the patients for better stratification and quality intervention.

Intervention. Providers received education about using the evidenced-based screening tool before implementation (see Appendix C). The CHA2DS2-VASc tool improved patient outcomes by screening and stratifying patients' stroke risk levels for therapy intervention (Zhu, Xiong, & Hong, 2015). Providers screened AF patients with questions about the risk factors and assigned scores of 0 to "no" and 1 to "yes." However, a 2 was assigned a "yes," if the age of the patient was ≥ 75 years or if the patient had a prior stroke or TIA. Providers then added the scores and stratified a patient at a level of either low, moderate, or high risk for stroke, which indicated the need for anticoagulation therapy or not (Deitelzweig, Jing, Swindle, & Makenbaeva, 2014). Age scored one time only. Thus, the highest possible point scored by a

patient was 9. The higher the score, the higher the percentage of the annual risk score for stroke

(see Appendix F). A score of 9 placed a patient at a 15.2 % annual risk of having a stroke. The

numbers stratified as no risk for 0, low risk for a 1, moderate risk for a 2 and higher risk for any

score ≥ 2, which required intervention with OAC according to the AHA/ACC/HRS Clinical

Practice Guidelines (January et al., 2019). AHA/ACC/HRS recommended that any score ≥2

required OAC to prevent stroke thromboembolism (Deitelzweig et al., 2014).

Implementing the CHA2DS2-VASc tool directly increased provider adherence and

compliance with the use of the screening tool. Providers identified patients at risk for stroke,

which indirectly impacted patient outcomes of better health care, patient satisfaction, and

improved quality of life. Providers also indirectly impacted the reduction in cost per capita

health.

Comparison: CHA2DS2-VASc intervention effects were compared with patients not

identified through the screening. The CHA2DS2-VASc is a modified version of the CHADS2

score. The CHA2DS2-VASc enhanced the screening by adding vascular disease, increased age

of 65 to 74, and female sex category than the CHADS2 tool. Further, CHA2DS2-VASc

screened and stratified patients at a more accurate assessment of stroke risk because patients

stratified at the low-risk score with the CHADS2 are more likely to have a thromboembolic

event (Chen et al., 2013). This QI project improved screening and identification of AF patient's

risk for stroke, to prevent stroke and improve their quality of life. The use of CHA2DS2-VASc

in this practice will not be compared to the national benchmark because the practice does not

have a standardized tool used, and no pre-implementation statistic was available.

Outcome(s). Measurable outcomes include:(1) How many patients with AF diagnoses

were screened and identified with CHA2DS2-VASc for low, moderate, and high-risk levels

based on comorbid hypertension, diabetes, previous ischemic stroke, and other factors. (2) Of

these patients, how many required no intervention. (3) How many required recommendations for

interventions with anticoagulation therapy.

Summary

AF is a significant risk factor for stroke. Background and significance showed that stroke

debilitated and decreased the quality of life of patients. Stroke is associated with a high financial

burden for the patient, health industry, and taxpayers. Older patients, 65 years and older, are

known to experience AF and stroke more than another age group. In a primary care site in

southeastern NC, AF patients were screened for risk of stroke because there was no standardized

process or tool to screen this group. Quality improvement was conducted using a question

guiding instrument (PICO), which outlined the target population to be the providers in the clinic.

Providers screened patients for risk factors with an evidenced-based risk stratification screening

tool, CHA2DS2VASc. Patients were stratified to a low, moderate, and high risk. Patients who

scored ≥2 were recommended for OAC per the AHA/ACC/HRS clinical guidelines for the

prevention of stroke. There were no pre-implementation data compared. Outcome measures

included the number of patients screened and identified by providers and the number of patients

who received OAC recommendations. The QI project identified risk among AF patients and

prevented ischemic events with OAC recommendations. Staff adherence to the screening

process during implementation helped to achieve the outcomes. Giving appropriate

recommendations for pharmacologic intervention reduced the incidence and mortality associated

with thromboembolic stroke.

Chapter Two: Review of the Literature Evidence

This literature review includes a review of what is previously known about the CHA2DS2-VASc screening tool. The review explores screening and intervention options for solutions among atrial fibrillation patients in primary care. It reviews any gap in knowledge regarding the use of the screening tool CHA2DS2-VASc. A summary page concludes the chapter.

Literature Appraisal Methodology

Sampling strategies. The first search strategy was conducted in Fall of 2018 using electronic databases, Cumulative Index of Nursing and Allied Health Literature (CINAHL) with the keywords "atrial fibrillation" and "CHA2DS2-VASc" and "nursing." 78 articles were located. Of the 78 articles, 16 were rejected for date delimitations. Out of the remaining 62, fifty-eight did not meet selection criteria. Thus, four articles were used. Using PubMed via Medline, 188 articles were produced after searching with the terms "atrial fibrillation" and "CHA2DS2-VASc". The best match search yielded 12 articles. Of the 12 articles, three articles were kept due to topic focus, and nine were excluded. A new search strategy was conducted in summer 2019 in CINAHL using MeSH terms "atrial fibrillation," "stroke," and "CHA2DS2VASC", which produced 179 articles. Filters applied included timeframe of 2015 – 2019, and the English language only. Also, the use of MeSH terms "atrial fibrillation," "stroke risk factors," "CHA2DS2VASC risk stratification," narrowed the search to 19 articles. All articles were saved in a drive, and the abstracts were reviewed. Of these 19 articles, fourteen were excluded due to focus on treatment modalities, and five full-text articles were used. A total of 12 articles from 2018 and a set of searches in 2019 were selected.

Relevant articles found from other sources were sent to emails and utilized throughout the progression of the project.

Evaluation criteria. Articles found were peer-review articles, research studies, cohort studies, randomized control trials. Inclusions were research works that studied or examined the different impacts of CHA2DS2-VASc stratification of stroke risk. Exclusion criteria had designs that focused on oral anticoagulation (OAC) treatment modalities, or solely treatment interventions that were not a focus of this QI project. A meta-analysis study, comparative studies, cohort studies, and peer review articles directly related to the topic were included.   All articles having a date of more than six years were excluded. Language limits were exclusive to English. The patient population excluded pediatrics and any patient without a diagnosis of AF. A PRISMA diagram that depicted a uniform reporting standard of the research data was included (see Appendix B). Both quantitative and qualitative articles were included in the materials. A literature matrix was added using the total articles reviewed from the research (see Appendix A). Articles from other sources sent to the project leader's email were screened and used. Evidence from level I to VII was used (Melnyk & Fineout-Overholt, 2011). Level I had the highest number as they incorporated the meta-analysis and systemic reviews with evidence that supported clinical practice (Black, Balneaves, Garossino, Puyat, & Qian, 2015).

Evidence ranking included four levels I systematic reviews and meta-analysis regarding the abilities of CHA2DS2-VASc in the stratification of risk factors for ischemic events.   One level II randomized controlled trial assessed the outcome of the nurse practitioner care model on the quality of life of patients concerning their health (Kutzleb et al., 2015). The project used two-level III, and two of level IV cohort studies, one level V systematic review, and three-level VII clinical expert guidelines on the use of CHA2DS2-VASc. The one thing that the research

uniformly established was that AF required to be identified for intervention in other to prevent a thromboembolic event.

Literature Review Findings.

Lahewala et al. (2017) determined from a cohort review of thromboembolic risk assessment of AF patients in the hospital, using the CHA2DS2-VASc tool that a higher score was associated with increased death, more length of hospital stay, readmission and increased healthcare cost. In other words, the higher the risk identified with CHA2DS2-VASc, the higher the mortality, morbidity, and healthcare costs for the patient and indirectly higher for the healthcare system and taxpayers. Patients with AF have the most common disorder of the cardiac rhythm (Kamel, Okin, Elkind, & Iadecola, 2016). Per Virchow's triad, AF causes pooling of blood in the heart (Kamel et al., 2016). This stasis increases the risk of arterial thromboembolism and ischemic stroke (Kamel et al., 2016). AF contributes to about 15% of ischemic strokes in the United States (CDC, 2017) and is the most common cardiac arrhythmia (Zhu, Xiong, & Hong, 2015).   In their meta-analysis, Zhu, Xiong, and Hong (2015) agreed that using the validated tool CHA2DS2-VASc score, enabled the identification of AF patients at risk for a thromboembolic event. Screening and identifying with the CHA2DS2-VASC directed provider's therapeutic choice of anticoagulation therapy in patients with AF. This standard, as discussed in the findings of the above article, is not present in the primary care setting of this project. CHA2DS2-VASC predicted stroke and thromboembolic events in AF patients. The tool helped to optimize the prescription of anticoagulation therapy (Zhu, Xiong, & Hong, 2015) for the prevention of stroke.

According to Ding et al., (2017), AF was common among older adults and that although the use of anticoagulant drugs has increased among AF patients, two-thirds of the older AF

patients with a high risk of stroke are untreated, partly due to unknown risk factors. That is why

screening and identifying with CHA2DS2-VASc is significant in this group to bridge the gap in

care. Such a gap in care is one of the reasons for this project.   Bridging the gap will help to

standardize identification through screening with the validated tool in the primary care site of the

project.

Chapman et al. (2017) found that adherence to clinical guidelines on the use of the risk

stratification tool improved stroke prevention. Adherence to clinical guidelines like the use of

the standardized stratification tool in primary care can improve risk identification and stroke

prevention, as indicated by the use of CHA2DS2-VASc. An interprofessional team that included

primary care providers for stroke prevention was important (Chapman et al., 2017).

Smigorowsky, Norris, McMurtry, and Tsuyuki (2017) discussed the gap in timely access

to care for atrial fibrillation patients as a concern. They maintained that the use of nurse

practitioner staffed primary care clinics may improve identification, access to care, and quality of

care of AF patient population in the primary care setting. To concur, a nurse practitioner-led

primary care clinic may improve identification and adherence, considering the recent successful

nursing models, and QI implemented to decrease hospital readmission and healthcare cost

(Kutzleb et al., 2015).

On a related note, the literature indicates several gaps in knowledge and clinical practice

regarding the effects of CHA2DS2-VASc score and AF on the renal system, which has also led

to a stroke. Beyer-Westendorf, Kreutzc, Poschd, & Aye, (2017) found a strong correlation

between the CHA2DS2-VASc scores among AF patients and lower glomerular filtration rate

(GFR). Lower GFR indicates a decline in renal function in adults $\geq$ 65 years (Beyer-Westendorf

et al., 2017). Based on their study findings, Mohinder et al. (2017) concluded that non-valvular

atrial fibrillation, which presented with stroke and renal failure, is associated with a higher

CHA2DS2-VASc score. Although the focus of this QI is on AF as a risk factor for stroke,

empirical work on higher CHA2DS2-VASC scores and its effects of AF on the renal system

bears discussing. (Mohinder et al., 2017). Mohinder et al. (2017), reported debilitating effects of

AF on the renal system leading to stroke and correlated it with high CHA2DS2VASc score in AF

patients. Literature also delved into cross-sectional and repeat cohort studies that have linked AF

to dementia, including Alzheimer's disease, independent of the clinical valvular AF in patients

over 55 years (Alonso, & Arenas de Larriva, 2016). AF and dementia open a new avenue for

knowledge in research.

Limitations of the Literature Review Process

Limitation of the literature review includes the English language only, which misses out

on studies conducted in Europe, Asia, and reported in French or Japanese language. There are a

few versions of the risk assessment tool, including CHADS, RCHADS with different

interpretations and applications concerning the CHA2DS2-VASc screening. The different

interpretations and applications of these tools limit quick understanding and use of the process.

Despite empirical works on the debilitating health and financial costs of AF on patients, the

healthcare system, and on the taxpayers, a gap still exists in the identification of AF patient's risk

for stroke in primary care. This gap exists in the clinics, whether the clinic is staffed by nurse

practitioners or traditional physician providers (Smigorowsky, Norris, McMurtry, & Tsuyuki,

2017). Adherence to the use of the stratification tool lack in several primary care setting,

including the project site and so warrants the need for a QI project.

Since 2014, a recommendation for the use of the CHA2DS2-VASc stratification tool was

in place. This recommendation was for the identification of AF patient's risk for stroke in other

to provide an intervention, yet, most primary care clinics have gaps in the use of this tool. There

is, therefore, the need for quality improvement work in primary care for the use of this

stratification tool. Atrial fibrillation continues to be a significant health problem resulting in

stroke and its sequelae, including renal decline, functional decline, dementia, and cognitive

impairment. Therefore, using the CHA2DS2-VASc tool to identify the AF patients at risk for

stroke in this primary care site is an essential objective of this quality improvement. Further QI

projects are warranted in the intervention for patients identified that have a risk for stroke.

There are new nursing model clinics and QI projects that successfully identify and

manage high-risk patients (Kutzleb et al., 2015) outcomes in the outpatient setting. The NP-care

model and its program focused specifically on cardiovascular patients with heart failure who

were discharged to home but identified to be at high-risk for early readmissions. There is

evidence in fields other than nursing for QI projects and models that manage outcomes for the

AF. However, there is no evidence for nursing models or QI projects for the identification and

management of this AF population in the outpatient clinic, including the project site. Therefore,

more nurse practitioner-led clinics, QI, and evidence are needed in this area.

Discussion

Conclusions of findings. CHA2DS2-VASc, as a screening tool, identified and stratified

risk for stroke among AF patients in primary care settings. As Smigorosky et al. (2017) wrote,

AF patients require formal screening with tools such as CHA2DS2-VASc for identification of

risk and stroke prevention, which may result in better health and better quality of

life. Successful use of CHA2DS2-VASc involved an interprofessional team, including

physicians, nurses, nurse practitioners in primary care (Chapman et al., 2017). The high cost of

six billion dollars and about 450,000 hospitalizations accumulates from AF, each year in the US (Cutugno, 2015) A QI project that will decrease the risk associated with AF patients and reduce cost in health care is advisable. Risk factors such as diabetes mellitus, prior stroke, congestive heart failure, and hypertension make up the stratification scheme. Other risk factors like age 65 to 74 years, female gender, ≥ 75years, vascular disease including peripheral artery disease, myocardial infarction, and aortic plaque, make up the stratification scheme in CHA2DS2-VASc (Deitelzweig, Jing, Swindle, & Makenbaeva, 2014).   These risk factors are found in a significant number of AF patients in primary care (Jacob, 2017). AF is a considerable risk factor for stroke and thromboembolic events. Many AF patients and older adults in primary care remain at risk for thromboembolic disease from AF due to a lack of identification of the risk factors (Jacob, 2017).

The CHA2DS2-VASc screening tool is best suited to stratify AF patients into low, moderate, or high risk for stroke. AF accumulates high cost to the patient, the healthcare industry, and taxpayers in the US.   Primary care clinics run traditionally by physicians and NP staffed primary care clinics will identify AF patients and provide intervention for the patients at risk for stroke. A recommendation is for NP staffed clinics to identify and stratify the risk factors of AF patients in primary care. This identification will improve the health of AF patients, by directing their interventions, improving their quality of life, and reducing health care costs (Lahewala, 2017), even as other NP models are successful (Kutzleb et al., 2015).

Advantages and disadvantages of findings.

Direct advantages that support the QI project. The direct advantages of CHA2DS2-VASc, as a screening tool that screens, stratifies, and identifies a patient's risk for stroke. This stratification helps intervention with medication therapy. It guides patient

education on lifestyle modification for the patients at risk for stroke. Using the CHA2DS2-VASc

screening tool will increase staff adherence to the utilization of quality improvement. Staff will

also adhere to the clinical practice guidelines set by the American College of

Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the

Heart Rhythm Society guideline (AHA/ACC/HRS) (January et al., 2019) for the AF patient

population in primary care

Indirect advantage. The QI project will indirectly prevent stroke and reduce comorbid

conditions. Indirectly, the QI will improve the care quality and patient-provider relations in the

primary care setting. It will also indirectly improve the quality of life of the patient population

and save lives. The QI will indirectly reduce systemic health costs (Lahewala, 2017).

Disadvantage. The QI project addressed the most recent version of the stratification tool

CHA2DS2-VASc, according to the American College of Cardiology/American Heart

Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society guideline

(AHA/ACC/HRS). Despite the above, some researchers believed that the CHA2DS2-VASc

stratification scheme exposes too many patients to the intervention of anticoagulation therapy.

