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# Improving Low Health Literacy in Poststroke Patients by Educating the Health Care Staff

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This DNP doctoral project, directed and approved by the candidate's committee, has been accepted by the School of Nursing and College of Graduate and Professional Studies of Abilene Christian University in partial fulfillment of the requirements for the degree

**Doctor of Nursing Practice**

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A doctoral project submitted in partial satisfaction

of the requirements for the degree of

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by

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# Dedication

I want to dedicate this DNP project to my husband, Bill, for his love, support, and courage. To my children, Natasha, Jason, and Mack, for all they have taught me about life and love, and especially my nine-year-old daughter, Natasha, who had to give up a lot of "mommy" time for over two years for me to accomplish this significant step in my career.

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## Abstract

Lack of health literacy in the poststroke patient population is a serious issue; with the addition of the homeless population to that group, the result may be devastating. According to the American Heart Association and American Stroke Association (AHA/ASA, 2016), stroke is considered the primary cause of death and one of the chief reasons for disability in the United States, and nearly 75% of strokes occur in those who are 65 years of age or older. Nurse practitioners are vital, providing necessary training and stroke education to the nursing and other health care staff. This DNP project was initiated to help implement clinical interventions and provide tools to the health care staff to help them educate patients after their stroke. This DNP project was designed to increase the health care staff's awareness and understanding of poststroke literacy and to improve stroke literacy and stroke outcomes in their poststroke patients.


*Keywords:* stroke, poststroke health literacy, stroke outcome, health care staff

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## Chapter 1: Introduction

According to the Agency for Health Care Research Quality (AHRQ; 2017), "health literacy is the ability to get, process, and understand basic health information and services needed to make appropriate decisions." Challenges with insufficient literacy about stroke in poststroke patients, especially those who are homeless, are formidable; this matter has a causational correlation with reduced medication usage, diminished communication with health care practitioners, and lack of knowledge of danger signs that would eventually result in recurrent strokes, debilitation, or death. I documented current existing information on low health literacy, how to assess for the lack of health literacy, and how to determine what tools are available for the nursing staff to evaluate low literacy in poststroke patients. I addressed many of the possible interventions that the nursing and medical staff need to consider that may help improve literacy issues in their patients, whether these individuals presented in the inpatient hospital setting with a stroke, rehospitalization with recurrent stroke, or in the outpatient clinic.

According to the National Institute of Neurological Disorders and Stroke (NINDS; 2018), more than 700,000 people suffer a stroke each year in the United States, and approximately two-thirds of them survive. What is currently available at most health care organizations is a yearly competency class addressing primary stroke education. In the majority of these facilities, poststroke patients often get admitted to neurology or the intensive care unit (ICU). Although nurses and other health care staff in the neurology sections of the hospital are better equipped to care for stroke patients, staffing does not always permit the admission of all stroke patients to a neurology unit. The patients may have risk factors for stroke but were admitted for unrelated issues and might suffer a stroke while hospitalized. Therefore, a potential stroke patient may be

cared for in any available acute care unit unless the patient is unstable or requires specific intravenous medication.

Other health care staff members need all the necessary tools to assess and care for poststroke patients. The acute care patient population includes those who share similar risk factors as the patients in neurology in addition to factors that place them in a hypercoagulable state, therefore increasing their risk factors for developing blood clots that may lead to a stroke. I addressed and added more in-depth information regarding stroke, the correlation between the type of stroke and presenting symptoms, rehabilitation requirements, and more detailed information on currently available pharmaceutical regimens such as anticoagulation. In addition, I investigated research studies that were in progress from the NINDS.

An evidence-based quality improvement (QI) DNP project that improves patient outcomes has the potential to help reduce health care cost and morbidities. Low health literacy in poststroke individuals, including veterans and those who are homeless, can be a substantial barrier to preventing reoccuring strokes in that population. Other barriers exist that disproportionately affect veteran and homeless populations. These barriers include lack of access to care, low socioeconomic status, limited reading and language skills, and a negative perception of health and health care. These barriers, along with a lack of health literacy, may contribute to worse stroke outcomes in that population.

**Nature of Project**

According to Berkman, Sheridan, Donahue, Halpern, and Crotty (2011), when a person is incapable of understanding or abiding by verbal instructions or written documentation concerning a diagnosis, the patient is identified as having low literacy. Insufficient literacy about health is linked to amplified disparities in well-being, adverse or poor outcomes, and reduced use

of available supportive care amenities. According to the Center for Disease Control and Prevention (CDC, 2017), poor literacy may lead to safety concerns including medical advice misinterpretation and medication usage errors. The rationale for this DNP project was to educate and increase the health care staff's awareness of low stroke health literacy in their poststroke patients. The goal was to furnish these providers with tools that would help their patients avoid reoccurring stroke. The education included reviewing diagnostic neuroimaging of the location of the stroke, addressing medicinal regimens, and identifying stroke risks, signs and symptoms of stroke, and stroke prevention using available tools from the National Institute of Health (NIH), the NINDS, and the American Heart Association and the American Stroke Association (AHA/ASA).

The goal was also to address the patient's characteristics and needs that are associated with low stroke health literacy to choose the right interventions. The health care staff are tasked to assess their patient's educational needs based on the patient's cognitive status, the level of literacy, stroke risk factors, stroke teaching needs, follow-up needs, medication compliance, illicit drugs or alcohol use, and other issues. The goal was to improve the staff's understanding of the importance of assessing poststroke health literacy in their patient population and help them educate their clients accordingly. In addition to the above statement, this DNP project was initiated to determine the effectiveness of the poststroke health literacy educational presentation and intervention designed to help health care staff consisting of registered nurses (RNs), pharmacists, and physicians, to improve health literacy in their poststroke patients, and help to improve the patient's stroke outcome.

Sanders et al. (2014) asserted that providers may assist in decreasing the costs and morbidities in health care by developing evidence-based interventions that address poststroke

literacy in their clients. What I helped to do was encourage the establishment of specific training programs that educated the health care staff about how to assess low health literacy in poststroke individuals. I addressed health care disparities, lack of information, and interventions needed for the team to help their patients in that population. The staff would then be equipped after the educational presention to educate their clients accordingly. The education the staff would provide to their patients, families members, and caregivers in the future would address the items mentioned above to help increase the patient's outcome.

**Research Questions PICOT Format**

When developing a well-defined research project, the question of inquiry helps provide the researcher with the information needed to provide literature to support the rationale for the study. In health care research, this question of inquiry is often called a PICOT question (Melnyk & Fineout-Overholt, 2015). According to Aslam and Emmanuel (2010), PICOT is the foundation for establishing a research inquiry. The (P) of the PICOT question relates to the problem or population to be addressed for a research inquiry. The (I) represents the intervention or treatment of interest. The (C) is for comparison, for example, when a new therapy is compared with the existing one. And (O) is for the outcome or the effect of the intervention (Aslam & Emmanuel, 2010). The (T) refers to the time frame for this project which is estimated to be about two to three weeks.

**Hypothesis (Restatement of PICOT)**

The question I sought to answer through this project was the following: Does the use of an educational program (I) for health care professionals (P) about poststroke health literacy compared to not receiving an educational program about poststroke health literacy (C) increase staff's own health literacy in their care of poststroke patients (O)?

**Theoretical Framework Discussion**

Dr. Nola Pender's health promotion model (HPM) served as the theoretical framework and model for this DNP project (Figure 1).

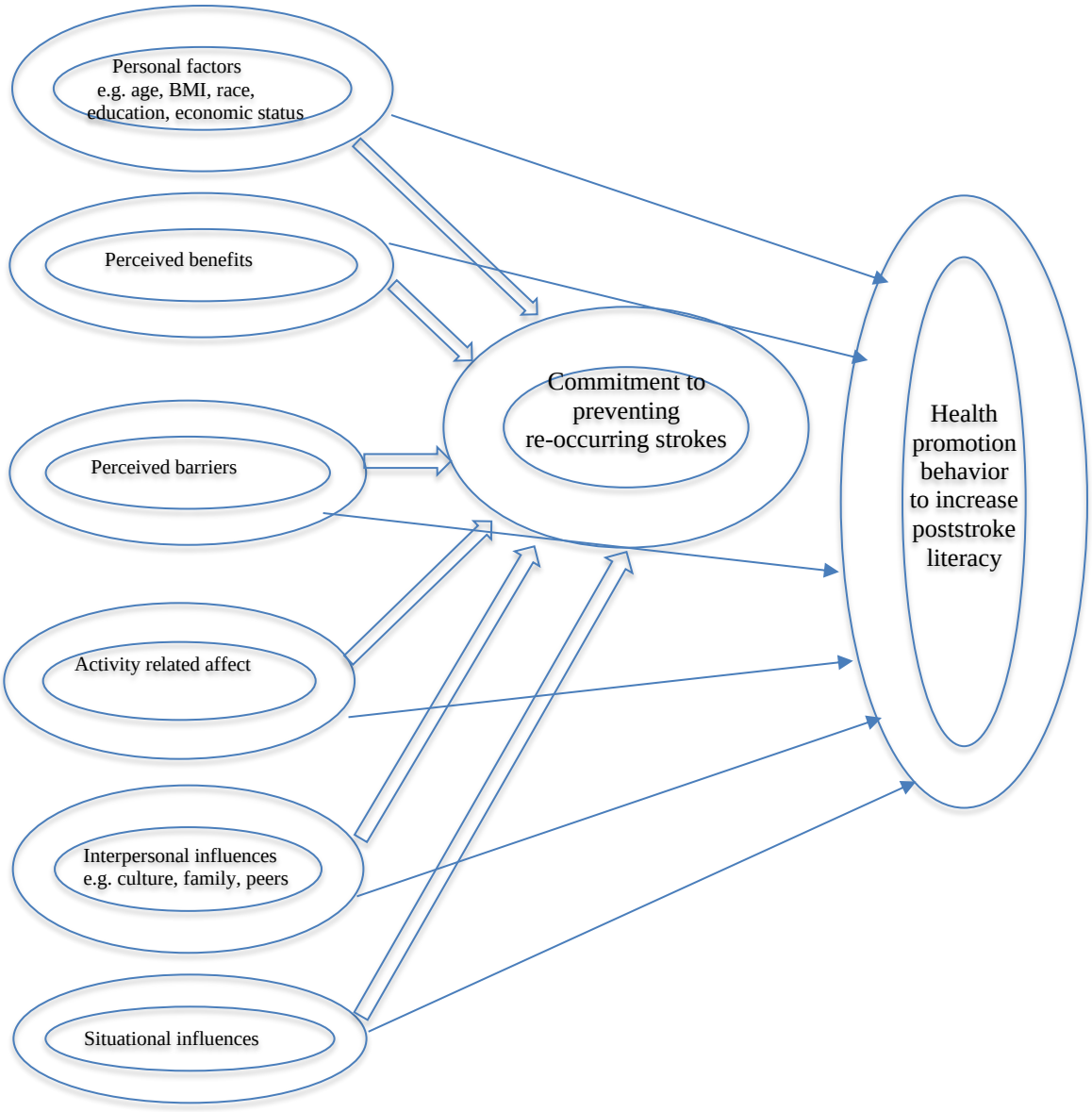


*Figure 1*. Diagram depicting health promotion model (HPM), designed by Marthilde Brzycki.

In brief, Pender, Murdaugh, and Parsons (2011) argued that HPM is a middle-range theory that addresses individual issues that impact a client's behavior toward health. The HPM is

recognized as a useful way to help increase the health of the patient population in the health care setting or in their communities leading to a better quality of life. The model emphasizes individuals and their background, environment, current diagnosis, and socioeconomic status. According to McEwen and Wills (2011), this model serves as a "framework for integrating nursing and behavioral science perspectives on factors that influence health behaviors" (p. 225).

Pender created her research based on "the social cognitive theory of Bandura and the value expectancy theory, which resulted in the development of a model that explains, predicts, and modifies forms of behavior that promote health" (Heydari & Khorashadizadeh, 2014, p. 1067). The model involves "three groups of factors that influence health behavior: individual characteristics, behavior-specific cognitions and effect, and immediate behavioral contingencies. The model shows how these three factors can both, directly and indirectly, influence health-promoting behavior" (Heydari & Khorashadizadeh, 2014, p. 1067). The health promotion model discusses personal factors, perceived benefits, perceived barriers, activity-related affect, interpersonal influences, situational influence, commitment to the plan, and health behavior outcome.

Previous research studies have analyzed the HPM. Heydari and Khorashadizadeh (2014) assessed it by reviewing more than 70 articles related to the model and analyzing the results. The data collected showed that the HPM was useful when used to predict behaviors that affect health and to define health perceptions and outcomes (Heydari & Khorashadizadeh, 2014).

In a cross-sectional study of 220 patients by Mohsenipoua et al. (2016), researchers investigated the effectiveness of the HPM in forecasting the lifestyles of cardiac surgery patients. The patients involved faced psychological, social, and physical problems after they were discharged from the hospital after coronary artery bypass graft (CABG) surgery. The researchers

studied the association between a patient's physical activity and their risk of having cardiovascular diseases. They concluded that Pender's model could help providers recognize and forecast the patients' lifestyle. In addition, they argued that this information could serve as a framework when coordinating the patient's educational intervention and hospital discharge, thereby improving the patient's lifestyles (Mohsenipoua et al., 2016).

In another HPM-related study, Khodaveisi, Omidi, Farokhi, and Soltanian (2017) studied the effect of Pender's HPM in improving the nutritional behavior of overweight and obese women. The researchers concluded that "Pender's HPM-based training improved nutritional behavior and some constructs of the model. Therefore, this educative model can be used by health care providers to improve the nutritional and other health-promoting behaviors" (Khodaveisi, Omidi, Farokhi, & Soltanian, 2017, p. 165).

**Operational Definitions**

Key terms were used to facilitate the project inquiry and review of the literature. The following key terms were used in this scholarly project:

**Health care staff**. Members of the nursing and medical team.

**Health literacy**. According to the Institute of Medicine, health literacy is defined as the "degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Ratzan & Parker, 2000, p. 1). According to the AHA/ASA (2016), "health literacy is the degree to which individuals are able to access and process basic health information and services and thereby participate in health-related decisions."

**Stroke**. "Stroke, or cerebrovascular accident (CVA), is a clinical term that describes a sudden loss of neurologic function persisting for more than 24 hours that is caused by an interruption of the blood supply to the brain" (Danziger, 2018, p. 1).

**Stroke literacy**. Awareness of stroke warning symptoms and risk factors.

**Scope and Limitations**

The HPM is detailed and lengthy. A limitation could be a possible lack of interest from the health care staff with non-compliant patients. The model helps identify different types of effective interventions that may help the team to increase a patient's literacy. These interventions include educating patients on the different types of strokes, the disease process, risks factors for stroke, stroke symptoms, and the location of the stroke that affects their disability. Interventions may also include assessing the individual's literacy about prescribed medications or preventative care. The goal of this model is to improve the client's health and to help improve their health outcomes. For these interventions to be successful, the patient must agree to alter his or her lifestyle, modify behaviors, and reduce barriers to stroke education or stroke prevention that is provided to them by their health care team. The model would then be successful in teaching all different types of stroke education, whether TIA, hemorrhagic, or ischemic.