The above opinion was due to lower risk standards, which may cause hemorrhagic effects on

them (Wang, Zhang, Liu, Zhong, & Yang, 2018). For this reason, in the management of

antithrombotic therapy, a recommendation is in place for a bleeding risk to be screened before

treatment (Deering, 2017). However, the benefits of CHA2DS2VASC in identifying risk for the

prevention of stroke outweigh this hemorrhagic exposure risk.

Utilization of findings in practice. The utility of the CHA2DS2-VASc tool in primary

care to identify AF patient's risks for stroke is one the aim of this quality improvement

project. Based on the clinical guideline provided by the AHA/ACC/HRS, the patient population

will be screened and then stratified. A "yes" score is equivalent to a stratified number of 1 or 2,

while a "no" score is equivalent to zero in each of the conditions being screened. A higher score

indicates a higher risk of stroke, and a low score indicates a low risk of stroke. A score of zero is

considered an indeed lower risk score and will not require medication therapy or intervention

(Deitelzweig, Jing, Swindle, & Makenbaeva, 2014). A score of 0-1 is considered low risk. It

may not require medication therapy. However, lifestyle modification is encouraged at any level

in the care of patients as it helps maintain good health. With more than a low-risk score of 2 or

more, anticoagulation, therapy for the prevention of stroke, becomes necessary (Deitelzweig,

Jing, Swindle, & Makenbaeva, 2014).

Summary

CHA2DS2-VASc is a useful screening tool for stratifying AF patients to determine the

need for anticoagulation therapy in other to prevent stroke. Reviewed literature recommended

this evidenced-based screening tool for effective stratification of AF patient's risk for stroke, in

other to provide appropriate interventions.

Findings included using this tool to reduce stroke risk, comorbid conditions, and resultant

effects associated with AF. Findings also included open areas of research regarding the

CHA2DS2-VASC scoring scheme concerning renal failure and dementia. Using the CHA2DS2-

VASc tool will help staff adhere to standardized practice guidelines set by the ACC/AHA/HRS

for the identification of AF patient's risk factors for stroke. Using CHA2DS2-VASc tool will

continue to sustain change from the project in primary care. Direct advantage and outcome is the

identification of risk factors that will help providers to decide the intervention to implement in

other to prevent stroke. Indirect benefits included stroke prevention, improved quality care,

improved quality of life, decreased cost of healthcare.

Chapter Three: Theory and Concept Model for Evidence-Based Practice

The concepts that supported this quality initiative project includes risk factors, risk stratification, atrial fibrillation, quality improvement, and collaboration. Analysis of these concepts as they relate to the QI evidenced-based screening tool CHA2DS2-VASc was covered. This chapter explored the nurse practitioner's model framework that underpinned the project, as well as its application to practice change. The process change and project sustainability at the primary care site were evaluated with the Plan-Do-Study-Act (PDSA) evaluation model.

Concept Analysis

Risk factor. A risk factor is a personal characteristic, or toxin exposure to an individual that increases the susceptibility of developing a disease, injury, or death. More specifically, a risk factor is a measurement associated with the probability of illness or death, of which the patient may not be aware of (Willadsen et al., 2016). Occasionally, risk factors are actual disease diagnosis but can also be risk factors for other disease processes (Willadsen et al., 2016). Atrial fibrillation (AF) is an essential determinant of stroke. For AF patients, stroke risk includes conditions like heart failure, prior stroke or transient ischemic accident (TIA), hypertension, and advanced age of ≥65. Other conditions that increase stroke risk include (1) diabetes mellitus (DM), (2) vascular diseases, i.e. peripheral artery disease, (3) myocardial infarction, (4) aortic plaque, and (5) female gender. These comorbid conditions all predispose patients to AF and subsequent ischemic events. When providers identify risk factors, providers and patients may act to prevent disease (Huckel Schneider, Gillespie, & Wilson, 2017).   When providers use the CHA2DS2-VASc screening tool to identify AF patient's risks, the identification provides an opportunity for healthcare providers to reduce patient risks, prevent stroke, and improve patient outcomes.

   Risk Stratification. The concept of risk stratification or classification determines the

high, moderate, or low levels of probability of an injury or death. It is a variable determinant of

increased or decreased levels of risk (Huckel Schneider, Gillespie &Wilson, 2017). In this

project, stratification classifies which patient has a low, moderate, or high score. Stratification

can offer benefits to patients by helping to determine components of a care management plan and

prioritization of health care (Huckel Schneider, Gillespie, & Wilson, 2017).   For this reason,

screening may reduce readmissions, improve patient satisfaction, and increase good patient

outcomes. (Huckel Schneider, Gillespie & Wilson, 2017). Patients with AF are predisposed to

cerebral ischemia and infarct because of thromboembolism. Therefore, stratification of variable

scores based on heart failure, hypertension, age of ≥ 65, DM, prior stroke or TIA, vascular

disease, and female gender is useful to detect higher or lower risk of stroke. Among AF

population, risk factor identification is crucial to prevent cerebral ischemic disease. Identifying

AF patients with a stratified screening tool is the essence of this QI project because it directs

high-risk patients to thromboembolic stroke prevention by a prescribed intervention.

   Atrial fibrillation. A supraventricular rapid, irregular heartbeat that emanates from the

left atrium of the heart as a dysrhythmia, which may cause palpitations, fatigue, and shortness of

breath (Staerk, Sherer, Ko, Benjamin & Helm, 2017). Patients with AF have the most common

disorder of the cardiac rhythm, which causes stasis of blood in the heart and increases the risk of

arterial thromboembolism and stroke five-fold (Yamashita, 2016). An understanding of

Virchow's Triad (see Appendix D) shows that AF involves abnormalities in blood coagulation,

vessel dysfunction, and poor blood flow seen in AF patients (Byrnes & Wolberg, 2017).

Virchow's Triad, according to Yamashita (2016), involves:

Not only abnormalities in blood flow but also blood constituents and the antithrombotic

function of the vessel wall would play a role based on the assumption that thrombus

formation in the fibrillating left atrium has many similarities to that in the vein. In the

fibrillating atrium, the triads correspond to a decrease in blood flow, abnormalities in

coagulation factors, and atrial endocardial dysfunction. (p. 2377).

Research suggests that AF contributes to at least 15% of all strokes (Yamashita, 2016). If

providers identify AF patients, even when asymptomatic, they can prevent stroke and its

comorbidities, which will positively impact the lives of their patients.

Quality improvement. QI is significant to patient care, and reduction of harm as it is the

basis used to improve the care delivered to patients systematically (White, Butterworth, & Wells,

2017). Quality improvement characterizes a process that can be analyzed, measured, controlled,

and improved (White, Butterworth, & Wells, 2017). With the US aging population, healthcare

costs, patient safety, and the changing healthcare needs are areas of concern for healthcare

providers. For this reason, QI alleviates some of the problems of health care related to the aging

population.

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safety, and changing healthcare needs have become concerns for healthcare providers. For this

reason, QI alleviates some of the problems of health care among the aging population.

It is imperative to know that this quality improvement project is not a research project

and will not provide treatment to the AF patient. It is an improvement process in identifying AF

patients at more than low-risk scores of a stroke, with the evidenced-based tool, CHA2DS2-VASc, in the primary care setting. This QI will also include a recommendation for oral anticoagulation therapy for the prevention of stroke.   The first step is the identification of patients at risk and recommendations for the intervention to prevent stroke. The next step and future QI projects to treat with OAC to prevent ischemic events. Identifying the AF patient helps in shaping the interventions the patients receive, which improves the quality of care they receive and improve their lives.

Collaboration. Green and Johnson (2015), in their work on professional collaboration in research, education, and clinical practice, wrote that collaboration occurs when two or more entities work together to produce a desired and shared outcome. Interprofessional collaboration occurs among different disciplines and at different levels (Green & Johnson, 2015) to produce cost-effective and comprehensive care (O'Reilly et al., 2017). In healthcare, the Doctor of Nursing Practice (DNP) and other advanced practice registered nurses (APRNs) work together with physicians, therapists, pharmacists, social workers, and other clinicians in primary, secondary, and tertiary care, to gain professional growth and exchange knowledge. The different disciplines collaborate to research, develop clinical guidelines, and quality improvement for better patient care and outcomes.

DNPs and APRNs also work with government officials and stakeholders for policy changes made into law. In the primary care setting for this QI project, collaboration is with the stakeholders, including one physician, one physician assistant, one nurse practitioner, nurses, other healthcare workers, and the office manager. Other team members are faculty members at East Carolina University.

Model Framework

  Naming the Model. The nurse practitioner (NP) care model (Kutzleb et al., 2015)

provides an underpinning for this QI project. The NP care model is a patient-centered

collaborative approach that integrates medicine, nursing, individualized care of patients, and

therapeutic disease management to achieve a great outcome in patient care initiatives. These

initiatives have been successful in acute care, emergency departments, outpatient settings, or in

the use of evidence-based initiatives that are central to the improvements of risk factors in heart

failure patients (Kutzleb et al., 2015). The NP care model helped in monitoring and managing

care for patients with chronic heart failure (Kutzleb et al., 2015). The model was designed to

provide efficient, high-quality care to the heart failure patient population, produce adequate

patient satisfaction, and save cost in the health care system. It achieved the goal of the Triple

Aim of population health, quality care experience, and deduction in per capita cost (Institute of

Health Improvement [IHI], 2017). Patients with heart failure were identified as high risk for

early rehospitalization (Kutzleb et al., 2015). With the NP care model, a QI initiative identified

risk factors for intervention that decreased rehospitalization (Kutzleb et al., 2015).

  The NP care model targets the risk factors of lifestyle modification, including medication

noncompliance, diet nonadherence, and lack of self-care disease management (Kutzleb et al.,

2015). While the measurable objective of improved financial performance was met by reducing

a 30-day readmission record, other objectives in the area of quality patient outcomes, and patient

satisfaction were met (Kutzleb et al., 2015). NP care model was a significant success in a nurse-

led initiative program in the hospital. The nurse leaders collaborated with other disciplines in a

Healthy Heart Initiative Program to reduce the readmission rate (Kutzleb et al., 2015). Before

the program, the readmission rate for 30 days post-discharge was 26% in the year preceding the

initiative. After the QI initiative, the readmission rate for the 30 days post-discharge reduced to

8%, which dropped the hospital cost and increased patient satisfaction (Kutzleb et al., 2015).

Application to practice change. The NP care model provides a grounding for the QI

project by identifying patients with AF who are at risk for stroke. The NP care model was

chosen because it is one of the first successful nurse practitioner-led models that optimized the

expertise, education, clinical practice, and experience of NPs in various successful patient care

initiatives. Utilizing the NP care model in this QI, it achieves the Healthy People 2020 goal of

"improving cardiovascular health and quality of life through prevention, detection, and treatment

of risk factors for heart attack and stroke." (Office of Disease Prevention and Health Promotion

[ODPHP], n.d.).

The plan is early identification of stroke risk factors ([ODPHP], Healthy People 2020),

which is this QI project's primary outcome. Using the NP care model, this QI project achieved

the goal of the Triple Aim of improving the individual population health through the

identification of risk factors and prevention of stroke with the recommendation of OAC (see

Appendix I). The second goal of the Triple Aim is achieved by reducing the cost of healthcare

for the patient population and the taxpayers (IHI, 2017). Prevention of stroke reduces the cost of

hospitalization and comorbid healthcare-related costs. In this DNP project, stroke risk factors

are stratified in other to identify patient's risks. Based on the stratified and identified risk scores,

oral anticoagulation therapy may follow. Empirical studies and evidence-based practice have

shown that using CHA2DS2-VASc to determine stroke risk among AF patients is beneficial

(Ding et al., 2017). The benefit in identification allowed for interventions channeled to the

patient. Other benefit includes quality care that decreases stroke, and cost of healthcare-

associated with thromboembolic events, as mirrored in the NP care model (Kutzleb et al., 2015).

Identification and interventions improve patient health, decrease healthcare costs, and achieves a Healthy People 2020 goal of preventing and reducing heart attack and stroke (ODPHP, n.d.). In the NP care model, cardiovascular patients at high risk were targeted and identified for preventive services and quality care. This model's use in this QI identifies patients at moderate and high risk for recommendations for preventive oral anticoagulation therapy.
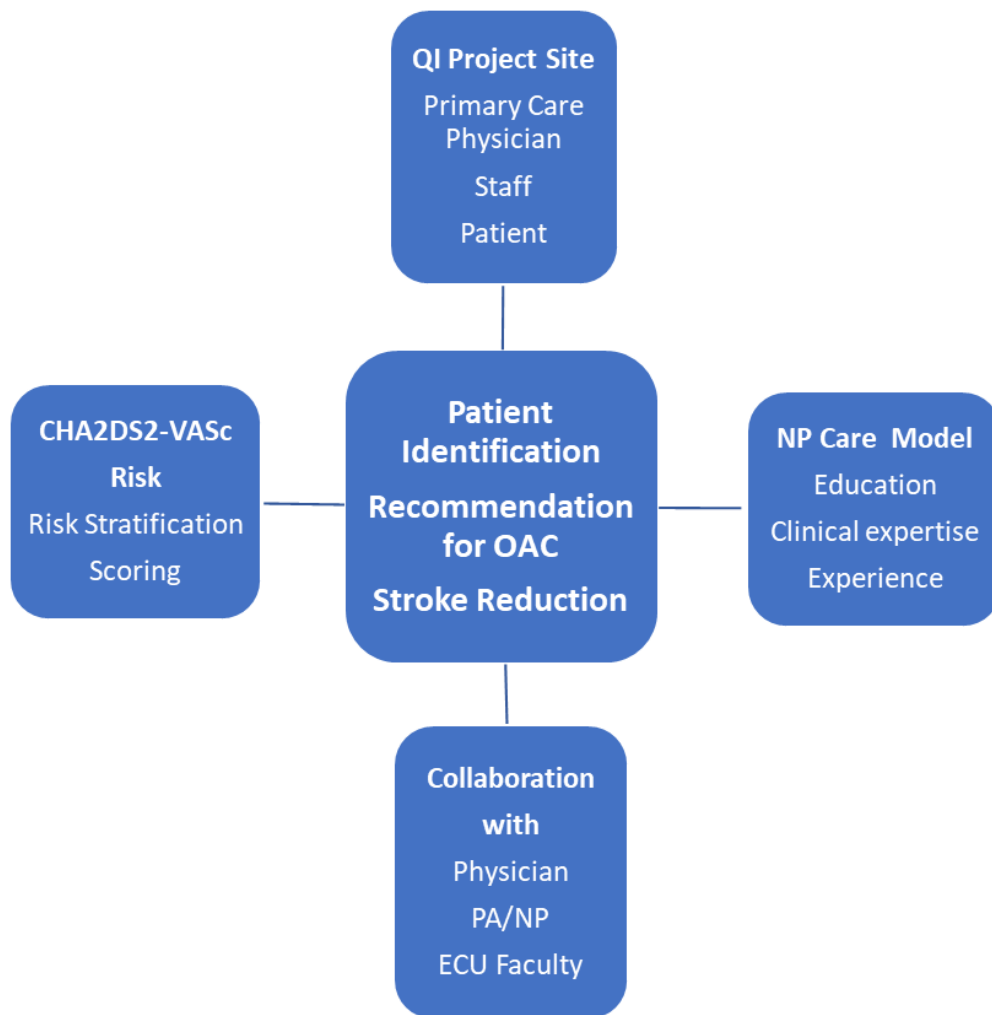
Figure 1: Application of the NP Care Model to the QI - Using the CHA2DS2-VASC

In applying this model to this project, an interdisciplinary effect resulted. APRNs collaborated with physicians, nurses, physician assistants (PAs), and ancillary staff to achieve the objectives of this QI (see Figure 1). In clinical practice, when healthcare professionals work collaboratively and APRNs use their leadership and clinical expertise, there is a great success for patients, physicians, and the healthcare organization (Thew, 2016).