## Chapter 2: Literature Review

Decreased poststroke literacy causes a higher incidence of stroke recurrence and a possible reduced level of general health in societal populations. According to accrediting bodies such as the Joint Commission, "completion of stroke education on acute ischemic stroke inpatients before hospital discharge is 1 of 8 core performance measures that Joint Commission-certified primary stroke centers must conduct" (Sanders et al., 2014, p. 4). For this project, I gathered and explored relevant articles systematically to assess for the presence of interventions targeting health literacy and stroke literacy. I utilized several avenues for collecting data about low health literacy in stroke patients, poststroke homeless patients, and poor or minority patients.

The search strategies included using library databases to search for full-text articles available. The databases explored were Wiley, EbscoHost, PubMed, and NCBI. First, a search was performed for *health literacy*, but that term was too broad. The search was narrowed down to *stroke health literacy, low literacy for homeless persons, interventions for low health literacy,* and lastly, *health literacy and stroke patients*. The search also included a look at literacy tools, surveys, and some case studies related to health literacy about other health care issues. The exhaustive search resulted in several online journal articles and reviews, some of which were directly related to this DNP project. After reading the abstracts, fewer than twenty relevant articles warranted selection.

### Assessing Stroke Literacy and Ways to Improve Stroke Literacy Status

Following a stroke incident, the expectation would be that these individuals would have increased stroke literacy and knowledge of stroke risk factors and symptoms, but that does not seem to be the case in most of the studies reviewed. Studies have shown that most poststroke patients and their caregivers have poor stroke literacy. Many of these patients, despite their

increased risk, continue their harmful prestroke routines. This lack of awareness related to stroke and stroke risk has been suggested as one contributor to the continuation of detrimental lifestyles (Ellis, Barley, & Grubaugh, 2013) and places these individuals at risk for reoccuring strokes.

In a cross-sectional, hospital-based project conducted at the University of Florida in Jacksonville, Koutnik-Fotopoulos (2014) included 100 persons admitted to the medical center with an acute ischemic stroke (AIS). The individuals were acknowledged and enlisted by their treating neurologist or a unit nurse manager (Koutnik-Fotopoulos, 2014). The neurologist confirmed the diagnosis of an AIS using imaging, such as a CT scan or an MRI, to aid in determining the type of the stroke and the infarcted location. Each patient's neurological deficit on admission can be outlined by using the guidelines provided by the National Institutes of Health Stroke Scale (NIHSS). The participants' cognitive status or impairment was examined using a mini-mental status exam. The average patient was 60 years of age, 57% were male, 56% were African American, and 75% earned < $25,000 per year (Koutnik-Fotopoulos, 2014).

The levels of the participants' health literacy were measured using the short form test of functional health literacy in adults (S-TOFHLA). The patients' understanding and ability to retain the information provided were evaluated using the available questions from the stroke patient education retention score, which ranged from 0 to 10. Testing was done after the educational session and before patient discharge (Koutnik-Fotopoulos, 2014). The results revealed that a decreased health literacy was prominent in this patient group with close to 60% having slight to poor health literacy on the date of discharge. Koutnik-Fotopoulos revealed that recall of stroke teaching was deficient, even with a typical poststroke education. Only a small percentage of the participants in that study could recognize all five warning indicators for a stroke, about 40% understood their stroke risk factors, 85% knew what actions to take if they

developed stroke symptoms, and 76% knew their medication prescribed for stroke prevention, and 53% knew their type of stroke (Koutnik-Fotopoulos, 2014).

I recognized the study's limitations due to the small study cohort, and the modeling approaches were not significantly designed to identify the effect of multiple demographic aspects on stroke occurrence (Koutnik-Fotopoulos, 2014). However, I determined that the outcomes of the study underline those of other studies that suggest that literacy is one factor contributing to health disparities, both in terms of the occurrence of low literacy and the impact it has on educational outcomes (Koutnik-Fotopoulos, 2014). This study was significant to this DNP project because it addressed the patient's literacy status and provided ways to improve stroke literacy.

**Limitations on Educational Recall Poststroke**

A study by Sanders et al. (2014) consisted of a cross-section of 101 patients in an urban hospital suffering from AIS. The data model the researchers used analyzed participants by age, race, sex, income, employment status, education level, their NIHSS, and mental health score. The test administered determined that individuals with a lack of understanding of health literacy remembered about half of their stroke education. Individuals that showed minimal health literacy were determined to be high risk. The data revealed that individual patients "who are subject to hospital admission with acute ischemic stroke had a great risk of stroke recurrence: 3.1% after 30 days, 11% after one year, 26% after five years, and 39% after ten years" (Sanders et al., 2014, p. 5). The results showed that a small percentage of stroke patients could remember the five warning signs of a stroke. A little over 40% could identify their risk factors after receiving the recommended stroke education, and less than half recalled the stroke they experienced (Sanders

et al., 2014). The results revealed that poststroke individuals who have poor literacy about their condition were considered to have a high risk for reoccurring strokes.

One of the study's strong points is that Sanders et al. (2014) used qualified nurses to train poststroke patients. Required testing that involved assessing the patient's ability to retain information was completed before being released, which increased the likelihood that the patient would welcome relevant data since they were departing the hospital environment. The shortcoming of this study is that although the researchers carefully evaluated the NIHSS, the study did not consider or go into detail about memory challenges—naming and memory abilities—could be affected automatically depending on the location of the stroke. Therefore, the patient's failure to recall the instruction provided could have been from the stroke itself and not from the lack of literacy. This study was one of the most relevant research articles to support this DNP project because the researchers relied on RNs to educate the poststroke patients using materials from the AHA/ASA.

**Low Literacy and Health Outcomes**

Berkman, Sheridan, Donahue, Halpern, and Crotty (2011) systematically analyzed poor health literacy and healthiness outcomes. The reason for that updated study was to determine if poor health literacy resulted in much less use of available health care and expense. Researchers analyzed the databases for studies that dated back seven years from 2003 through May 2010 for their audit, correlating patients relative to the results. Two autonomous evaluators analyzed each study for accuracy and comprehensiveness, and more than 3800 projects were audited, with the data from 1,012 accepted (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011). The results demonstrated that the percentage of persons with low health literacy was more significant in populations over 65 years of age, minority groups, impoverished, and those with an eighth-grade

education or less. The positive results of this study stemmed from the high volume of studies and data analyzed. Variables included age, education level, gender, socioeconomic status, literacy, and stroke. The analysis concluded that poor well-being and nominal use of health care organizations correlate to deficiencies seen in health care literacy (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011). The study was useful toward this DNP project in that it addressed the causes of low health literacy and the correlation with the patient's health outcome.

Baggett et al. (2010) analyzed the predictors and occurrence of requirements of a national sample of impoverished people for some basic elements of healthcare over a one-year period, such as unmet needs for medical or surgical care, prescription medications, mental health care, or counseling, vision, and dental care. The survey and data were obtained from 966 adult respondents. The sample size was 436,000 individuals nationally. The data were assessed using multivariable logistic regression, examining multiple types of unrealized needs. The strength of the research is that it addressed many causes, such as lack of medical care, prescription medications, and mental health, vision, and dental care. In addition, the study participants were unemployed for twelve months, had inadequate nutritional intake, and a visual deficit (Baggett et al., 2010). The researchers determined that the degree of deprivation for health service in the U.S. was high, and the results correlated with a lack of health insurance coverage. Other common issues were foster care during childhood age, low food sources, lack of job-related income, and vision deterioration.