Evidenced-Based Process Change Model

The Plan-Do-Study-Act (PDSA) is an evidence-based practice change model, applied in this QI project to guide the change process in the primary care site of the project. The PDSA is useful in testing and evaluating change (IHI, 2017). In this PDSA model, the cycle is a symbolic worksheet for testing a change by developing a system to test the change (Plan), implementing the test (Do), analyzing and learning from the consequences (Study), and determining what changes to be made to the test (Act) (IHI, 2017). The PDSA worksheet used is an ongoing cycle that assesses any shift, including quality initiatives and projects.

Applying the PDSA involves using the tools at the QI project's site with the stakeholders in the primary care clinics. As a cycle, the project plan is developed, implemented, studied, evaluated, and re-evaluated for modifications. The PDSA will ask and answer questions regarding what the QI project is trying to accomplish, the need for change, the persons involved, whether the change is an improvement, and if a change occurred. (see Figure 2).

PDSA is an efficient worksheet for instituting change in healthcare. Healthcare changes happen rapidly, perhaps more than some providers can keep up with at times. PDSA provides a quick and easy way of testing change, even as research has shown (IHI, 2017).
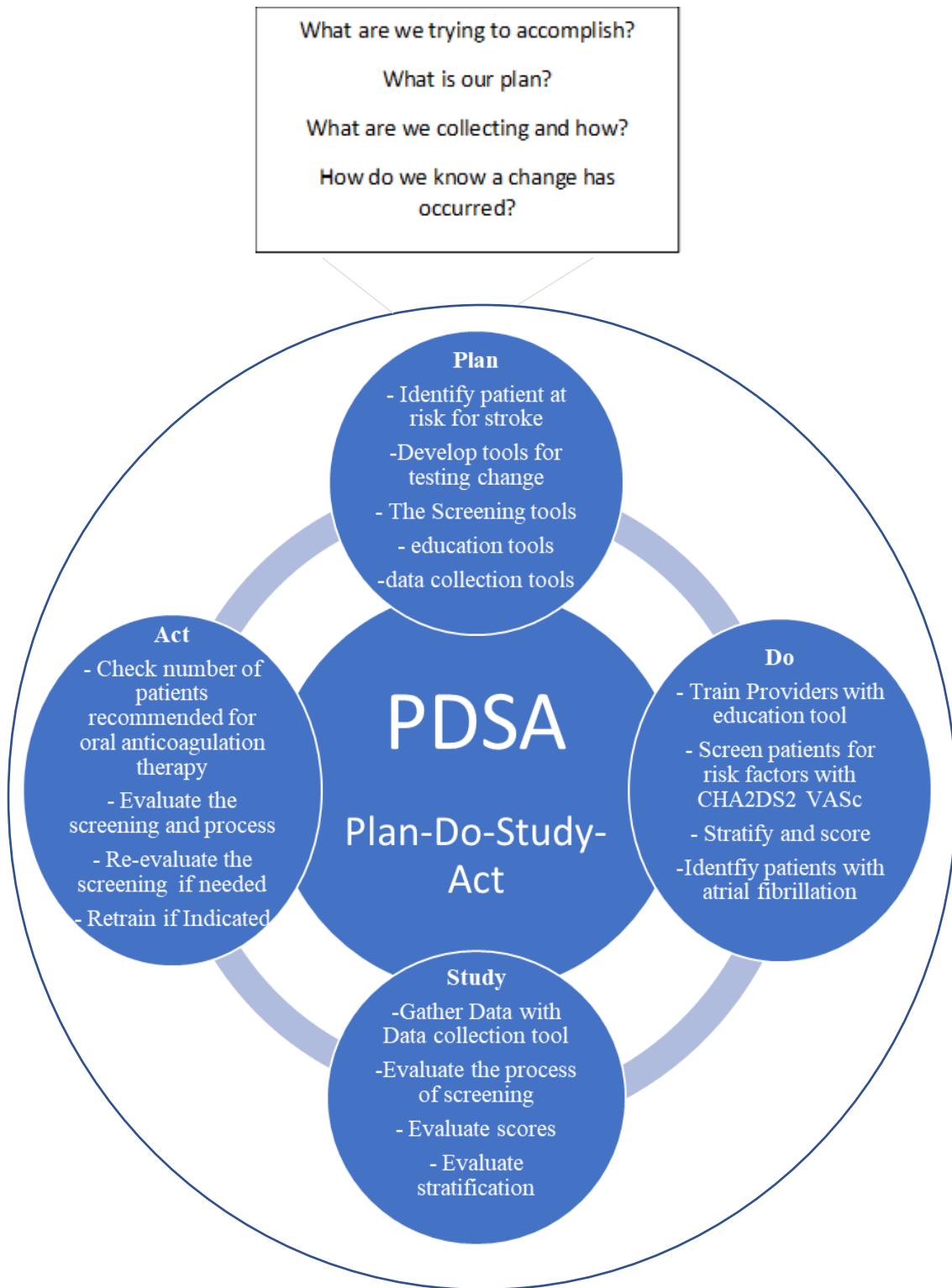
Figure 2. PDSA Model for CHA2DS-VASc. (Institute of Health Improvement, 2017)

More so, it is instrumental in testing change for quality improvement projects in health care (IHI, 2017). For this reason, the PDSA used as an analysis for change in this QI project is helpful.

Application to practice change. PDSA will help document and develop the plan to test the change agent. The tools include the CHA2DS2-VASc screening tool with directions on how to use the screening tool. The staff education material consists of a PowerPoint presentation on CHA2DS2-VASc and the QI, the data collection tool (see Appendix G). After the training, the providers will have access to the screening tool for implementation purposes. The providers will screen for the identified risk factors by asking questions or through chart review. The CHA2DS2-VASc points range for each patient is 0-9. Age is only scored one time, which is either age 65 to 74 years, or age equal to or ≥75 years.

According to the 2019 Guidelines of American College of Cardiology, American Heart Association, and Heart Rhythm Society (AHA/ACC/HRS):

> Female sex, if the only risk factor, does not confer a CHA2DS2-VASc score of 1. Female sex adds to the score only when another risk factor is present. Oral anticoagulants are recommended for patients with AF and elevated CHA2DS2-VASc scores — ≥2 in men and ≥3 in women. (Link, 2019).

Plan. All providers will receive training on the use of the screening tool (see Appendix C). A staff education tool (see Appendix E) was designed to educate staff on the CHA2DS2-VASc screening tool before implementation. The providers received education on the project and the use of the risk assessment and stratification form. A data collection tool was developed to collect pertinent data during the chart review and data collection period of the project implementation (see Appendix G).

Do. The providers will use the screening tool CHA2DS2-VASc to screen and score

patients who have a diagnosis of AF and are 65 years and older. The project leader will collect

and collate data from the screening tool used by the providers to identify patients during the

implementation. The PDSA cycle assesses and evaluates for proper identification of AF patients

with the risk assessment tool. The number of patients recommended for oral anticoagulation

(OAC) therapy is a measurable objective. This number will constitute the moderate and high-

risk levels.

Study. Close surveillance, observations, and evaluation of the implementation process

are carried out every week to ascertain the proper use of the screening tool and process. Using

the predesigned tool will help focus on the implementation of the project in other to get the

desired outcome.

Act. An evaluation of the outcome of the application will help to determine the

appropriate use of the screening tool. Assessment of the results will help to meet any

modifications that need to be carried out in the implementation and intervention phase of the

quality improvement project.

Summary

Analysis of the concepts of the QI includes risk factors, risk stratification, atrial

fibrillation, and quality improvement. A risk factor predisposes an individual to develop a

disease, injury, or death. Identifying an AF patient's risk for a cerebral or ischemic event with

the CHA2DS2-VASc screening tool is necessary to reduce their susceptibility and prevent a

stroke.

Atrial fibrillation causes stasis of blood and is a significant risk for stroke. Stratification

of other risk factors for AF and stroke is key to using the evidenced-based screening tool

CHA2DS2-VASc to score and identify patients at low, moderate, or high risk for a possible

recommendation of oral anticoagulation therapy or lifestyle modification. Other risk factors for

AF include heart failure, prior stroke or TIA, hypertension, the advanced age of 65 and above,

DM, vascular diseases, myocardial infarction, aortic plaque, and female sex.

      A distinction of no human subject makes this project a QI and not a research project.

Another concept important to this project is a collaboration between medical and nursing

professionals, which helps to enhance the project outcome. This project will be implemented up

to where the leader and provider make a recommendation for anticoagulation therapy.

      The framework that supports this project is the NP care model developed by nurse

practitioners and successfully piloted a QI project with the model. The application of the model

to this QI project helps produce a positive outcome.

      A PDSA cycle is the evidenced-based practice change model that evaluates the

implementation and the change process. The result is that when providers identify AF patients

with moderate or high risk for stroke using the CHA2DS2-VASc tool, they will reduce the

incidence of stroke in the patients taking oral anticoagulation therapy. Indirectly their care

quality and quality of life are improved. Furthermore, providers will be able to reduce the cost

of health care and hospitalization associated with atrial fibrillation and stroke.

Chapter Four: Pre-implementation Plan

This chapter describes the pre-implementation plan for a QI project on screening AF patients for stroke risks. This chapter also explains project management, interprofessional collaboration, and risk assessment. Organizational and IRB project approval processes are presented (East Carolina University & Medical Center Institutional Review Board, n.d). This chapter further discusses project cost analysis, data management, outcome, and how results were evaluated. A summary page concluded the chapter.

Project Purpose

The project's purpose was to increase the identification of atrial fibrillation (AF) patient's risk for a thromboembolic event using the CHA2DS2-VASc screening tool at a southeastern NC primary care clinic in other to recommend an intervention that will prevent stroke. The CHA2DS2-VASc screening tool will also improve (1) staff adherence to screening AF patients and identifying their risk for stroke, (2) stroke prevention and health care quality, and (3) health outcomes among the AF patient population.

Project Management

Organizational readiness for change. The project site assessment for organizational preparedness for change showed that employees have positive beliefs and perceptions of commitment to complete the project (Sharma et al., 2018).   The corporate culture showed staff interest in the stroke risk identification method. The Medical Director, the Physician Assistant (PA), and the Nurse Practitioner (NP) at the clinic participated in the QI project to identify patients at risk for stroke. Discussions with the clinic's medical director produced a shared consensus about screening needs and project goal achievement. The nursing staff were eager and committed to learning about the project during staff training. Organizational culture,

including employee attitudes and beliefs, were positive towards innovation and change, which were needed in the culture to promote change (Bayot, & Sharts-Hopko, 2019). The clinic had no standardized screening tool to identify AF patients at risk for stroke.

Interprofessional collaboration. According to Green & Johnson (2015), interprofessional collaboration means different professionals and disciplines working together for a purpose like to produce the desired outcome. In this project, the DNP student implemented the project in partnership with the medical director, who championed the project. A physician, NP, and PA helped to screen patients during implementation. Nursing staff coordinated appointments between the DNP Student and the providers. The clinic's office manager liaised with the DNP project leader. Others involved are the faculty of East Carolina University who guided the writing of the DNP project as displayed in the hierarchy of interprofessional collaboration for the project (see Appendix I).

Risk management assessment. A SWOT analysis discussed the strengths, weaknesses, opportunities, and threats experienced during project completion. The SWOT elements were affected by internal and external factors that impacted the project (Crowfoot & Prasad, 2017).

Strengths. Identifying patients at risk for stroke with the CHA2DS2-VASc tool resulted in enhanced project goal of increased provider adherence to using the screening tool to identify patients at risk for stroke. Stroke prevention with oral anticoagulation therapy contributed to improved quality of care and better patient outcomes. Interprofessional collaboration is a strength because it helped to produce shared project outcomes.

Weaknesses. The perceived weaknesses included staff not using the tool to identify patients at risk for stroke. Lack of knowledge about using the screening tool and incorrect stratification due to wrong scoring is also a possible weakness (Savoy, 2017). These weaknesses

would be eliminated by staff re-education within the pre-implementation period.

Opportunities. These included improved adherence to stroke risk screening. Staff assistance in project implementation and completion identified patients at risk for stroke at the micro-level in the clinic. The project was expected to grow to a macro-organizational level as a standardized screening among other primary care clinics. The project was expected to evolve into a precise treatment intervention.

Threats. One perceived threat was a lack of sustainability at project completion. Sustainability was dependent upon continued use of the screening tool. Another perceived threat to the project was reduced, clinical staff compliance. Another threat was the patient's non-compliance with recommended OAC (see Appendix J).

Organizational approval process. Approval to conduct the DNP project was obtained from the clinic's medical director during the project's leader's clinical rotation. Following discussions about problems associated with atrial fibrillation, stroke, and using the CHA2DS2-VASc screening tool, the DNP student requested to conduct the project at the primary care site. The medical director granted this request, agreed to be the site champion, signed a contract with ECU, and then wrote a letter of support to the project leader (see Appendix K). The stakeholders included the champion, a physician assistant, a nurse practitioner, nurses, and ancillary staff.

Information technology. The project site's computer program, E-Clinical Works was used to review charts. Microsoft Excel was used to prepare the budget and cost analysis of the project. The DNP student used Microsoft word to type the project and to design the data collection instrument. Microsoft PowerPoint Presentation was used to design the staff educational material and poster presentation (see Appendix O). Electronic health records (EHR),

E-Clinical Works helped to review clinic charts. Demographic data and project-specific

questions completed by providers helped to analyze data.

Cost Analysis of Materials Needed for Project

Project costs comprised of traveling to the project site, food for staff, and printing costs.

The total cost budgeted for the project was $500. The total spent was $480, saving a total of $20.

The DNP graduate saved money from printing at an inexpensive copy center and some copies

that the project champion authorized in the clinic one time for his file (see Appendix L).

Plans for Institutional Review Board Approval

Approval by both faculty and site champion deemed the project a quality improvement.

Per ECU DNP requirements, the DNP student completed ECU's IRB approval process. The

Quality Improvement Tool/Program Evaluation Self-Certification Tool was submitted to the

DNP faculty lead for prior approval and then submitted through the ECU/IRB website. The

project was considered a quality improvement and did not require ECU IRB approval (see

Appendix M).

Plan for Project Evaluation

Demographics. Demographic details were collected and analyzed statistically.

Demographics included gender and age. Gender was reported as the number of male and female

participants. Age of subjects in the data collection sheet was reported as ranges of 65 to 88

years, and 89 years and over, due to HIPPA stipulations. Stratification levels and

recommendations for OAC were reported as ranges (see Appendix N). Implementation and data

collected were presented in a narrative statement, graph, and pie chart (see Figure 3).

Outcome measurement. Outcome measures are high-level contributions in health care

organizations (Jones, 2016). Outcomes included direct identification of patient's risks. Another

outcome is the recommendation for OAC to prevent stroke, staff adherence to the use of the

screening and stratification tool for the patients. Indirect outcomes included stroke prevention,

increased high-quality care to patients, and improved quality life for patients.

   Was the CHA2DS2-VASC screening tool used to screen patient? This outcome

measured evidenced-based tool use at the clinic site. This measure helped the staff adhere to

using the tool (Jones, 2016). This process measure ensured that providers completed the

screening. Continued screening tool use increased provider adherence to patient screening and

the sustaining of the project.

   Did staff stratify patients for identification? This outcome measure identified and

stratified patient's risk to receive the recommended intervention to prevent a stroke. This

measure was a process site outcome.

   Was the recommendation made for OAC to prevent stroke? This patient outcome

identified patient-risk and recommended treatment for stroke prevention. This measurable

outcome produced the number of patients identified at risk for stroke. The patients received a

recommendation for OAC when identified with two or more scores. With a recommendation,

patients would begin OAC to prevent stroke. If a stroke is prevented, the patient experiences

better quality care. Better quality care increases trust and a therapeutic relationship with the

provider. Such a patient-provider relationship is known to improve the health and quality of life

indirectly. The use of the CHA2DS2-VASc screening tool in patient stratification represented a

process measure. Stratification was one of the screening tool's objectives because it classified

patients' risk level to recommend them for intervention. The intervention was for OAC or

lifestyle modification.

Evaluation tool. A PDSA cycle evaluated whether the QI project was effective in meeting its goals and objectives (IHI, 2017). The goals included to screen, identify stroke risk factors, stratify the risks as low, moderate, or high risk, and to make an OAC recommendation if the patient had more than low risk. The project leader assessed the results from week one of implementation to ascertain proper use of the screening and stratification tool. After the first two weekly evaluations, a bi-weekly surveillance chart review was conducted, and information was entered into data collection worksheet. The PDSA Model was obtained from the Institute of Health Improvement Website.