In Sheridan et al. (2011), the investigators intended to assess the lack of general literacy and the usefulness of interventions meant to increase poor health literacy. Data were inputted into tables by one analyst then validated by two independent researchers. Each collection of data was ranked by a self-regulating analyst from poor to fair to good. Outcomes, based on the

experimental study on health literacy and numeracy levels reported, were examined based on the researchers' recounting how to solve the effects of poor health literacy. A strength of that study was that the sample population included all ethnicities, races, cultural groups, and ages (Sheridan et al., 2011). The analysts determined that additional research was needed in several areas to investigate more efficient processes that can be utilized by practitioners and recommended some theoretical and technological aspects that should be addressed in future studies (Sheridan et al., 2011). According to Sheridan et al. (2011), this recognition would permit more informed results in future studies.

**Intervention To Address Low Literacy**

A report from the Agency for Health Care Research Quality (2017) addressed possible connections between a subject's literacy level, the use of patient care organizations, and health results. The report analyzed more than 120 studies concentrating on how health literacy influenced patient outcomes (Berkman, Sheridan, Donahue, Halpern, Viera, Crotty, & Viswanathan, 2011). The study also examined interventions that were found to increase health literacy, including the use of those interventions that contained more than one facet, involved thorough self-management, or focused on specific disorder management (Berkman, Sheridan, Donahue, Halpern, Viera, Crotty, & Viswanathan, 2011). This research was considered advantageous to this DNP project when evaluating effective interventions.

In a recent study by Saengsuwan, Suangpho, and Tiamkao (2017), the researchers used a a cross-sectional questionnaire to evaluate patients who were most at risk of having a recurrent stroke or transient ischemic attack (TIA). The participant's awareness of the warning signs of stroke and their understanding of risk factors for stroke were evaluated. The clients were high-risk patients admitted with reoccuring stroke or a TIA in two hospitals in Thailand. The

researchers determined that these individuals did not have sufficient understanding of stroke risk factors and warning signs. The results showed that using only an open-ended questionnaire was unsatisfactory and suggested that health care providers offer organized interventions to help expand understanding and awareness of stroke in these patients (Saengsuwan, Suangpho, & Tiamkao, 2017).

A study by Giuse et al. (2012) that focused on learning style preferences to help increase health literacy had compelling results. It demonstrated that out of all the participants involved, 83.7% had competent health literacy, 8.7% marginal, and 7.7% deficient health literacy. Results showed that more committed, health-literate persons have better health results. In addition, they found that enhanced knowledge about a condition is connected to increased medication adherence and overall health. This study was significant; it had a large sample and a scope that addressed the degree of health literacy.

In a study by Coleman, Hudson, and Maine (2013), the interventions that appeared to be successful with poststroke patients with poor health literacy included increasing and improving education for health professionals on the topic of health literacy. The conclusion of this analysis had the potential to affect and help the staff and patients in this DNP project. While the available literature has shown that poor health literacy seriously affects an individual's health outcome after a stroke, it is essential to consider other possible causes of recurrent stroke. Reasons such as the patient's risk factors, the type of stroke that the patient had, and other diseases in that population can contribute to the degree of literacy level. Additional causes that may affect literacy levels include being elderly, having baseline mental health, being a minority, substance or drug use, less than high school education, and having a low income (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011).

**Literature Review Summary**

The literature discussed seems to conclude that, regardless of the patient's diagnosis, if he or she has poor health literacy, there is a higher chance of having more unfortunate health outcomes. Researchers have recommended better interventions and further research on this topic. The resulting data have demonstrated that poststroke individuals who have poor literacy about their health have a high risk of reoccuring strokes.

## Chapter 3: Methodology

Reports from the U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion (2010) have suggested many strategies that particular organizations or professions can take to further increase health literacy. The core principle of the action plan is to ensure that all individuals receive health information that helps them make informed decisions.

### Project Design

After considering the method that would yield the best data for this project, I decided to use a quantitative design. These designs test theories by studying the relationship between the variables (Schmidt & Brown, 2012). The variables are usually measured with statistical instruments so that data can be collected and analyzed. It was important to consider the audience involved, in this case the health care staff responsible for providing interventions and education to these poststroke individuals with low stroke literacy. Poststroke patients would have been included in the study, but there was an insufficient number of these individuals readily available to provide a valid statistical pool to participate in the project. However, there were many members of the health care team willing to participate.

### Instrumentation/Measurement Tools

The search for appropriate instruments was complex. There is currently no specific tool to assess the health care staff's poststroke literacy level. Therefore, a stroke educational toolkit from the National Institutes of Health (NIH) and the NINDS along with materials, brochures, and pamphlets from the AHA/ASA, and CDC were used to provide stroke education to health care professionals. Before the educational presentation, a Likert scale survey (Appendix H) was administered to gauge the participants' views and ability to determine the health literacy needs of

their poststroke patients. The recommendations from the NIH, NINDS, and AHA/ASA were applied to the educational presentation. Following the presentation, the participants were surveyed again using the Likert scale survey.

Likert-type scales are used commonly in medical education presentations and medical education research. Sullivan and Artino (2013) wrote that "common uses include end-of-rotation trainee feedback, faculty evaluations of trainees, and assessment of performance after an educational intervention" (p. 1). Sullivan and Artino noted that "a sizable percentage of the educational research manuscripts submitted to the *Journal of Graduate Medical Education* employ a Likert scale for part or all of the outcome assessments" (p. 1).

I tabulated and analyzed data collected from the Likert scale survey to gauge the care staff's feelings or impressions of the effectiveness of the educational presentation. I also collected demographic information of the participants and presented this data in the next chapter.

To ensure that the health care team was using instruments with the best levels of validity and reliability to assess their patients, I discussed in the presentation and distributed to participants the NIHSS (Appendix B) that is free for use by the public, and medical staff and facilities. It can be used as a clinical stroke assessment tool to evaluate and document neurological status in stroke patients. The stroke scale is valid for predicting lesion size and can serve as a measure of stroke severity. The NIHSS is a predictor of both short and long-term outcomes of stroke patients (National Stroke Association, 2018). The NIHSS scale can be used by staff to identify stroke symptoms. Surveys completed pre- and posteducational presentation could identify nursing staff who required more education on how to identify low literacy in the poststroke individuals at greater risk for reoccuring stroke. Educational needs of patients are

determined by their care team and are based on the patient's level of literacy and poststroke cognitive status.

There are other tools available for the health care staff to assess a patient's general literacy level, which I discussed in the educational presentation. According to Wasserman, Wright, and Maja (2010), tools to evaluate literacy that the staff can use with their patients include the Rapid REALM (Rapid Estimate of Adult Literacy in Medicine), S-TOFHLA (Short Test of Functional Health Literacy in Adults), TOFHLA (Test of Functional Health Literacy in Adults), and NAAL (National Assessment of Adult Literacy). Some of these tools are available for a fee and require the author's and the health care organization's permission. The health care staff members were made aware of these available tools. But, for this particular project, these tools were not used did not because they primarily measure a patient's health and general literacy. The participants in this project were health care professionals caring for poststroke individuals.

**Methodology Appropriateness**

Changes in behaviors were monitored to assess the effectiveness of the intervention. All participants received stroke education via an in-person PowerPoint presentation. They were educated on how to teach their poststroke patients about stroke. The educational materials included verbal instructions with the use of illustrative handouts from the NIH, NINDS, and the AHA/ASA. Neuroimaging was used to demonstrate the locations of strokes and potential effects on the body. The participants were evaluated via oral and written survey and pre- and postpresentation surveys. The survey statements addressed the health care staff's views on stroke education and prevention, their understanding of how to use the NIHSS when assessing their

patients, neuroimaging of stroke locations, and their comfort level vis-à-vis the topic of poststroke literacy.