Data analysis. A biweekly chart review of the EHR was performed, and the completed CHA2DS2-VASc data collection sheet was updated. Data were extracted from the CHAD-VASc EHR patient encounter, collected, collated, and tabulated. The number of AF patients 65 years and older screened were compared with the number of patients with moderate and high-risk scores that met with OAC recommendation. This DNP QI project did not provide OAC treatment. OAC treatment was the next level research project that involved IRB clearance due to human subjects. Instead, this QI project initiated and identified patients at risk for stroke through increased use of the screening tool. There are no organizational, local, state, or national benchmarks in existence. However, data analysis indicated that an estimate of over 50 % of the primary care AF patient population was screened, identified, and recommended for OAC treatment. Those patients had a reduced risk of suffering a stroke based on the project's OAC recommendation and AHA guideline.

Data management. Storage of data included an ECU pirate account that was confidential and secured with user ID and password. The project was stored for educational needs in the ECU

secured scholarship website. No PHI was included in the survey, and all data collection tools and

collected data were shredded after data extraction.

Summary

This QI project increased patient screening and identification of stroke risk. Pre-

implementation required organizational readiness for change assessment, which revealed

employee perception of eagerness and commitment to the change. Employee belief included a

high-quality care corporate culture. Absence of an onsite, existing identification tool supported

need to continue the QI. In conducting the QI project, an interprofessional collaboration

developed among the ECU CON faculty, DNP student, physician, NP, PA, office manager, and

other staff. A SWOT analysis discussed strengths, weaknesses, opportunities, and threats that

might affect the project. Organizational approval granted by the primary care clinic's medical

director helped to commence the project. The ECU IRB categorized the project as a QI process,

which did not involve human subjects and required no IRB approval. E-Clinical Works, the

project site's EHR, was used to review data and compare it with the data collected with the data

collection tool for evaluation. While Microsoft Word, PowerPoint, and Excel were used to

create, organize, and manage data, project cost analysis identified the resources used. Project

evaluation outlined demographic information collected in the DNP student's data collection tool.

Three specific patient outcome measures identified were the use of the screening tool to identify

the patient's risks, stratification based on low, moderate, and high risks, and OAC

recommendation for stroke prevention. The PDSA tool helped to evaluate the outcomes. Data

analysis indicated that 50 of the AF patient population were screened and identified. Over 80%

of the AF patients received a recommendation for OAC thereby preventing stroke for them.

Chapter Five: Implementation Process

Implementing an intervention with evidenced-based tools like CHA2DS2-VASc is an essential step toward the completion of a QI project. It is the tipping point for the success of the project. Collaboration from all the participants helped to identify stroke risk. This chapter describes the project site and details the recruitment process of the participants. The chapter also describes the project participants. This chapter discussed the ease, and the barriers experienced while recruiting for participants and implementing the project. A narrative of the staff perception and all processes resulted. The chapter ended with summarized conclusions.

Setting

The project site was an outpatient primary care clinic in southeastern NC with about 12,000 active patients, of which 90% are adults. The project site is an independently owned care practice set up to care for patients on a for-profit basis. This practice, established in 1987, is situated in a well-populated area. The site had affiliations with an Accountable Care Organization (ACO). An ACO is an independently owned but coordinated health-care providers, hospitals, who voluntarily give high-quality, coordinated health services to Medicare patients (United States Centers for Medicaid and Medicare Services (CMS, 2019). The ACO aimed at coordinated care that ensured high-quality, right time care for patients, thereby reducing cost, eliminating duplication of services, and medical errors (CMS, 2019).

The outpatient clinical site is affiliated with a large university and committed to providing higher educational standards through preceptorship and project site support assistance. The clinic bills Medicaid and Medicare or private insurance for service. There was no stake identified except for the voluntary enhancement of graduate education and improvement in clinical outcomes.

Participants

The stakeholders were the participants: one Physician, one Physician Assistant (PA), and one Nurse Practitioner (NP). Others were nurses, healthcare workers, and the office manager. The Medical Director was a licensed physician who provided health care to patients in the clinic. The NP and PA were licensed providers that provided health care to the clinic population. The clinic nurses received training on the screening tool to understand the QI project. The three licensed providers helped implement the project; however, nurses and ancillary staff did not participate in the implementation of the project. The office manager assisted in providing the project leader access to clinic statistical data and a description of the clinic. Clinical personnel excluded from the implementation of the project included (a) interns, (b) students on clinical rotation.

Recruitment

In discussion with the medical director in the Fall of 2018 on the CHADS-VASC topic, the project idea emerged, and the DNP student recruited the medical director as site champion. In 2019, the DNP student discussed with the site champion the need for the NP and PA regarding being part of the implementation. The medical director communicated the willingness of the NP and the PA to participate in the implementation of the project. All participants formed a convenience sample as they were employees of the clinic. The participants thought the project was feasible and will bridge the health care gap, including the need to improve the standardization of identifying AF patient's risk for stroke. The participants believed in the efficient quality care to the patients in a cost-effective way. The participants were interested and willing to implement the project. There were no barriers to the recruitment process of the participants.

Implementation Process

Pre-implementation Phase. The pre-implementation phase began by identifying the problem of interest and the high cost to the patient, clinic, healthcare, and taxpayers. The project leader discussed with the medical director of the project site on the need to improve care for AF patients at risk for stroke in the clinic. Further discussion on the topic occurred with ECU-CON faculty. A SWOT analysis detailed the strength, weaknesses, opportunities, and threats of the project. A PDSA set up for the evaluation of the project, and the outcome availed for the project. The planning phase of the PDSA aimed at providing the data collection and education tools, setting up meetings, and staff education on the identification process. This process included the use of the risk stratification tool CHA2DS2-VASc to identify and stratify AF patient's risks into low, moderate, and high levels. Planning also included recommending OAC for a patient with moderate or high-risk scores. The project presentation to the College of Nursing and IRB for approval proved satisfactory. The leader obtained ECU-CON institutional permission in summer 2019, and the IRB considered the project a QI, and with no approval required. Staff at the project site received a pre-implementation education with a PowerPoint presentation on the project.

Implementation Phase. EHR data revealed that the clinic has about 12,444 active patients registered in the clinic. Out of that 12,444 patients, 3279 patients or 26.3% of the population were adults 65 years and older, and about 130 were AF patients. During implementation, the participants screened mostly patients with a diagnosis of AF 65 years of age and older. Though the majority of the patients were 65 years of age and older, the project specifically addressed the AF population as a project requirement.

The PDSA cycle used to monitor and evaluate the implementation and change process reflected this the age limit of the population. The patients with a diagnosis of AF were screened with the CHA2DS2-VASc and stratified to identify their risk levels (see Appendix D).

Providers specifically asked questions about the risk factors and assigned scores of 0 to a "no" and 1 to a "yes". An exception to that rule is the age of 75 years and older, and a prior ischemic event or a transient ischemic attack (TIA) assigned a rating of 2 each. The participants added the scores and stratified a patient at a level of either low, moderate, or high risk for stroke, which indicated the need for anticoagulation therapy or not (Deitelzweig, Jing, Swindle, & Makenbaeva, 2014).

According to the CHA2DS2-VASc screening tool, scoring is given to the risk factor of age though there are two age limits in the tool (a) age $\geq$ 75 and age 65 – 74 (see Appendix D). The highest possible rating scored by a patient was 9. A score of 9 placed a patient at a 15.2% annual risk of having a stroke. The numbers stratified in ranges include (a) no risk scored a 0, (b) low-risk score a 0-1, (c) moderate risk assigned a 2-4 score, and (d) high risk assigned a score of 5- 9. Moderate and high-risk levels required intervention with OAC according to the AHA/ACC/HRS Clinical Practice Guidelines (January et al., 2019). AHA/ACC/HRS recommends that any score of two or higher requires OAC to prevent stroke or thromboembolism because, the higher the score, the greater the risk of stroke for the patient (Deitelzweig et al., 2014).

The study section in the PDSA model assessed the implementation outcomes against the implementation criteria. The evaluation started in the first week of implementation. Weekly surveillance ascertained proper use of the tool and plan in other to provide re-education or make corrections if indicated. The evaluations checked whether the implementation answered the

project questions and whether the project followed the established plans. Evaluations also

verified the CHA2DS2-VASc screening tool use and if the project accomplished the targeted

goal of at least screening 50 patients. Answering the PDSA questions directed the

implementation and intervention to the desired outcome. As a cyclical model, PDSA guided the

continuous evaluation of the implementation and outcome at each stage of the implementation.

The project leader collected data from EHR chart reviews weekly with the data collection sheet

and tabulated the data.

       Post Implementation Phase. The DNP student continued outcome measure evaluation

with EHR chart reviews using the Data Collection Tool. The evaluation of measurable outcomes

included the number of patients screened with the CHA2DS2-VASc tool and the number of

patients in each level of risk. Interval worksheets, excel chart run, and graph provided visual

change process. This outcome indicated that the participants used the CHA2DS2-VASc

instrument to screen patients. The outcome also indicated that participants adhered and complied

with the AHA/ACC/HRS Clinical Practice Guidelines. Post-implementation data showed that

the participants screened a total of 50 patients. Stratified levels of the patient's risk included

low, moderate, and high. All moderate and high-level scores received a recommendation for

OAC.

       The screening process was done electronically and has become a part of the patient

clinical encounter record, which will help to sustain the project. The project has directly

increased identification and indirectly improved the quality of care for patients through

therapeutic intervention to prevent stroke. As a result, patient care improved indirectly. All

patients received secondary prevention of stroke and indirect enhancement of their quality of life.

The implementation was considered a success, with 50 target patients screened and identified

with the CHA2DS2-VASc tool. Out of the 50 patients, 82% of the total patient population screened met eligibility for OAC recommendation.

Plan Variation

Previously in the summer of 2019, a variation was made in the implementation process to screen all patients with a diagnosis of AF in the clinic. However, during implementation, with faculty consultation and guidance, A change was made to screen AF patients who are 65 years and older only. This change in the implementation process narrowed the focus. The narrowed focus made data gathering easier. With more faculty consultation, another plan variation in data collection occurred. The initial plan was to collect data with the data collection tool biweekly. However, after consultation with faculty, data collection was changed to weekly from the beginning to the end of the 60day implementation period.

Another plan variation was the change from manual to electronic screening. Initially, the providers used the paper CHA2DS2-VASc screening tool for screening. During a PDSA cycle process, the CHA2DS2-VASc tool was programmed into the patient EHR encounter for ease and accessibility of screening. This electronic screening helped to make screening and identification more accessible. Being part of the electronic health record encounter helped in the sustainability of the project since the tool became a permanent part of the patient's electronic record encounter. As part of the electronic record encounter ensured being screened by the provider during an AF patient encounter.

Summary

The QI project conducted in a privately-owned outpatient clinic that saw mostly adult patients. Participants recruited in the summer of 2019 included three providers that screened AF patients with the CHA2DS2-VASc screening tool. Implementation began in the fall of 2019.

Data review and collection were done weekly with a data collection sheet by logging into the electronic system of the project site.

Fifty patients were screened and stratified for identification into the low, moderate, and high-risk level score. Some variations occurred during the implementation period, including data collection from a biweekly to a weekly phase. Another change was that all patients with a diagnosis of AF and 65 years old were screened and stratified instead of patients that were 65 years and older as initially planned. This change streamlined the project and targeted the project to the AF population.

The project is a success so far in that this screening became a part of the patient electronic screening process in each patient encounter at the project site. Being part of the patient encounter assured the sustainability of the project. It also confirmed provider adherence and compliance in using the AHA/ACC/HRS Clinical Practice Guidelines for AF patients.

Another PDSA process change was in streamlining the number of patients screened in one week because after the electronic screening commenced, it resulted in a significant in the screening, stratification, and identification. There was also an increased number of chart reviews due to ease of accessibility of chart reviews electronically.

This completed project was successful as it directly identified and stratified patients and indirectly prevented patients from ischemic attacks based on OAC recommendations and lifestyle modification.

Chapter Six: Evaluation of the Practice Change Initiative

This chapter discusses and evaluates the outcome of the changes the QI project brought to the southeastern NC primary care clinic. The participants of the project are described based on their demographic data. A discussion on the short, intermediate, and long-term goals of the project ensued. This chapter discusses the findings from the QI project. A summary page concludes the chapter.

Participant Demographics

Using a participant data collection question tool (see Appendix N), demographic information and project-specific questions were obtained from the participants and analyzed (see Table 1). From the data collected, there were three participants in the clinic, including a male physician, a female physician assistant (PA), and a female nurse practitioner (NP). The physician who was the site champion for the project is the medical director of this primary care clinic. He is a general practitioner with over 26 years of medical experience.

With his wealth of experience, the physician is committed to promoting the advancement of medical and health practice through education, precepting, volunteering, QI projects, and health fairs. The PA has over 21 years of work experience providing care to all populations in the clinic site. The PA screened AF patients during the implementation stage of the project. The NP is an experienced family nurse practitioner with over 15 years of care provision in this practice site. She also screened AF patients during the implementation stage of the project. The NP programmed the CHA2DS2-VASc screening tool into the E-Clinicals patient encounters in the electronic health records. The NP helped to provide statistical data regarding the AF patients for screening and identification.

The participants provided demographic data. Participants answered three demographic

questions and two project-specific questions. The participants were supportive of using the

CHA2DS2-VASc stratification tool to screen AF patients and to identify patients at risk for

stroke. Participants all believed that the project brought changes to the clinic. The participants

also communicated their belief that the project will cause some extra work for the providers but

would be worthwhile if it will improve patient outcomes. The participants reported that the

CHA2DS2-VASc screening tool screened stratified and identified AF patient's risk for stroke.

The providers also reported their willingness to continue using the risk assessment tool.

Table 1.

Demographic Data and Project-specific Table

Question	MD	PA	NP
Are you an employee of the site?	Yes	Yes	Yes
What is your gender?	Male	Female	Female
Length of work at the site?	26years+	21years+	15Years+
Does the CHA2DS2-VASc screening tool identify risk for stroke?	Yes	Yes	Yes
How likely are you to use CHA2DS2-VASc?	Very Likely	Very Likely	Very Likely

Note: Demographic data and project-specific questions collected from a survey given to

participants at the project site.

Intended Outcome(s)

Goals are the intended representation of desired ends (Höchli, Brügger, & Messner, 2018). Identified project outcomes are classified as short-term, intermediate, and long-term goals, as discussed below. However, goals may not be clear cut and can overlap in time and achievement.

  Short term goal. These goals were the immediate intended objectives or outcomes realized from the QI project within one week, one month, or less than one year. In this project, the short-term goals resulted in immediate changes at the DNP project site. One short term goal was the direct utilization of the risk assessment tool in screening AF patients for stroke risk. A short-term outcome goal realized from the QI project was the increased identification of patients with moderate and high risk for stroke after applying the screening tool. Another short-term goal achieved was increased adherence to the use of the CHA2DS2-VASc screening tool by the providers in the clinic.   The QI project led to the inclusion of screening with the CHA2DS2-VASc tool as part of the patient's EHR encounter. Recommendation for patients in the moderate and high-risk levels for OAC is an immediate outcome goal of this project, considering that 82% of the AF patients screened identified in the moderate and high-risk levels.

  Intermediate goal.   Prevention of stroke was a secondary goal achieved in the QI project. When patients received recommendations for oral anticoagulation therapy, the incidence from having a thromboembolic event is reduced.

  Long-term goal. These included the goals that will materialize in the future and stay sustained (Bradley & François, 2017). Long-term goals can be direct and indirect outcomes of the project. Prevention of stroke and its subsequent comorbidity fall into the long-term outcome goals of this project. When AF patients are screened and identified at the level of moderate and

high risk for stroke, recommendations for treatment with OAC reduces the risk of a stroke.

When a stroke is prevented, the quality of care and quality of life of AF patients is improved.