In addition, the postpresentation Likert scale survey helped me to determine the effectiveness of the educational presentation as it related to preventing new or reoccurring strokes in high-risk patients. Perceived barriers to helping patients increase poststroke literacy were assessed as well. Despite careful planning, there was always a possibility of encountering obstacles during the data collection stage, which would have caused delays. However, this project's advantage was that the target population and data were obtained through the nursing, medical, and pharmacy staff. They were encouraged to fill out the surveys at different times, days, or shifts. Surveys were in written form and also available online at the SurveyMonkey site.

Data analysis began with a data reliability assessment. Once data had been collected from the project, it was measured for reliability with alpha coefficients, and data with an alpha coefficient 0.7 or higher were considered reliable. Therefore, a survey was provided to the health care staff to evaluate their understanding of the educational presentation and how it might aid in improving poststroke health literacy in their patients. The questions were set up in a Likert scale format to analyze the effect the education provided (Appendix H). The data were collected in two periods: before and after the educational intervention and evaluated by the use of a spreadsheet, graphs, scales, and SPSS software. The results were obtained with the help of a statistician.

The efficacy of the educational presentation was set to be evaluated using either the paired *t* test, Wilcoxon, or the Mann-Whitney U test. The paired *t* test is a type of *t* test for a single sample because it tests the difference between two paired results (Kim, 2015). According to Kim, "if there is no difference between the two treatments, the difference in the results would

be close to zero; hence, the difference in the sample means used for a paired *t*-test would be zero" (p. 544). Kerby (2014) advised the use of the Wilcoxon Rank Sum Test when dealing with the same population with the same treatment or intervention. It helps the researcher to know the participants that benefitted well from the intervention before and after. The Wilcoxon test assigns ranks to all the scores considered as one group, then sums the ranks of each group. According to Kerby, "the null hypothesis is that the two samples come from the same population, so any difference in the two rank sums comes only from sampling error" (p. 2).

For this study, a statistician was used to assist with data analysis. The decision was made to use the paired *t* test to show the results of the study. A paired *t* test is appropriate for data in which the two samples are paired in some way, where the pairs include before and after measurements on a single group of subjects (Skaik, 2015).

**Feasibility and Appropriateness**

The staff's willingness and time to participate in this project were all that was needed. Wariness of the nurses to participate was a hurdle in the beginning and took some time to overcome. Reluctant participation was most likely because the respondents, especially the nursing staff, might have felt that if they expressed an accurate statement about their competency, managers might desire to be notified. That was not the case. The nursing staff was reassured about their privacy. To encourage participation, an arrangement was made to avoid disruption in workflow. Securing nursing staff to participate in the education process included contacting the unit manager, team leader, and the unit's director. Registered nurses (RNs), pharmacists, physicians, and nurse practitioners (NPs) that met the criteria were able to volunteer willingly for the project. The criteria included being a nurse or medical provider and caring for poststroke patients in the unit.

**IRB Approval**

The training on human subjects was completed on December 17, 2018. The proposed research project had to be approved first by the DNP project chair and committee. The DNP project chair was also involved in the application process for IRB approval at Abilene Christian University (ACU). Upon successful proposal defense, IRB approval was granted. Exempt approval was granted on July 30, 2019 (Appendix A).

**Study Process and Procedures**

It is essential to include information about the protection of the participants when conducting research in any form to ensure participant rights are protected. I addressed concerns about confidentiality by informing the health care staff who volunteered for this project that all personal data obtained would be kept confidential. A number code was assigned to all respondents to protect their privacy. The participants' names were not attached to the responses provided or disclosed to anyone in the facility. The demographic survey for the questions was made available online for the staff to complete anonymously before and after the educational presentation. A paper version of the items was presented before and after the educational presentation for convenience. Authorization to conduct the study was acquired from ACU's research committee.

The data collected during this project was stored in a secure university hard drive under my name. Data stored are owned by the university in case access is needed at a future date. This drive was provided by the online graduate school for doctoral student research and supported by the university's IT department for security purposes. I stored all data obtained during implementation on a password-protected computer and was the only one with password access. Data will be kept for at least three years according to federal regulations for protecting and

maintaining data of human research participants. After completion of data collection, I filed a data collection inactivation form to alert the IRB that the study was complete.

**Informed Consent**

Chism (2016) emphasized that respect for autonomy is an integral part of informed consent in every study. There were no anticipated risks associated with participation in this study. No patient records or personal information were accessed for this project. I informed the participants of the nature of the project and provided them with a survey with an option to respond online or in person at their convenience. They were informed that by participating or responding, implied consent would occur. I advised all potential participants that participation was entirely voluntary and that their privacy would not be affected by their involvement. I also gave participants the option to decline to participate at any time and for any reason.

Frequently encountered issues with informed consent include a lack of understanding of the research project, culture, and cognitive status of the subjects. The regulation defines a human subject as a living person who is the subject of a study. The examiner acquires the data through an intervention or contact with that person or via private, specific, identifiable information (HHS, 2018). Information provided was in simple and easy to understand language that was familiar to the health care team. The pre- and postpresentation scores on poststroke literacy were grouped and stored in a secure database for analysis.

**Practice Setting**

The location of the educational presentation was an acute care unit and posttransplant outpatient clinic at a hospital in Seattle, Washington. All the participants provided care for patients at high risk for stroke. The RNs in the unit and outpatient clinic had unique roles when it came to helping to increase the patients' poststroke literacy. They were responsible for assessing

the educational needs of the patient and caregivers. The medical assistants had continuous exposure to the patients and were an excellent first contact for the patients when admitted to the unit during vital sign check and initial questions; they served as a great resource to improve the patient's stroke literacy. The pharmacists were part of the admission and discharge education team, and participated in daily inpatient hospital rounds. Their primary focus was medication literacy to encourage compliance and help prevent issues such as higher stroke risk that may result from patients not taking their medications. They helped educate patients, families, and caregivers on poststroke medication literacy and stroke prevention.

**Target Population**

The population for the project consisted of current health care staff from the acute care inpatient unit and the outpatient clinic who cared for patients at high risk for stroke and those who have had a stroke. The patients in the acute care settings and those who frequent radiology for testing and procedures share similar risk factors. These individuals have risk factors that place them in a hypercoagulable state, therefore increasing their risks factors for developing blood clots that may lead to cardiac arrest, pulmonary embolisms, and or stroke.

The study population included a variety of health care staff and contained a mix of genders, races, and education levels. The participants initially included 15 RNs with bachelor's degrees, two advanced practice registered nurses (APRNs), two physicians, three interventional radiology techs, two medical assistants, three pharmacists with doctoral degrees, and two doctoral pharmacy fellows. The medical assistants had continuous exposure to the patients and were a good first contact for the patients when admitted to the unit. They can serve as a resource to improve patient literacy, but were excluded because of the gap in knowledge between them and the physicians, NPs, or pharmacists. The interventional radiology technicians were excluded

prior to starting the project due to staffing issues. Although the demographics of the health care staff was not a determining factor as to what type of education was needed, it is evaluated and presented in Table 5 in the next chapter.

**Risks or Benefits**

My DNP project addressed the educational needs of the health care staff who were responsible for implementing the intended interventions to poststroke patients with low levels of health literacy and to the patients' families and caregivers. The benefit of participating in this project was a better-informed health care staff equipped to educate patients. The goal was for a possible decrease in reoccurring strokes and improved stroke outcomes in the patient population seen in the unit or clinic. However, some risks involved may include staff who may have developed feelings of inadequacy because the education they received revealed their lack of knowledge related to proper care of those with or at risk of strokes, which could impact their mental health. Thus, participants were informed to seek care from their primary provider or utilize employee-provided resources should this occur.