The reduced financial burden for the patients and taxpayers is a long-term change from the

project, considering that stroke costs the US about six billion dollars annually and approximately

450,000 AF hospitalizations each year (Cutugno, 2015). In this project, 82% of screened

patients identified in the moderate and high-risk levels of stroke risk. These patients met

eligibility for OAC or received a recommendation for OAC. Considering that it costs about

$14,000 for one hospital stroke admission, the project saved about $574,000 for the patients in

the project site and the taxpayers (see Appendix O). Another intended long-term goal is lifestyle

modification that prevents stroke through the education of the patients.

Findings.

The implementation of the QI was completed for the patients 65 years and older with a

history of AF. Fifty patients were screened and stratified to either low (0-1), moderate (2-4), or

high- risk (5-9) level of stroke. Nine patients ranked low (18%), thirty-five patients scored

moderate (70%), and six patients classified as a high-risk level (12%). Eighty-two percent of the

screened patients were in the moderate and high-risk range. However, the highest number of

patients stratified for risk factors remains at a moderate level (see Figure 3).

Screening with CHA2DS2-VASc for identification of risk factors in AF patients became

a part of the electronic health record encounter. Being a part of EHR ensured continued risk

identification and stratification. Electronic screening also ensured the sustainability of the

project. Screening and identifying AF patient's risk levels increased providers' adherence to the

use of clinical practice guidelines for AF patients. Screening, stratifying and identifying risk

factors allowed for a recommendation for OAC for the moderate and high-risk levels to prevent

an ischemic event. When a stroke is prevented, the quality of care and quality of life of the

patient is improved based on the identification of risk factors. With the recommendation for

OAC, the providers reserve the clinical judgment not to recommend OAC, where there is a

contraindication like increased bleeding time. The QI project potentially reduced the financial

burden for the patient and taxpayer with each stroke admission prevented. The potential stroke

hospitalization cost becomes very significant with the number of patients in this project who

received a recommendation for an OAC that potentially can prevent a cerebral ischemic event.

Stratification of Identified Risks

12%
n=6

18%
n=9

70%
n=35

N=50, 82% screened met eligibility for OAC

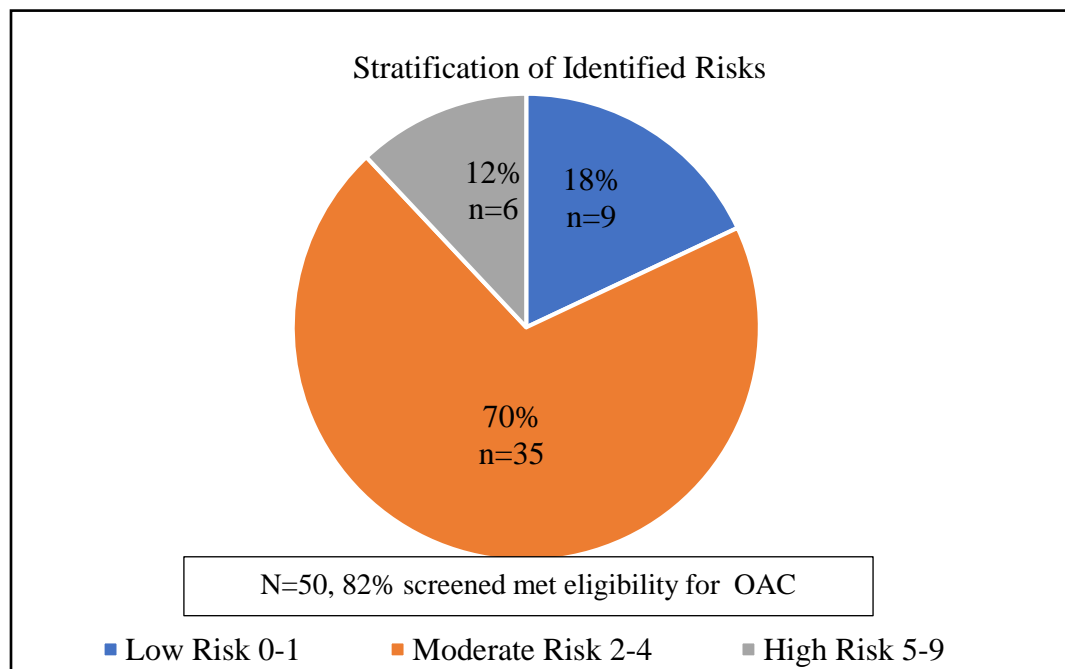■ Low Risk 0-1   ■ Moderate Risk 2-4   ■ High Risk 5-9

Figure 3. Screened patients and the stratified levels of risks.

Summary

This chapter evaluated the practice change effect of QI using the evidenced-based risk

assessment and stratification tool, CHA2DS2-VASc, to identify AF patient's risk for stroke.

Three providers screened AF patients in a primary care clinic. The participants identified the

patient's risks into low, moderate, or high risk through screening and stratification.

Demographic and project-specific questions answered by the participants assisted in the

outcomes of the project. A total of 50 patients were screened and identified for risk factors in the

QI project, which occurred over eight weeks. Eighty-two percent of screened patients with

identified risks received a recommendation for oral anticoagulation therapy. As a result of their

intermediate or high-risk levels of stratification, the patient received advice for OAC.

The short-term goals ensured the usage of the CHA2DS-VASc tool to identify AF

patients at risk for stroke. The project increased provider adherence to the clinical guidelines set

for AF patients. This increased identification also assisted and ensured the sustainability of the

project. The intermediate outcome goals, directly and indirectly, impacted the QI site. This

impact resulted from the financial burden associated with AF and stroke that potentially is

decreased with identification, treatment, and prevention of thromboembolic events. The majority

of patients screened were eligible for oral anticoagulation therapy based on their elevated risk

score. Based on these findings, the QI project was considered a viable and sustainable.

Chapter Seven: Implication for Nursing Practice

The *Doctor of Nursing Practice Essentials* provides the foundational competencies needed for the practice of advanced nursing (American Association of Colleges of Nursing, 2006). It outlined implications for the practice of advanced nursing. These *Essentials* and competencies equipped the APRN for clinical work in the highly advanced technological healthcare system of present times. For this reason, this chapter explored the application of these *Essentials*, its implication to nursing practice, and how it related to this quality improvement (QI) project.

Practice Implications

Essential 1: Scientific underpinning for practice. The scientific foundation provided the empirical bases for advanced nursing practice. This scientific backing originated from different fields of study, including philosophy, medicine, psychology, ethics, biology, and nursing. This scientific support enhanced the job of the APRN in that it prepared the DNP graduate to work safely in the clinical setting. The scientific foundations govern the advancement of clinical practice and provide backing for QI work in clinical settings. The improvement work in clinical settings helped to promote quality care and wellbeing of patients. In particular, the evidenced-based tool CHA2DS2-VASC from the AHA/ACC/HRS guidelines (January et al., 2019) for clinical practice was used in a QI project to screen, stratify and identify stroke risk for AF patients who are $\geq$ 65years. The identification helped to provide appropriate therapeutic intervention to the patients.   The nurse practitioner care model that provided the scientific backing for this project was developed in the field of advanced nursing and used to reduce re-hospitalization with cardiovascular patients. Research work provided support for

advanced practice nursing because when empirical knowledge and evidence are translated into

clinical practice and decisions, care delivery is known to improve (Curtis, Fry, Shaban, &

Considine, 2017). In applying scientific backing, the AF patients in this project were screened

for risk factors and stratified for the identification of increased stroke risk. These identified

patients received therapeutic interventions based on their level of risk. Adherence to this

screening process in the project site sustained the project and produced excellent outcomes in

stroke prevention. This project paved the way for future projects that will delve into

pharmacological interventions to prevent stroke. Recommendations included to carry on the

project to the next level that will involve pharmacological therapy to prevent stroke.

Essential II: Organization and systems leadership for quality improvement and

systems thinking.   APRNs are ready to lead in the organizational and systemic levels of private

and government establishments. This DNP *Essential* provided adequate tools and preparation

for the APRN to assess risks, identify problems, and make sustainable quality improvements.

Through the leadership efforts of APRNs, quality improvements are made based on identified

needs in the organizational and systemic infrastructures to reduce costs of healthcare to

organizations and taxpayers. Through screening and identification of risk factors, AF patients

received assistance with appropriate therapeutic intervention. Through leadership decisions,

APRNs provided cost-effective care, which translated to lower cost for the patients, clinics,

hospitals, taxpayers, and governmental systems. Lamb, Martin-Mesiner, Bryant-Lukosius, and

Latimer (2018) discussed two leadership areas that APRNs use to improve care delivery and

environment for healthcare staff, patients, and their families. These two domains included

patient-focused and, organization leadership and system-focused leadership.   These two fields

are capabilities that advanced practice nurses use to contribute towards improving the care

environment for patients and healthcare staff.

The health care delivery system for this project was an outpatient primary care setting.

The patients were of diverse backgrounds with ailments and comorbid conditions, such as

diabetes, congestive heart failure, hypertension, and renal insufficiency. The staff and

participants included a physician, a physician assistant, a nurse practitioner, and ancillary staff of

different educational backgrounds. The DNP student coordinated meetings and led the project

implementation, which included preparation of screening materials, designing data collection

tools, training the participants, leading the project, and in consultation with faculty, developed

modalities for data collection, and change process. Several healthcare organizations are willing

to support APRN led projects that will improve the quality of care for patients. In this project, all

patients 65 years and older with AF were screened in the clinic and stratified to identify stroke

risks. The ECU IRB system reviewed the project and considered it a QI not involving human

subjects. The recommendation is to sustain this screening and identification of AF patients and

their risk levels so that the patients receive an evidence-based intervention. The proposal

included the utilization of oral anticoagulation therapy to prevent stroke in patients stratified at

intermediate risk and above. Recommendations are for APRNs to lead quality improvement

projects since health care delivery systems are willing to help sponsor and provide the setting for

these. This project conducted at a micro-level can expand into a macro level of care where other

primary care settings, including private organizations and government establishments, will

benefit from it.

Essential III: Clinical Scholarship and analytical methods for EBP. Unlike practices that rely on tradition, intuition, and unproven methods, evidence-based practice is a proven problem-solving approach based on scientific evidence (Reid, Briggs, Carlisle, Scott, & Lewis, 2017). In nursing, EBP helps to guide nursing decision-making and provide a systematic way of solving problems in healthcare settings. EBP provides clinical practice that uses the best evidence from research, patient values, preferences, and provider's knowledge in the care of patients (Reid, Briggs, Carlisle, Scott, & Lewis, 2017). The APRN understands how to find scholarly materials and proven scientific work and to use work as EBP into the process of quality improvement.   CHA2DS2-VASC is the evidenced-based tool used in this QI. The application of CHA2DS2-VASC to this QI was necessary to the project's goal because in using this EBP tool, a patient could be identified, stratified for risk factors, and given appropriate intervention. The literature review in this project was another empirical process that allowed the APRN to search through scholarly work, to locate bodies of knowledge that supported the QI (Shellenbarger, Hunker, & Gazza, 2015). A PRISMA diagram organized and presented the literature review. A literature matrix helped to define the levels of evidence (see Appendix A).

The project met the goals of the Institute of Health Initiative Triple Aim, which focused on the improvement of population health using the evidenced-based screening tool like the CHA2DS2-VASC. The second goal of the Triple Aim centered on patient care; the project accomplished through the application of this QI to AF patients. The third goal of the Triple Aim met was the reduction of systemic health care costs. In this project, the identification and stratification of stroke risk levels improved clinical staff adherence to the use of the evidenced-based tool, CHA2DS2-VASC. Stratification and identification of AF patients' stroke risks in this

micro clinical setting prevented stroke and saved the cost of care. Stroke risk identification with the recommendation of therapeutic intervention like OAC prevented stroke in AF patients reduced healthcare costs associated with stroke and AF. The QI project became part of the EHR encounter, which increased the ease of screening and identification with the evidenced-based risk assessment tool CHA2DS2-VASc. This ease in implementation increased provider adherence to clinical practice guidelines for AF patients. The project becoming a part of the EHR encounter assured sustainability of the project.

A PDSA cycle that reflected the implementation process helped to accommodate changes that occurred throughout the implementation phase of the project. The recommendation was for the use of the project to be continued as that will enhance the continued quality care of the patients in the clinic and save costs. A recommendation was for the project to be duplicated in other primary care settings that do not have a standardized method of identifying AF patient's risk to get the same result. Another recommendation was to research the best pharmacological interventions to prevent stroke.

Essential IV: Information systems/technology and patient care technology for the improvement and transformation of healthcare. The efficient use of the information system is vital to clinical practice. Information technology (IT), including Microsoft Excel, was used to write the budget, write time log, literature matrix, chart run, to enter, and tabulate data for display. Microsoft Word helped to design and write the project. The data collection tool and the project interval documentations were designed and written in Microsoft Word. Microsoft PowerPoint was used to design and create an education tool. Electronic screening and chart review completed in the EHR E-Clinical program assisted data extraction. Though no protected

health information was used, the APRN must protect any data extracted in the course of chart

reviews. The QI project was screened by the IRB to make sure that no violation of identifying

information occurred. A user ID and password allowed access to the project site EHR for chart

reviews conducted at the project site. The chart reviews allowed for the analysis of data under

CHA2DS2-VASc screening and stratification score. The data collection tool help to record data

collected for review, including identification of risk, diagnosis of AF, scoring details, and levels

of stratification. The data collection tool displayed the collected data. The recommendation

included continued use of the QI in the EHR.

Essential V: Healthcare Policy for Advocacy in healthcare. The DNP graduate must

understand the process of healthcare policy development, which can be through empirical

evidence, clinical expertise guidance, and quality improvements made to become health policies

and law. The different counties and congressional areas in NC rely on healthcare policies that

meet the need of their population (CDC, 2016).   Healthcare policies and plans supported by the

APRN can meet the health care needs of clients endorsing the Affordable Care Act, and other

government programs. The APRN advocated for such policy changes through congressional

efforts and collaborations, in other to help patients gain access to healthcare programs. The DNP

graduate advocated for change in policies to meet the needs of the population served for those

patients who experience healthcare disparity. The DNP graduate developed and implemented QI

projects that effected change and improved care through the identification of AF patient's risk in

other to prevent stroke for population centered care. This change was developed and

implemented by the DNP graduate using an evidence-based (EBP) screening and stratification

tool to identify those at medium to high risk of stroke. Identification and stratification of the risks

helped the DNP graduate to intervene with appropriate therapy. This EBP tool used in this QI

affected a change in the policy of the project site by making the QI permanent in the site EHR

for continued use. Policy integration in healthcare with sustained QIs produced low-cost quality

care, increased access to care for those in disparity, and those with sensitive cultural needs.

Legislative and health advocacy for health policies increased care access for the patient.

      Essential VI: Interprofessional collaboration for improving patient and population

health outcomes. The definition of this *Essential* dealt with interprofessional connections and

interactions in a technologically sophisticated healthcare system. These connections provided

the safe, timely, and effective patient-centered care required to meet the efficient treatment and

care of the patient (AACN, 2006). These interconnections occurred amongst different

professions and nursing professionals at different levels. In the QI project, the interprofessional

relationship was evident between the project champion, who is a physician, and the DNP student,

a nurse practitioner, and physician assistant, nurses, and ancillary staff.

      Further collaboration between ECU, CON faculty, and primary care physicians opened

more avenues for growth in education and quality care for the patient. This collaboration

resulted in the screening, stratifying, and identifying AF patients to provide the patients with an

appropriate intervention that prevented them from having a stroke and ultimately saved their

lives and healthcare costs. Together, the efforts of interprofessional staff working together for a

unity of purpose resulted in cost-effective, comprehensive quality care to patients (O'Reilly et

al., 2017). Recommendations are for continued collaboration that can be expanded to get more

substantial results like cost-effective care and quality care outcome for patients.

Essential VII: Clinical prevention and population health for improving the nation's health. Following the nation's goals on Healthy People 2020 in preventing and reducing heart attack and stroke (ODPHP, n.d.). This QI identified risk factors that were preventable for stroke and cardiovascular symptoms through lifestyle modification and therapeutic interventions. Further, the goals of the Triple Aim helped to target and improve the health of the individual and population. This project employed the use of Healthy People 2020 and the goals of the Triple Aim through the identification of preventable risk factors for stroke. In identifying these risk factors for appropriate intervention, stratification become important.   In this project, the strategies included the use of an evidence-based screening tool to screen and identify AF patient's risks for hypertension, advanced age, diabetes, prior stroke, vascular disease age, sex category in patients with AF $\geq$ 65years. The recommendation is to use this quality improvement to target population health for AF. and stroke patients for identification and prevention purposes.

During this period of COVID-19, APRNs and DNP graduates became frontline workers in clinical prevention and population health improvement. In the effort to improve the nation's health, this pandemic became a time for the autonomy of practice for DNP graduates trained to take on that challenge in some states like New York.

Essential VIII: Advanced Nursing Practice. The DNP graduate prepared to take on new leadership roles in the private and systemic levels of government. The DNP graduate trained and prepared in clinical expertise where utmost judgment and critical thinking are applied. The DNP student mastered the conduction of empirical work that changes the healthcare systems through clinical guidelines, DNP essentials, QI, research, policies, and law.   The APRN graduate developed this project and collaborated with other professionals to improve the care of

AF patients through increased identification of risk factors. The increased identification allowed for a recommendation of therapeutic intervention that prevented stroke

Summary

The DNP student established competence in clinical expertise through the *DNP Essentials*. This QI project and its outcomes gave experience to the DNP prepared student to be ready to take on leading roles in a healthcare system that is ever dynamic. The DNP graduate, through the competencies and *Essentials*, covered tenets of health care policies that meet the needs of the population and the goals and guidelines set by national organizations. The Healthy People 2020 and the IHI Triple Aim goals addressed the need for the national healthcare systems in the United States. The DNP graduate understood the process of healthcare policymaking that can change based on the need for access to care, sensitive cultural need, and health disparity. Identification and stratification of the risk factors were steps to preventing ischemic stroke associated with AF. The DNP student, designed, established, and implemented a quality improvement project in a clinic site that produced positive outcomes and helped improve the treatment and outcomes of AF patients.   Through collaboration with ECU faculty, the medical director, a physician assistant, nurse practitioners, nurses, and ancillary staff of the outpatient clinic, the DNP student executed the QI project with excellent outcomes. The QI helped to achieve the requirements of the DNP competencies, and the national preventative care established by both government and organizations.

Chapter Eight: Final Conclusions

This chapter discussed the significant findings of this QI project as well as its strengths, weaknesses, limitations, and benefits. It also delved into recommendations based on findings of the project. A final summary provided closure to the paper.

Significance of Findings

The outcome findings realized from the QI project included direct goals that had an immediate impact on the patients and the project site. Direct goals included results that had a direct impact on the patients, project site, taxpayers, and health industry. A significant outcome was the increased identification of the risk factors of AF patients and their risk stratification into low, moderate, or high levels.   The project found that 82% of AF patients screened in the clinic were stratified as moderate and high risk and would receive a recommendation for OAC for prevention of stroke. Another significant outcome was the increased utilization of the evidence-based practice risk assessment tool by the providers, which directly impacted the screening and stratification of patient's risks. The use of the CHA2DS2-VASc stratification tool was significant in increasing provider adherence to the clinical practice guidelines set by the American Heart Association, the American College of Cardiology, and the Heart Rhythm Society for AF patients. Adhering to clinical practice guidelines was purposeful in the effectiveness of quality care, decreasing variations in care, and in the reduction of preventable costly adverse events (Kredo, Bernhardsson, Machingaidze, Young, Louw, Ochodo, & Grimmer, 2016).

The QI project led to the inclusion of the evidenced-based CHADS2-VASC risk stratification tool into the patient encounter in the electronic health record. Being part of the template of a patient encounter in the clinic assured the sustainability of the project. The reason

is that each patient encounter would ensure the assessment is completed for every AF patient, thereby improving efficiency in the identification of risk and care of the patient.

The recommendation for OAC based on the moderate and high-risk levels of patient's risk identification is significant in the prevention of a thromboembolic event. With the prevention of an ischemic event, there is a subsequent reduction in the comorbidity associated with stroke. It is significant in the sense that with the prevention of an ischemic event in AF patients, their quality of care and quality of life gets indirectly improved.

Another significant outcome is the reduction of the financial burden associated with AF and stroke for the patients and taxpayers. This outcome is in line with the adopted goals of the Triple Aim, which focuses on giving population and patient-centered care, risk status identification, and in decreasing the healthcare cost per capita (IHI, 2018). With the prevention of an ischemic event with an OAC, a reduction in the financial burden for the taxpayer becomes substantial, considering that stroke costs about six million dollars for the taxpayer in the US yearly (Cutugno, 2015). Furthermore, approximately 450,000 AF hospitalizations that occur each year in the US become significantly reduced when AF is prevented (Cutugno, 2015).

The nurse practitioner care model is significant in this project. This model was successfully developed and applied by advanced practice registered nurses (APRNs). APRNs reduced costs and rehospitalization of cardiovascular patients. The framework was adopted in this project since there was a potential financial burden reduction for patients, healthcare industry, and taxpayers. A lesson learned is that the application of the nurse practitioner care model to this QI at a micro-level produced a significant result; the same way, it will create a significant successful impact when applied at a macro level of project or research.

Project Strengths and Weaknesses

Strengths. The strengths of this project include the use of an evidence-based risk stratification tool, CHA2DS2-VASc, to screen, stratify, and identify AF patient's stroke risks. The nurse practitioner care model provided strength for this QI in that the model identified risk factors, provided an intervention that will prevent stroke, and decreased costs to the patients and taxpayers. The nursing model used in the project contributed strength to the project, without which it may be difficult to call the project a success. The application of this impressive model in other primary care settings that currently have no standardized way of identifying AF patient's risks will produce the same significant and beneficial health outcome

Electronic health records increased the ease of screening and risk identification. EHR also increased the ease of chart reviews. With login ID and password, the DNP student was able to have easy access to the project site to the patient's records in the E-clinical system.

Interprofessional collaboration between the DNP student, the faculty, and the project site providers, made the QI project a success. A low-cost budget of the QI project is another strength for this project because it allowed for the DNP student to work within the allotted cost of the project and achieve the intended outcome. Another strength was faculty guidance throughout the writing of the paper and the conduction of the project.

ECU College of Nursing (CON) lead faculty, who guided the writing and implementation of the project for four semesters, was an excellent strength to this project. The ECU CON lead faculty included academic guidance in the writing of this project.

Weaknesses. Weaknesses included time constraints in completing the project within three months of implementation of the project, which, if more time were available, more patients would screen for a more favorable result.

Project Limitations

Limitations included personnel shortage during the post-implementation survey. It was challenging to reach one of the participants to collect post-implementation answers to project-specific-questions. This limitation affected the use of all the questions in the survey (see Appendix N). The QI project had limitations in office space at the project site during chart reviews of patient EHR and the collection of post-implementation data due to office space shared with staff, student interns, and students on clinical rotation. This limitation from office space was overcome by doing chart reviews on the day interns, and students on rotation were not present in the clinic. Another option was doing chart reviews towards the end of the day with less traffic in the office.

Project Benefits

This project benefitted the patient by improving their care outcome. When the patient's risks are identified and stratified, an OAC is recommended for use to prevent patients from suffering a stroke. Stroke prevention indirectly improves the quality of care received by the patients. Further, the quality of life of the patient is also indirectly and positively impacted. Stroke prevention helps to reduce comorbidity and mortality associated with AF and stroke. This project is beneficial to the project site, and to other primary care clinics that have no standardized method of identifying AF risk factors A duplication of the project could produce the same result for them. The taxpayers, healthcare industry, and patients benefit from this project due to a reduction in the financial and debilitating cost of AF and stroke. This project potentially saved approximately 574,000 dollars for the patients in the project site and the taxpayers, considering that it costs about $14,000 per one stroke admission. Out of the 50 patients screened, 41 patients scored moderate and high levels of risks.

Practice Recommendations

Based on the significance, benefits, findings, limitations, strengths, and weaknesses of the project, the recommendation was for the project to be used and sustained. Another recommendation was for a duplication of the project in other primary care clinics that do not have a standardized method of identification of AF patient's risks to benefit the patients, taxpayers, and clinics. A replication of this project can be done in other primary care clinics to screen and identify more patient's risks and to recommend for OAC to prevent stroke.

Further guidance is for the project to evolve into research work with more time in order to ascertain proper OAC treatment options. The involvement of human subjects is beyond the scope of this QI project. However, further QI and research projects conducted can produce the results that impacts the reduction of stroke, improve the quality of care and life of AF patients, save patient's lives, and impact reduction of the financial burden associated with stroke in AF patients.

Final Summary

This QI project provided increased identification and stratification of AF patient's stroke risk by utilizing an evidence-based risk assessment tool CHA2DS2-VASc. This paper discussed the identification of risks and recommendations for the treatment of AF with OAC to prevent stroke. The strengths of the project enhanced the completion of the project to get the desired outcome goals. The QI project assisted with indirectly improving the care quality given to the patient. The QI also indirectly improved the quality of life of the patients, saving healthcare costs, and advanced health education. The weaknesses of the QI include a lack of understanding of the stratification process, lack of knowledge of how to use the screening tool as well as wrong stratification. Other flaws included limited office space experienced by the APRN student at the

project site during the implementation period. Time constraints in conducting the

implementation of the project were weakening to the project, considering that the DNP student

had three months to prepare, educate, and execute the project.

The patients benefited from the project by directly having their risks identified, which

helped to prevent stroke. The patients also benefitted from the project by receiving good care

quality and better quality of life due to stroke prevention. The patient received health care cost

reduction in hospital copayments, medication copayments, family care costs associated with a

thromboembolic event. The project site indirectly benefitted through indirect cost reduction to

their patients and directly through reduced care cost in personnel for the patients who would

have been stroke patients. The project site benefitted from the collaboration with ECU College

of Nursing, and the exposure received. Benefits include increased provider adherence to the use

of evidence-based guidelines for AF patients. The taxpayers and healthcare industry benefited

from the QI based on findings of the calculated amount of $574,000 dollars saved, potentially

preventing stroke in the moderate and high-risk patients.

Overall, the project was a success considering that many advantages came from

identifying and stratifying risk that prevented stroke in AF patients. Fifty patients were screened

for stroke risk, and 82% of the patients identified as the moderate to high-risk level. This project

can be adopted and continued as a QI project in other primary care clinics that have no

standardized method of screening and identifying stroke risk. The same results, as described

above, can be produced if duplicated for AF patients. Further research is needed to determine

the appropriate treatment options for patients receiving oral anticoagulation therapy.

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Appendix A

Literature Matrix

NURS: DNP Project Literature Review Matrix				
Student: Chika Nwanedo			Date of Submission:	April 27, 2020
Faculty: Dr. Reilly				
Project Title: Using the CHA2DS2-VASc risk score to reduce stroke: A quality improvement project				
Article (APA Citation)	Level of Evidence (I to VII)	Data/Evidence Findings	Conclusion or Summary	Use of Evidence in EBP Project Plan
Alonso, A., & Arenas de Larriva, A. P. (2016). Atrial fibrillation, cognitive decline, and dementia. European Cardiology, 11(1), 49–53. Doi:10.15420/ecr.2016:13:2	Level VI	Community-based observational studies show a consistently higher rate of cognitive decline and increased risk of dementia in persons with AF. These associations are partly due to the increased risk of clinical stroke in AF.	AF is a risk factor for cognitive decline, dementia, and related to stroke.	The use of CHA2DS2-VASc has an evidence-based risk factor stratification scheme recommended for clinical use.

Beyer-Westendorf, J., Kreutz, R., Posch, F., & Ay, C. (2018). The CHA2DS2-VASc score strongly correlates with the glomerular filtration rate. It predicts renal function decline over time in elderly patients with atrial fibrillation and chronic kidney disease. International Journal of Cardiology, 253, 71–77. https://doi.org/10.1016/j.ijcard.2017.10.110	Level VII	Glomerular filtration rate has more annual declines in patients with AF when screened with CHAD2DS2-VASc patients screened with CHA2DS2.	The CHA2DS2-VASc score can identify AF patient subgroups with lower baseline eGFR and a higher risk of CKD progression, which has important implications for the management of anticoagulation in these patients.	There is a strong correlation of CHA2DS2-VASc score for AF patients and having lower glomerular filtration rates that can help predict renal function decline for patients 65 and older.
Black, A. T., Balneaves, L. G., Garossino, C., Puyat, J. H., & Qian, H. (2015). Promoting evidence-based practice through a research training program for point-of-care clinicians. The Journal of nursing administration, 45(1), 14–20. doi:10.1097/NNA.0000000000000151	Level III	A mixed-methods design evaluated a research training intervention with point-of-care clinicians in a Canadian urban health organization.	Giving clinicians opportunities for point-of-care enables better EBP as well and providing better clinical research.	EBP improves patient care and outcomes. Innovative approaches are needed to overcome individual and organizational barriers to EBP.

Chapman, S. A., St Hill, C. A., Little, M. M., Swanoski, M. T., Scheiner, S. R., Ware, K. B., & Lutfiyya, M. N. (2017). Adherence to treatment guidelines: the association between stroke risk-stratified comparing CHADS2 and CHA2DS2-VASc score levels and warfarin prescription for adult patients with atrial fibrillation. BMC health services research, 17(1), 127. doi:10.1186/s12913-017-2025-6	Level IV	Oral Anticoagulation therapy was under-prescribed for patients with AF. The research discussed the improvement of adherence to stratification guidelines for patients with AF to reduce risk factors for stroke.	Improving guidelines and management of stroke prevention with the interprofessional health care team helps with adherence to risk stratification to prevent stroke.	Opportunities for interventions are present to improve guideline adherence in alignment with risk stratification for stroke prevention. Interprofessional health care teams can provide improved management of stroke prevention for patients with AF.
Chen, J. Y., Zhang, A. D., Lu, H. Y., Guo, J., Wang, F. F., & Li, Z. C. (2013). CHADS$_2$ versus CHA$_2$DS$_2$-VASc score in assessing the stroke and thromboembolism risk stratification in patients with atrial fibrillation: A systematic review and meta-analysis. *Journal of Geriatric Cardiology, 10*(3), 258–266. http://doi.org/10.3969/j.issn.1671-5411.2013.03.004	Level I	A systematic review and meta-analysis of the predictive abilities of CHADS2 and CHA2DS2-VASc in stroke and thromboembolism risk stratification of atrial fibrillation (AF) patients.	CHA2DS2-VASc has the vital advantage of identifying extremely low-risk patients with atrial fibrillation, as well as classifying a lower proportion of patients as moderate risk.	To find the predictive abilities of CHADS2 and CHA2Ds2-VASc in stroke and thromboembolism risk stratification of AF.

Deitelzweig, S.B., Jing, Y., Swindle, J.P. & Makenbaeva, D. (2014). Reviewing a clinical decision aid for the selection of anticoagulation treatment in patients with nonvalvular atrial fibrillation: Applications in a US managed care health plan database. Clinical Therapeutics, 36(11). doi.org/10.1016/j.clinthera.2014.09.016	Level I	The retrospective study used claims data from the large US managed care database, including enrollees in commercial and Medicare Advantage plans.	Evidence-based clinical decision-making tools utilizing risk assessment for recommending a treatment may be valuable for not only health care providers but also health care payers in optimizing care at the population level.	Stroke risk stratification scheme is valuable for the CHA2DS2-VASc QI for patients 65 and older. Evidence-based clinical decision-making tools utilizing risk assessment for recommending a treatment may be helpful for not only health care providers but also health care payers in optimizing care at the population level.
Ding, M., Fratiglioni, L., Johnell, K., Fastbom, J., Ljungdahl, M. & Qiu, C. (2017). Atrial fibrillation and use of antithrombotic medications in older people: A population-based study. International Journal of Cardiology, 15(249), 173-178.	Level I	The study compared patients with AF with a CHADS2 score of more than two at baseline, along with the usage of antiplatelet drugs and anticoagulant to high bleeding risk.	AF is common among older people. The use of anticoagulant drugs increased over time in AF patients, yet still, two-thirds of those with high stroke risk remained untreated. Two- thirds of patients with AF taking	Adherence to risk identification of risk factors of stroke prevents stroke with the use of OAC in older patients 65 and older.

			anticoagulating drugs remain a high stroke risk because of unidentified factors linked to stroke.	
Huckel Schneider, C., Gillespie, J. A., & Wilson, A. (2017). Implementing system-wide risk stratification approaches: A review of critical success and failure factors. Health Services Management Research, 30(2), 72–84. doi.org/10.1177/0951484817695738	Level V	System-wide risk stratification approaches that reviewed critical success and failure factors in the use of standardized risk assessment tools.	Risk stratification has become a widely used tool for linking people identified at risk of health deterioration to the most appropriate evidence-based care.	Evidence-based care risk stratification linked the identification of stroke risk factors to the health decline.