**Interprofessional Collaboration**

Having a collaborative-ready health workforce and integrating workforce planning and policymaking can help support collaborative practice (WHO, 2010). The DNP should participate in interprofessional education that is considered critical in developing a "collaborative practice-ready health workforce, one in which staff works together to provide comprehensive services in a wide range of health care" (WHO, 2010, p. 13). Successful interventions and strategies for this project included creating an environment that supported interprofessional collaboration to provide educational training to help improve health care outcomes. Health care providers should be provided with opportunities to learn from and with one another (WHO, 2010).

Interprofessional collaboration involved me along with stakeholders in the inpatient practice setting and university. I was an employee at the practice setting and had the most vested interest in the research study. At the practice site, approval to conduct the project and support of the educational intervention was granted. Other stakeholders in the practice setting included the participants. At the university, collaboration was conducted with the DNP project chair, committee members, the DNP program director, university instructors, and the IRB committee.

**Timeline**

The educational PowerPoint presentation was offered to acute care nursing and other health care staff members in person via two 15-minute educational sessions. The presentation was shown in two parts to small groups in the acute care area and the outpatient clinic that is equipped to see potential stroke patients. The presentation covered stroke risks, signs and symptoms of stroke, and stroke prevention using available tools from the NIH, NINDS, and the AHA/ASA. The presentation also covered acute stroke and stroke prevention treatment and medication literacy including acute treatments of stroke, preventative regimen, and maintenance therapy. It was estimated that the time for this project would be within seven days covering a total of six sessions in the early morning, late afternoon, and evening shifts. Table 1 provides a timeline of the actual series of events that occurred for this study.

Table 1

*DNP Project Timeline*

| DNP project task completed | Date task completed |
|---|---|
| Located doctoral prepared mentor/preceptor (optional). | March 2017 |
| Secured a project chair/committee members and complete project chair/committee form. | First group March 2017<br>New group 8-10/2018 |
| Research clinical site where DNP project was to be done. | March – April 2017 |
| Start development of DNP project PICO question. | April 2017 |
| Begin/finalize theoretical framework/concept analysis paper. | May 31, 2017 |
| Researched measurement tool to be used for DNP project contact author for permission to use. | July 2017 |
| Initial meeting with project chair to discuss the DNP project and work on initial components of the paper. | August 2017 |
| Worked on literature review and methodology; submitted paper for review by chair. | August – November 2017 |
| Finalizing PICO question. Work with chair to complete chapters 1–3 of DNP project paper. | August – December 2017 |
| Finalize selection of measurement tool. Retrieve letter for permission to use tool from AHA/ASA, and NIH. | October 2017<br>Permission obtained 5/2019 |
| Finalize initial component of DNP project paper. | December 2017 |
| Completion of IRB training, upload certificate to e-portfolio. Review IRB module in Canvas. | August – September 2017 |
| Worked on chapters 1–3. Submitted copy to chair for review/revisions. | February 2018, 11/2018 - 6/2019 |
| Mid Program Review. | April 2018 |
| Prepared proposal defense PowerPoint slides which include brief summary of info. from chapters 1–3 of paper. | 3–-6/2018, 9–12/2018, 1–6/2019 |
| Prepared for DNP project proposal defense; submit proposal defense form. | December 2018 |
| Secure IRB approval. | Approval 12/2018 |
| Secured letter of support for project from facility/clinic director and manager. | April 2019 |
| Secured updated IRB approval. Implemented DNP project. | July 2019 |
| Created excel spreadsheet and continued to upload data. | July 2019 |
| Submitted data to a statistician for review, set up and uploaded into SPSS for analysis. | August 2019 |
| Ongoing work on chapters 4–5 of DNP project paper; submit for review and input by chair/committee members; complete revisions as directed by chair; submit final DNP project defense form. | July – September 2019 |
| Prepare for final defense and final end of program review with DNP project chair to ensure all papers and forms are correct. | July 2019 – September 2019 |
| Maintain licensure and certifications. | Renewed August 2019 |
| DNP final defense presentation scheduled. | September 30, 2019 |

*(table continues)*

| | |
|---|---|
| Upload information and continuous review through Canvas DNP Module. | March 2018 – October 2019 |
| Log clinical hours related to project development and those r/t DNP Essentials from practice learning experiences on clinical log form. | January 2017 – December 2019 |

**Chapter Summary**

This chapter discussed methods used to conduct the project. The tools mentioned were effective methods nursing and other health care staff can use to assess their patient's poststroke health literacy and tailor nursing education based on recommendations from the AHA/ASA, NIH, NINDS, CDC, and the Joint Commission. The NIHSS scale was the main instructional tool in the presentation that could be used by staff to identify stroke symptoms. The health care professionals were assessed via survey before and after the educational presentation and the results are reported in Chapter 4. The use of a specific research project design and the paired *t* test using a statistician with the latest version of SPSS 25.0 for data analysis was appropriate to achieve the desired outcomes with the method used. Approval was obtained to conduct the research study in accordance with ACU's IRB. These methods and tools mentioned above are recommended to address ways to increase stroke literacy in health care professionals to help improve stroke outcomes in the poststroke patient population.

## Chapter 4: Project Analysis

The Institute of Medicine, in its 2004 report, *Health Literacy*: *A Prescription to End Confusion,* recommended that health care establishments do their part to help increase literacy. This decision came as a result of noting that improving health literacy helps in the fight to eliminate health disparities. This DNP project is a study that involved the implementation of a stroke educational series and presentation with detailed results reported in this chapter. The health care staff completed Likert scale surveys before and after an educational presentation and discussion. Discussion involved gathering information on their current practice, observations, their perception of what the patients may or may not need after a stroke, and their understanding of what their roles are to the patients, pre- and poststroke.

### Statistical Tests and Data Analysis

A pre- and postpresentation Likert scale survey (Appendix H) based on the AHA/ASA and NINDS materials was given to each participant in the training. According to Sullivan and Artino (2013), a "typical Likert scale is a 5- or 7-point ordinal scale used by respondents to rate the degree to which they agree or disagree with a statement" (p. 541). The authors reported that researchers and educators frequently use the Likert scale to group items into a data survey scale, "and then calculate a total score or mean score for the scale items" (Sullivan & Artino, 2013, p. 541). This method is preferred when "researchers are attempting to measure . . . fewer concrete concepts, such as trainee motivation, patient satisfaction, and physician confidence—where a single survey item is unlikely to be capable of fully capturing the concept being analyzed" (Sullivan & Artino, 2013, p. 542).

The data analysis that was used to evaluate this project effectively was the paired *t* test. A paired *t* test is the most accurate of the available measures. Skaik (2015) mentioned that the

paired *t* test is precise for data in which the two samples are conjunctive in some way, where the data consist of before and after quantities on a single group of subjects. The paired *t* tests can be considered as a type of *t* test for a single sample because it tests the difference between two comparable outcomes (Kim, 2015). According to Kim (2015), "if there is no difference between the two treatments, the difference in the results would be close to zero; hence, the difference in the sample means used for a paired *t*-test would be zero" (p. 544).

**Study Procedures**

This qualitative improvement educational program was presented in two parts to 25 health care staff in an acute care unit and an outpatient clinic. All providers were invited via email by their manager to attend. The presentation was held before the beginning of the shift and after the clinic's operating hours. I collected verbal consent before the initiation of the discussion. Risks, benefits, and contact information for the Office of Research Integrity before commencing the first part of the presentation were offered to the participants. A brief PowerPoint presentation was provided to the participants that addressed the background, incidence, and reoccurrence of stroke and poststroke literacy in the United States based on information from the AHA/ASA, NIH, and CDC. Recommendations were then presented for stroke education, risks, prevention, and follow-up. The presentation also included instruction on stroke imaging using MRI and CT scans depicting stroke locations resulting in the patient's presenting symptoms. Furthermore, I presented information on medications and available poststroke interventions.