Jacob, L. (2017). Nurse-led clinics for atrial fibrillation: Managing risk factors. British Journal of Nursing, 26(22) 1244-1247	Level VI	Nurse-led clinics for atrial fibrillation: managing risk factors	major cardiovascular risk factors associated with AF, drawing on evidence from the literature, and considers the effectiveness and implications for the practice of introducing community-based nurse-led clinics for risk-factor management in patients with AF.	The use of this reference is to indicate the significant number of risk factors that are supposed to identify a patient for AF before they show signs of a stroke.

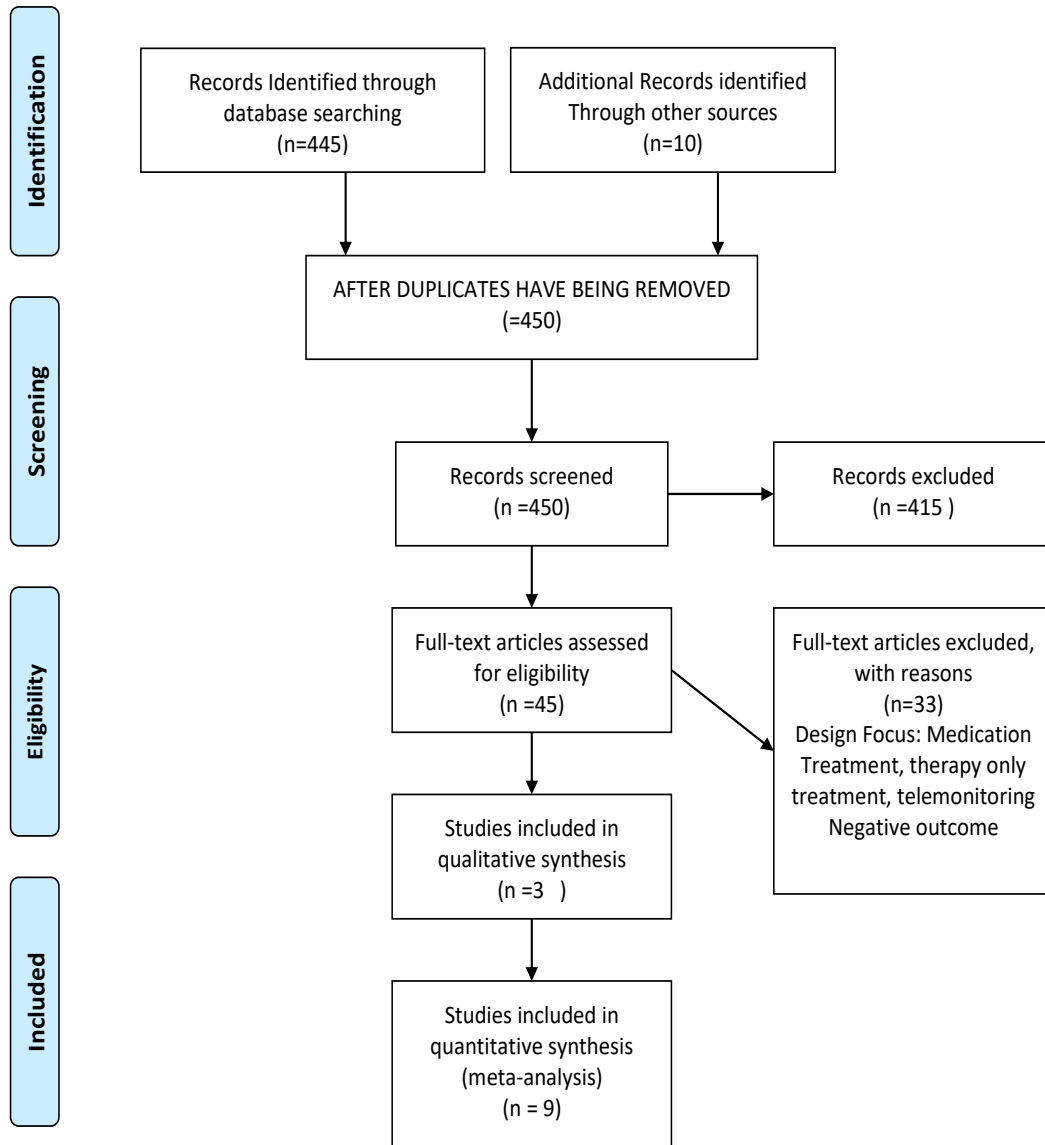|				
January, C.T., Wann, L.S., Alpert, J. S., Calkins, H., Cigarroa, J. E., Cleveland, …, Yancy, W. C., (2019). 2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the management of patients with atrial fibrillation: A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. Journal of American College of Cardiology, January 28. DOI: 10.1016/j.jacc.2019.01.011	Level VII	The American College of Cardiology presents data stating that older female patients tend to have a higher likelihood of stroke if they are diagnosed with AF. CHA2DS2-VASc scoring was utilized for patients to determine if it was beneficial to use CHA2the DS2-VASc score to help prevent thromboembolism.	AHA/ACC/ HRS Guideline for the management of patients with atrial fibrillation: A report of the American College of Cardiology/ American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society.	The American College of Cardiology guidelines for scoring individuals with stroke risk was used for the classification from no risk to high risk for stroke.

Smigorowsky, M.J., Norris, C. M., McMurtry, M. S., & Tsuyuki, R. T. (2017). Measuring the effect of nurse practitioner (NP)-led care on health-related quality of life in adult patients with atrial fibrillation: study protocol for a randomized controlled trial. Trials,18(364).https://doi.org/10.1186/s13063-017-2111-4.	Level II	The study will determine the effect of NP-led AF care on HRQoL in patients with AF, as well as to measure its impact on relevant outcomes such as death, hospitalization, and emergency department visits. Along with the findings for delivering care to patients with AF	Impact and implications of NP-led AF care on HRQoL in patients with AF.	The use of timely care for AF patients through the help of nurse practitioners can help improve the identification and quality are of AF patients.
Turakhia, M. P., Shafrin, J., Bognar, K., Trocio, J., Abdulsattar, Y., Wiederkehr, D., & Goldman, D. P. (2018). The estimated prevalence of undiagnosed atrial fibrillation in the United States. PloS one, 13(4), e0195088. Doi:10.1371/journal.pone.0195088	Level IV	The study determined the prevalence of AF in the elderly population and how CHADS2 scoring of 77% resulted in more than one score, and 56% has a score of greater than 2.	Retrospective cohort study using 2004±2010 health insurance claims data from a commercial claims dataset representing several large, self-insured companies and administrative claims data from Medicare.	Patients who are 65 years and older still are not diagnosed with AF affecting the healthcare gap.

Rozen, G., Hosseini, S. M., Kaadan, M. I., Biton, Y., Heist, E. K., Vangel, M., … Ruskin, J. N. (2018). Emergency Department Visits for Atrial Fibrillation in the United States: Trends in Admission Rates and Economic Burden From 2007 to 2014. Journal of the American Heart Association, 7(15), e009024. doi:10.1161/JAHA.118.009024	Level I	The number of emergency AF indecent decreased from 70 % to 62 %; however, more AF hospitalizing increased from 288,225 to 333,570 patients. Resulting in an annual cost of 7.39 billion to 10.1 billion.	This study is a repeated cross-sectional analysis of US ED visits using data from the NEDS, the Healthcare. A systemic Review	We aimed to investigate the trends in ED visits and hospital admissions for AF.
Wang, G., Zhang, Z., Ayala, C., Dunet, D. O., Fang, J., & George, M. G. (2014). Costs of hospitalization for stroke patients aged 18-64 years in the United States. Journal of stroke and cerebrovascular diseases: The official journal of National Stroke Association, 23(5), 861–868. Doi:10.1016/j.jstrokecerebrovasdis.2013.07.017	Level IV	The cost of strokes average to about $20,396 to $23,256, where $ 18,963 for ischemic, hemorrhagic cost about 32,035 to 32,046 and other stokes result in 19,248 to 21,703.	The cost of hospitalization varies between Ischemic, hemorrhagic, and other strokes.	Some researchers believed that the CHA2DS2VASc stratification scheme exposes too many patients to the intervention of anticoagulation therapy due to lower risks standard, which may cause hemorrhagic effects on them.

Appendix B

PRISMA 2009 Flow Diagram

| Identification | Records Identified through database searching (n=445) | Additional Records identified Through other sources (n=10) |

AFTER DUPLICATES HAVE BEING REMOVED (=450)

| Screening | Records screened (n =450) | Records excluded (n =415) |

| Eligibility | Full-text articles assessed for eligibility (n =45) | Full-text articles excluded, with reasons (n=33) Design Focus: Medication Treatment, therapy only treatment, telemonitoring Negative outcome |

| Included | Studies included in qualitative synthesis (n =3   ) |

Studies included in quantitative synthesis (meta-analysis) (n = 9)

Adapted from The PRISMA Group (2009). www.prisma.statement.org

Appendix C

Risk Assessment Tool CHA2DS2-VASc

	CONDITION	POINTS
C	Congestive heart failure (or left ventricular systolic dysfunction)	1
H	Hypertension: blood pressure consistently above 140/90mmHg (or treated hypertension on medication)	1
A$_2$	Age ≥75years	2
D	Diabetes Mellitus	1
S$_2$	Prior Stroke or TIA or thromboembolism history	2
V	Vascular disease (e.g. peripheral artery disease, myocardial infarction, aortic plaque)	1
A	Age 65 – 74 years	1
S$_C$	Sex category (female)	1

Total Points for Patient: _____

Stratification: (check one)

Score of 0-1 Low Risk _____

Score of 2-4 Moderate/Medium/Intermediate Risk: _____

Score 5-9 High Risk: _____

Provider Comment: _____

Appendix D

Virchow's Triad
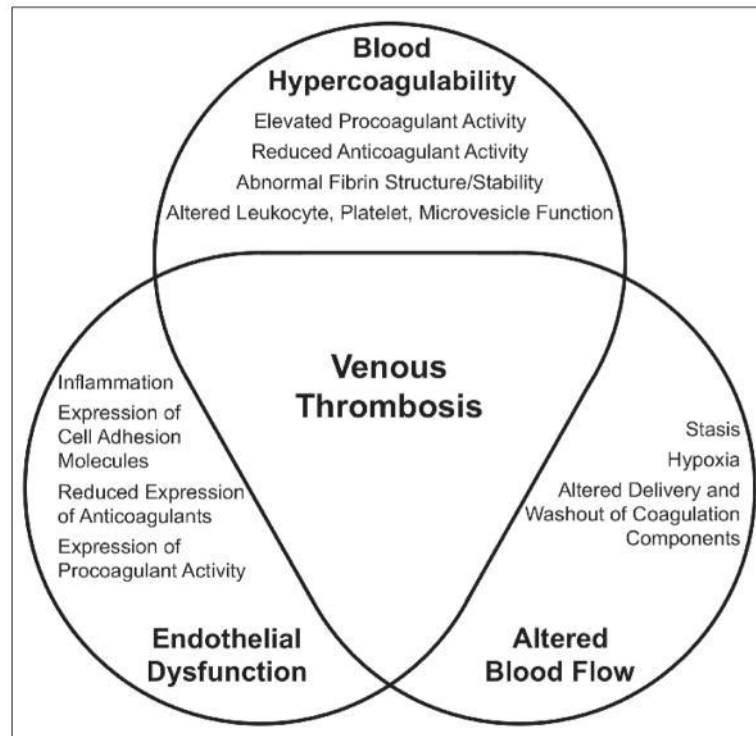
Adapted from Yamashita, T. (2016). Virchow triad and beyond in atrial fibrillation. *Heart*

Rhythm,13(12), 377–2378. https://doi.org/10.1016/j.hrthm.2016.09.007.

Appendix E

Staff Education PowerPoint

USING THE CHA2DS2VASC RISK SCORE TO REDUCE STROKE

A QUALITY IMPROVEMENT PROPJECT

By

Chika Nwanedo, BA, RN-BSN, DNPc
East Carolina University, College of Nursing

Greenville, NC

1

WHAT IS CHA2DS2VASC?

Cha2ds2vasc is an evidenced based screening tool used to estimate risk of stroke in atrial fibrillation patients.

Cha2ds2Vasc can identify Atrial Fibrillaton patients who are at low, moderate/medium or high risk for stroke and embolic disease (Chen et al., 2018)

2

WHY IDENTIFY PATIENTS WITH CHADS2VAS2C?

- Atrial Fibrillation (AF) is a significant risk factor for ischemic stroke and other thromboembolic events. Atrial Fibrillation increases the risk of arterial thromboembolism and stroke five-fold.

- Empirical Studies show that AF contributes to at least 15 percent of all strokes.

- The Center for Disease Control and Prevention (CDC) approximates that 2.7 to 6.1 million people in the United States have AF. About 9% of people aged 65 years or older have AF.

- With the aging of the U.S. population, this number is expected to increase.

3

CHADS2VA2SC: ACRONYM FOR THE RISK FACTORS

C – Congestive Heart failure

H – Hypertension 140/90 MMHG

A –Age- Equal to or more than 75years of age

D – Diabetes Mellitus

S2- Prior Stroke or TIA or thromboembolism

- V- Vascular Disease (MI, PAD, Aortic Plaque

- A – Age 65 – 74

- Sc – Female Category or Gender -Research has shown that more women are at more risk for Atrial Fibrillation. This category was added

4

Appendix F

Relationship Between CHA2DS2-VASc and Annual Risk of Stroke
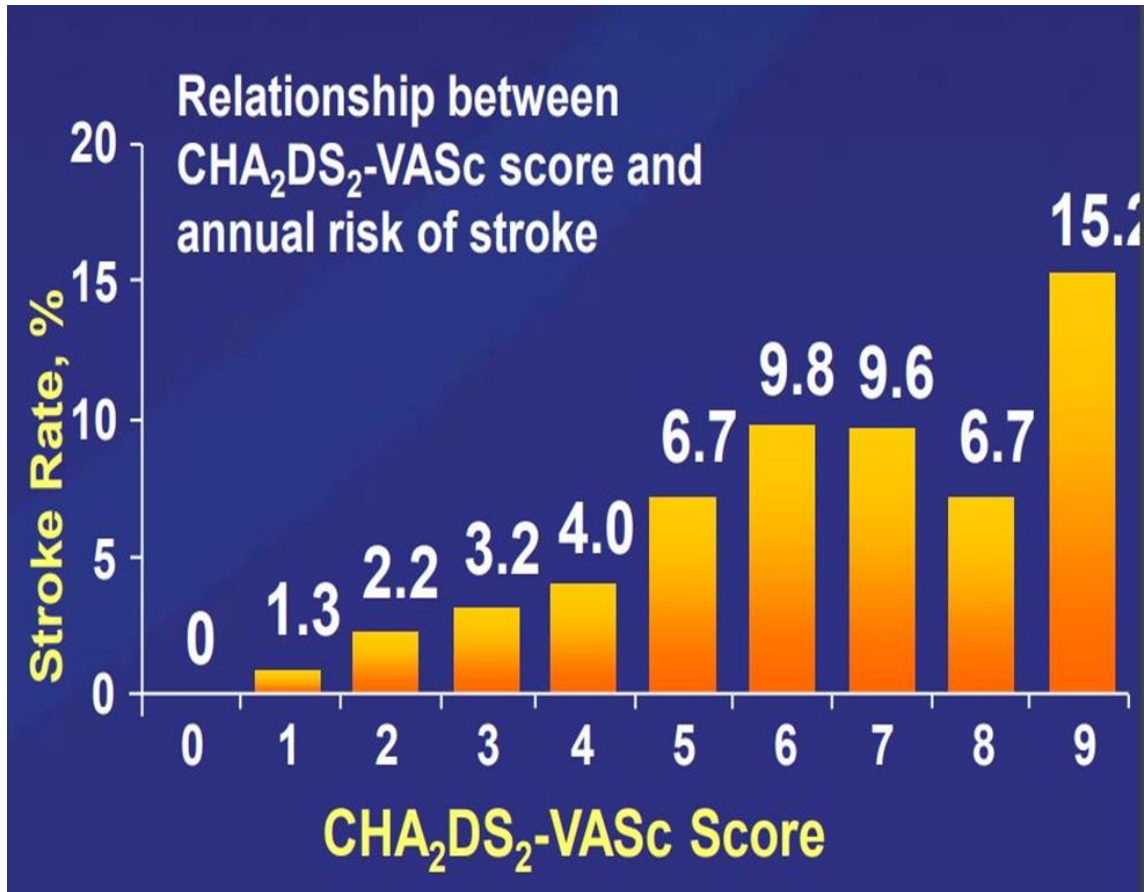
Bar chart showing the rate of stroke per score by Lip GY, Halperin JL. (2010). *American Journal of Medici*ne,123(6),484-488
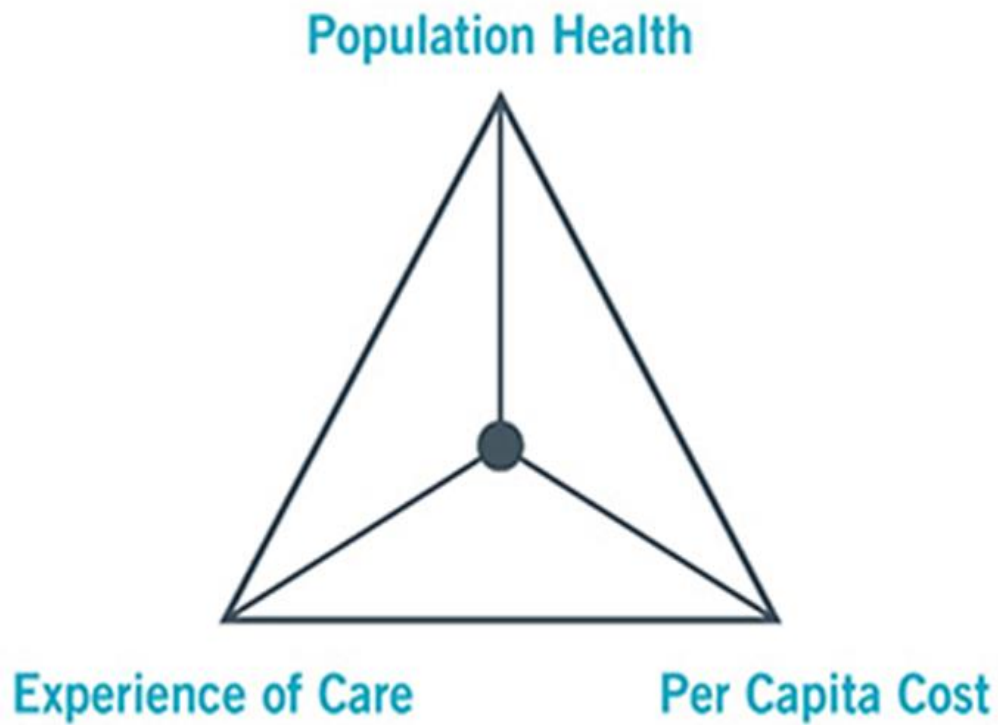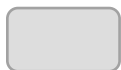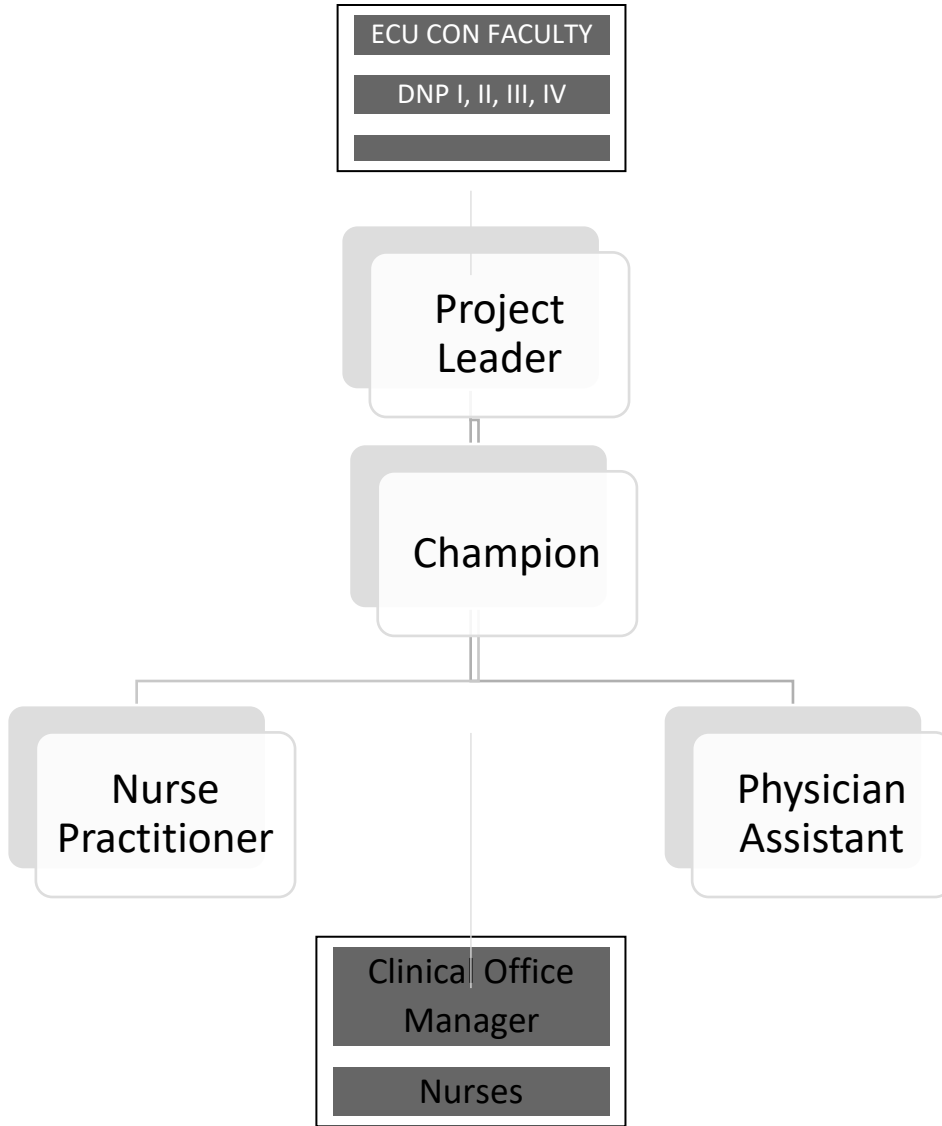
Appendix G

DNP Data Collection Tool for CHA2DS2-VASc.

DNP DATA COLLECTION TOOL FOR CHA2DS2-VASc SCREENING.

Date: _____Week _____

N O	MALE	FEMALE	AGE 65–88 Yrs.	AGE – 89 AND OLDER	LOW RISK	MODERATE RISK	HIGH RISK	RECOMMENDATION
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								

Appendix H

The Triple Aim

Figure 2. Triple Aim Triangle adapted from the Institute of Health Care Improvement.

Appendix I

Hierarchy of Interprofessional Collaboration

| ECU CON FACULTY |
| DNP I, II, III, IV |
| |

Project Leader

Champion

Nurse Practitioner

Physician Assistant

| Clinical Office Manager |
| Nurses |

- Faculty provided Guidance to Leader, Faculty Approval, Collaboration

- Collaboration, Implementation of Project

Appendix J

SWOT Analysis of the DNP Project Process

S — Strength

- Screening and Idefinftion of Patients
- Quality Care and improvement
- IRB and orginzational approval
- Identification and stratification of patients provides for improve quality care with CHA2DS2-VASc
- intervention prevents stroke, increases quality of life and and patient satisfaction

W — Weakness

- Lack of understanding of the stratification process.
- Lack of understanding of how to use the screening tool
- Wrong stratification

O — Opportunity

- Improved Clinical Staff Adherence to Screening for Stroke Risk.
- Assist in the implementation and completion of Project.
- Opportunity from micro to macro organizational level.

T — Threat

- Lack of sustainability at the end of the Project .
- Patient dissatisfaction.
- Poor Staff Compliance and Poor patient Compliance with recommendation

Appendix K

Site Approval and Support Letter

M.D.
Family Health Care

Adult Medicine and Pediatrics
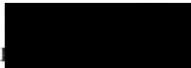
Date: November 29, 2018

7550 Six Forks Road
Suite 260
Raleigh, N.C. 27615
(915) 846-9292
FAX (915) 848-3578

To Whom It May Concern:

We at, ███████, MD have reviewed Chika Petronila Nwanedo DNP Project Title "CHADSVASC Screening Tool for Patients with AFib." Ms. Nwanedo has organizational support and approval to conduct her project within our institution. We understand that for Ms. Chika Nwanedo to achieve completion of the DNP program dissemination of the project will be required by the University, which will include a public presentation related to the project and a manuscript submission will be encouraged.

Our organization has deemed this project as a quality improvement initiative, and not requiring institutional IRB interview.

Thank you,

MD/Owner

For Tips on Healthy Living
Like us on Facebook -
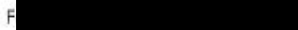
Appendix L

ECU DNP Project Budget

ECU DNP PROJECT EXPENSES					
	unit price	Quantity		amount	NOTES
Transportation - Gas to	$10 per trip	12 Site Visits		$ 120	Cost of transportation per trip is $10.
	-				
Snack food basket	$30 per basket	6		$ 180	Snack food for the staff
Grammerly App	$65 Copyright App	1		$ 60	APP Subscritpion and Download for One Year
Copying & Printing	20 Cents per page	250 copies		$ 50	Copeis of DNPI Eval, paper, Tools, Folder Jacket, $20 saved from using cheaper copy center
CONTINGENCY				$ 70	for higher prices/cost of transportation, accomodation, food
LABOR - STAFF COST					No cost for my research/class time
Savings of $20				$ 20.00	Saved from Using Cheaper Copy Center
GRANT TOTAL				$ 500.00	

Appendix M

IRB Approval Process

Quality Improvement/Program Evaluation Self-Certification Tool

Purpose:

Projects that do not meet the federal definition of human research pursuant to 45 CFR 46 do not require IRB review. This tool was developed to assist in the determination of when a project falls outside of the IRB's purview.

Instructions:

Please complete the requested project information, as this document may be used for documentation that IRB review is not required. Select the appropriate answers to each question in the order they appear below. Additional questions may appear based on your answers. If you do not receive a STOP HERE message, the form may be printed as certification that the project is "not research," and does not require IRB review. The IRB will not review your responses as part of the self-certification process.

Name of Project Leader: Chika Nwanedo

Project Title: Using the CHA2DS2-VASc Risk Score to Reduce Stroke: A quality improvement project

Brief description of Project/Goals:

The purpose of this Doctor of Nursing Practice (DNP) quality improvement (QI) project is to utilize the CHA2DS2-VASc screening tool to identify atrial fibrillation patients who are at low, moderate, or high risk for stroke and embolic disease in a Southeast NC Primary Health Care outpatient setting. Atrial Fibrillation (AF) is a significant risk factor for ischemic stroke and other thromboembolic events. AF puts patients at increased risk of arterial thromboembolism and ischemic stroke. About 90 percent of the patient population in the Southeast NC primary health care are adults. These patients may be at risk for stroke due to undetected atrial fibrillation (AF), yet, there is no standardized screening process or tool used to identify the patients who have AF.

For this reason, a quality improvement project using the evidenced-based screening tool CHA2DS2-VASc will identify patients with AF at the primary care clinic. Patients will be stratified to low, moderate and high risk for stroke and embolic disease, for intervention with anticoagulation therapy following the American Heart Association (AHA)/American College of Cardiology (ACC)/Heart Rhythm Society (HRS) guidelines. Patients with AF have the most

common disorder of the cardiac rhythm. Based on Virchow's Triad, AF causes stasis of blood in the heart, which increases the risk of arterial thromboembolism and stroke five-fold. Research shows that AF contributes to at least 15 percent of all strokes. The Center for Disease Control and Prevention approximates that 2.7 to 6.1 million people in the United States have AF. About 2% of people younger than age 65 have AF, while about 9% of people aged 65 years or older have AF. With increased aging of the U.S. population, this number is expected to increase. The project will directly impact outpatient health care at a primary family practice by preventing strokes and achieving high-quality care outcomes for the AF patient population. The quality improvement project will be implemented in the Fall of 2019. The plan is to conduct two educational training on the use of the evidenced-based CHA2DS2VASc screening tool. The training will be done one week apart to cover all shifts. The training will focus on the use of the evidenced-based tool CHA2DS2-VASc to screen and identify patients with AF based on the CHA2DS2-VASc. Patients will be stratified to low, moderate, and high risks. With more than low risk, oral anticoagulation or antiplatelet therapy for the prevention of stroke or thromboembolism may be imperative. The first training will be done before the beginning of the implementation. Stratified data will be collected and evaluated after one week of screening patients with the CHA2DS2-VASc tool to ascertain the proper use of the instrument. A re-education will be done at this stage to cover all staff and if the evaluation indicates the need for previously trained staff. Implementation will be for 60 days. Close weekly surveillance will be conducted on the use of the screening tool and for data collection. The project implementations will be evaluated using a Plan-Do-Study-Act (PDSA) model. Measurable objectives include the number of electronic patient records indicating the use and application of the QI project screening tool.

Further measurable objective is how many patients identified to need a recommendation for anticoagulation therapy based on the CHA2DS2-VASc project and guideline. The project will, through education of the staff and standard practice, sustain itself. The QI, though begins at a micro level, is expected to extend to a macro clinical practice level and thus provide a foundation for future interprofessional leadership.

Based on your responses, the project appears to constitute QI and Program Evaluation. IRB review is not required because, in accordance with federal regulations, your project does not constitute research as defined under 45 CFR 46.102(d). If the project results are disseminated, they should be characterized as QI and/or Program Evaluation findings. Finally, if the project changes in any way that might affect the intent or design, please complete this self-certification again to ensure that IRB review is still not required. Click the button below to view a printable version of this form to save with your files, as it serves as documentation that IRB review is not required for this project. 6/21/2019. Powered by Qualtrics

Appendix N

Demographic and Project-Specific Question for Participants

Questionnaire

Using the CHA2DS2-VASc Risk Score to Reduce Stroke: A quality improvement project

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INSTRUCTIONS TO SURVEY PARTICIPANTS IN QI PROJECT

- *This survey is given for collection of data for a quality Improvement projects*
- *Please read and answer all questions and provide your answers in the spaces given.*
- *Please return this survey as soon as completed within one week*

---

1.   Are you an employee of this clinic?   _____Yes   No_____

2.   What is your gender? Male_____, Female_____

3.   What is your position? _____

4.   How Long have you worked in this clinic? Less than 1 – 4years_____,

      5years -10 years _____, 11years – 15years _____, 16years – 20years_____,

      21years – 25years _____, 26 years and above _____

5.   Are you supportive of using the CHA2DS2-VASC to screen patients? Yes_____, No_____

6.   Do you believe that the screening will increase quality care and save lives? Yes_____, No_____

7.   Do you believe that the screening tool will bring some changes in the clinic

      e.g. patient satisfaction, extra work for staff? Yes_____, No_____

8.   Do you believe that such change from using CHAD2s2-VASc will improve patient outcome?

9.   How likely are you to use the screening tool CHA2DS2-VASc? Not at all Likely_____,

      Somewhat likely _____, Neither Likely nor Likely _____, very Likely _____

10.   Are you ready for the change that the screening tool will bring? Yes_____, No _____

Appendix O

DNP Poster Presentation