Before and after attending the educational session, a set of 10 questions (the Likert scale survey in Appendix H) was asked of the attendees to assess their knowledge about patients' health literacy and stroke outcomes and their comfort level teaching about stroke to their

patients. I directed all educational gatherings, presentations, surveys, and consultations within the unit or clinic after approval was received from the IRB at ACU. There was no contact with patients during the study, nor did I access patient data or hospital records at any time. The pre- and postpresentation surveys were based on the presentation using the AHA/ASA and NINDS guidelines and recommendations. The survey was in written form and also available online on SurveyMonkey. The survey was also provided in a paper format and took less than five minutes each to complete.

The PowerPoint presentation was 25 minutes long, two sessions for each group, morning, evening, and night shift. The demonstration consisted of a brief review of the current AHA/ASA and NINDS guidelines. The NIHSS stroke scale, the AHA/ASA, and NINDS educational packets with the "FAST" acronym (Face, Arms, Sudden Weakness, Time) were also presented. The presentation contained pictures, graphs, figures, and diagrams for visual effect. As part of the program, participants were provided education about neuroradiological imaging of different types of strokes. This education reviewed brain imaging of stroke locations and its significance, a review of stroke prevention, and medications to help with different types of stroke. The presentation on stroke literacy was interactive, and the following discussion was informal. I encouraged participants to share experiences, ask questions, and provide feedback or concerns freely during or after the presentation.

**Statistical Methods**

Frequency and percentage statistics were used to describe the healthcare staff's response in the sample. Repeated-measures *t* tests were used to compare the pre- and postintervention surveys. Means and standard deviations were reported and interpreted for the *t*-test analyses. Statistical significance was assumed at a Bonferroni-adjusted alpha value of 0.005 (alpha value

of 0.05 divided by 10 concurrent hypotheses being tested). Statistical analyses were performed using SPSS 25.0.

**Statistical Results**

The statistical measures were conducted with the assistance of a statistician, Dr. Robert Heidel. The results reported in Table 2 show that there was a statistically significant increase in Likert-type ratings across time for each question, $p < .001$. Question 6 was significant, but the p-value was .002. After the intervention, it was determined that all the participants demonstrated significant improvement in stroke knowledge. The health care staff who attended the sessions were provided with more comprehensive information about stroke education and prevention than previously available. The respondents reported that they felt that they were better educated with the added information provided.

Table 2

*Descriptive Statistics for Repeated-Measures t Tests*

| Question | Preintervention | Postintervention | *p*-value |
|---|---|---|---|
| Question 1 | 4.3 (0.6) | 5.0 (0.2) | < .001 |
| Question 2 | 3.2 (0.9) | 4.4 (0.6) | < .001 |
| Question 3 | 3.0 (0.8) | 4.4 (0.6) | < .001 |
| Question 4 | 3.4 (0.8) | 4.4 (0.6) | < .001 |
| Question 5 | 3.3 (0.6) | 4.4 (0.6) | < .001 |
| Question 6 | 3.4 (0.8) | 4.0 (0.5) | .002 |
| Question 7 | 4.0 (0.8) | 4.8 (0.4) | < .001 |
| Question 8 | 2.8 (0.7) | 4.4 (0.6) | < .001 |
| Question 9 | 4.2 (0.7) | 2.7 (0.5) | < .001 |
| Question 10 | 4.2 (0.7) | 4.8 (0.4) | < .001 |

Repeated-measures *t* tests (Table 3) found statistically significant increases in Likert scale scores for question 1, $t(24) = -5.6$, $p < .001$; question 2, $t(24) = -9.4$, $p < .001$; question 3, $t(24) = -9.9$, $p < .001$; question 4, $t(24) = -7.1$, $p < .001$; question 5, $t(24) = -7.7$, $p < .001$; question 6, $t(24) = -3.5$, $p = .002$; question 7, $t(24) = -5.2$, $p < .001$; question 8, $t(24) = -14.4$, $p <$

.001; question 9, $t(24) = -4.3$, $p < .001$; and question 10, $t(24) = -4.3$, $p < .001$. Means and standard deviations for the repeated-measures *t* tests can be found in Table 4.

Table 3

*Paired Samples Test*

**Paired Samples Test**

Paired Differences

| | | | | | 95% *CI* of the Difference | | | | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | *M* | *SD* | *SEM* | Lower | Upper | *t* | *df* | |
| Pair 1 | q1pre - q1post | -.640 | .569 | .114 | -.875 | -.405 | -5.628 | 24 | .000 |
| Pair 2 | q2pre - q2post | -1.280 | .678 | .136 | -1.560 | -1.000 | -9.436 | 24 | .000 |
| Pair 3 | q3pre - q3post | -1.400 | .707 | .141 | -1.692 | -1.108 | -9.899 | 24 | .000 |
| Pair 4 | q4pre - q4post | -1.000 | .707 | .141 | -1.292 | -.708 | -7.071 | 24 | .000 |
| Pair 5 | q5pre - q5post | -1.080 | .702 | .140 | -1.370 | -.790 | -7.688 | 24 | .000 |
| Pair 6 | q6pre - q6post | -.640 | .907 | .181 | -1.015 | -.265 | -3.527 | 24 | .002 |
| Pair 7 | q7pre - q7post | -.800 | .764 | .153 | -1.115 | -.485 | -5.237 | 24 | .000 |
| Pair 8 | q8pre - q8post | -1.640 | .569 | .114 | -1.875 | -1.405 | -14.421 | 24 | .000 |
| Pair 9 | q9pre - q9post | -.560 | .651 | .130 | -.829 | -.291 | -4.303 | 24 | .000 |
| Pair 10 | q10pre - q10post | -.560 | .651 | .130 | -.829 | -.291 | -4.303 | 24 | .000 |

Table 4

*Means and Standard Deviations for Each Question Pre- and Posteducation*

| | | *M* | *SD* |
|---|---|---|---|
| Pair 1 | q1 pre | 4.32 | .627 |
| | q1 post | 4.96 | .200 |
| Pair 2 | q2 pre | 3.16 | .850 |
| | q2 post | 4.44 | .583 |
| Pair 3 | q3 pre | 3.00 | .816 |
| | q3 post | 4.40 | .577 |
| Pair 4 | q4 pre | 3.36 | .810 |
| | q4 post | 4.36 | .569 |
| Pair 5 | q5 pre | 3.32 | .557 |
| | q5 post | 4.40 | .577 |
| Pair 6 | q6 pre | 3.40 | .764 |
| | q6 post | 4.04 | .455 |
| Pair 7 | q7 pre | 4.00 | .816 |
| | q7 post | 4.80 | .408 |
| Pair 8 | q8 pre | 2.76 | .723 |
| | q8 post | 4.40 | .577 |
| Pair 9 | q9 pre | 4.16 | .688 |
| | q9 post | 4.72 | .458 |
| Pair 10 | q10 pre | 4.24 | .663 |
| | q10 post | 4.80 | .408 |

**Demographics**

Participants consisted of 25 health care professionals. The majority of the participants were RNs (*n* = 15, 60%), followed by pharmacists (*n* = 6, 24%), physicians (*n* = 2, 8%), and ARNPs (*n* = 2, 8%; see Table 5). The participants were chosen from different professions within the medical community to demonstrate differing perceptions by the health care positions who touch the patient's experience in different ways and from different points of view. RNs would

have the most substantial influence on our scores (67% Male, 33% female) and typically interface with patients regularly.

Table 5

*Percentage of Health Care Professions Among Participants*

| | | *n* | Percent | Valid percent | Cumulative percent |
|---|---|---|---|---|---|
| Valid | ARNP | 2 | 8.0 | 8.0 | 8.0 |
| | Physician | 2 | 8.0 | 8.0 | 16.0 |
| | Pharmacist | 6 | 24.0 | 24.0 | 40.0 |
| | RN | 15 | 60.0 | 60.0 | 100.0 |
| | Total | 25 | 100.0 | 100.0 | |

The education levels achieved by participants ranged from physician (MD), doctorate, master's degree, and bachelor's degrees (see Table 6). The majority of respondents acquired a bachelor's degree (60%) with eight participants holding doctorates (32%). There were more RNs in the participant pool than other titles, but the NPs and physicians (8% and 8%, respectively) would have a more significant influence on the content of stroke education. This influence is exerted through policies made by physicians and practitioners and the patient care procedures that are generated by these professions.

Table 6

*Academic Degrees and Professional Credentials of Participants*

| | | *n* | Percent | Valid percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Bachelor's Degree | 15 | 60.0 | 60.0 | 60.0 |
| | Master's Degree | 2 | 8.0 | 8.0 | 68.0 |
| | Medical Doctor | 2 | 8.0 | 8.0 | 76.0 |
| | Doctorate | 6 | 24.0 | 24.0 | 100.0 |
| | Total | 25 | 100.0 | 100.0 | |

The majority of participating health care professionals were male (56%) with slightly fewer female participants (44%) Six of the participants holding advanced degrees were female (24%) while four of the male participants held advanced degrees (16%). The physicians participating were one male and one female, with two female NPs. There were also three male and three female pharmacists and 10 male and five female RNs. Gender percentages are shown in Table 7.

Table 7

*Gender Percentages of Participants*

| | | *n* | Percent | Valid percent | Cumulative percent |
|---|---|---|---|---|---|
| Valid | Male | 14 | 56.0 | 56.0 | 56.0 |
| | Female | 11 | 44.0 | 44.0 | 100.0 |
| | Total | 25 | 100.0 | 100.0 | |

As shown in Table 8, the majority of participants were White (64%) with three Black participants (12%) and six participants identifying as Other (24%).

Table 8

*Racial Percentages of Participants*

| | | *n* | Percent | Valid Percent | Cumulative percent |
|---|---|---|---|---|---|
| Valid | White | 16 | 64.0 | 64.0 | 64.0 |
| | Black | 3 | 12.0 | 12.0 | 76.0 |
| | Other | 6 | 24.0 | 24.0 | 100.0 |
| | Total | 25 | 100.0 | 100.0 | |

Respondents' ages ranged from 24 to 50 years old. The data pool included six individuals in their twenties (24%), 11 participants in their thirties (44%), seven participants in their forties (28%) and one respondent more than 50 years old (4%). The age range of the group was 26 years; the average age of participants was 32.64 years.

**Health Care Staff Comfort Level Teaching Stroke Literacy**

Of those assessed who provided stroke literacy education to their patients, only 4% strongly agreed and 32% agreed that they felt comfortable educating stroke sufferers on the signs and symptoms of a stroke before receiving the educational presentation. This percentage compared to 48% strongly agreeing and 48% agreeing to being comfortable recognizing these signs postpresentation, showing a significant increase in comfort levels. This is a clear indication that these health care professionals were aware of their inexperience with stroke recognition, and that the information could be effectively presented and understood (see Figure 2).

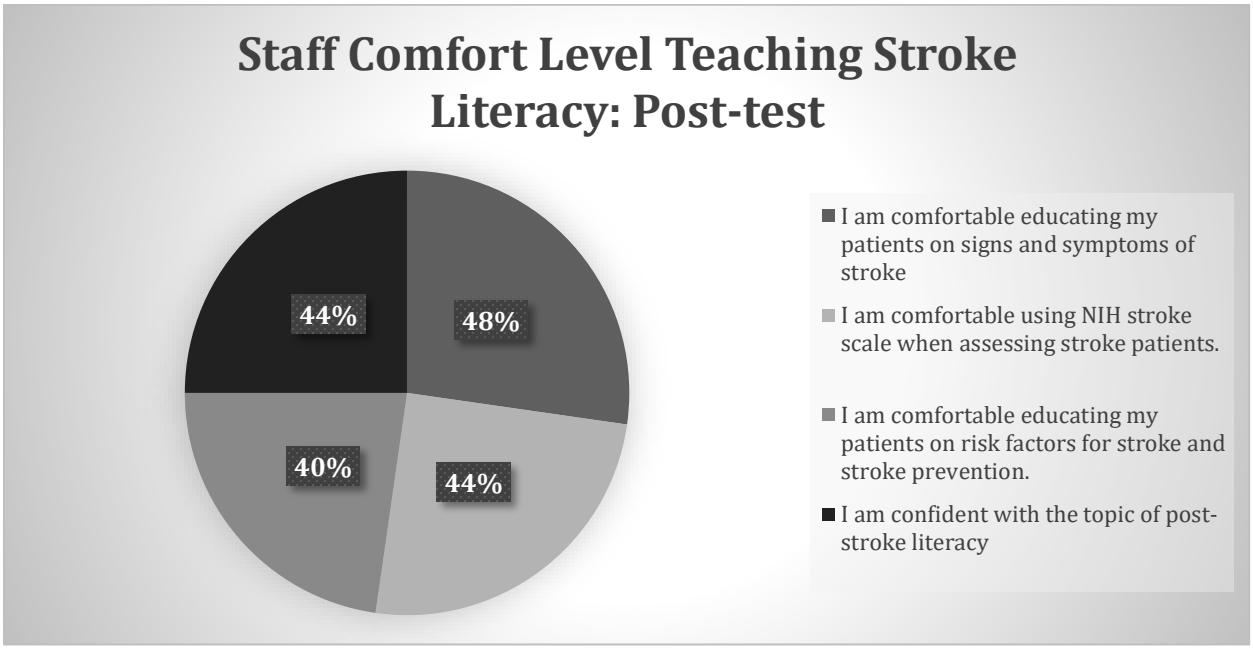


*Figure 2*. Staff comfort levels teaching stroke literacy postpresentation.

Table 9 reports postpresentation Likert scale survey results. A higher percentage of health care providers pretest were comfortable using the NIH stroke scale when assessing a stroke patient: 28% strongly agreed and 48% agreed; this represents 76% of the population being comfortable using the scale. The NIH is readily available and can be followed by health care professionals without additional education needed. Though the NIH is readily available, the

posttest data showed that 96% of participants felt more comfortable after being presented with further information with none disagreeing.

Table 9

*Results of Likert Scale Survey Postpresentation*

| Questions | Strongly agree (%) | Agree (%) | Neither (%) | Disagree (%) | Strongly disagree (%) |
|---|---|---|---|---|---|
| Improving patient's health literacy poststroke is important to improve health outcomes. | 96% | 4% | 0% | 0% | 0% |
| I am comfortable educating my patients on signs and symptoms of stroke. | 48% | 48% | 4% | 0% | 0% |
| I am comfortable using the NIH stroke scale when assessing stroke patients. | 44% | 52% | 4% | 0% | 0% |
| I am comfortable educating my patients on risk factors for stroke and stroke prevention. | 40% | 56% | 4% | 0% | 0% |
| I use the AHA/ASA FAST acronym when assessing stroke patients. | 44% | 52% | 4% | 0% | 0% |
| I don't have the amount of time required to educate patients on stroke literacy. | 12% | 80% | 8% | 0% | 0% |
| I will use the information or education to help increase stroke literacy in my patients. | 80% | 20% | 0% | 0% | 0% |
| I am confident with the topic of poststroke literacy. | 44% | 52% | 4% | 0% | 0% |
| Educating my high-risk patients on stroke might prevent new or reoccurring strokes. | 72% | 28% | 0% | 0% | 0% |
| Educational presentations for nurses and other health care staff helps with patient outcomes. | 80% | 20% | 0% | 0% | 0% |

Another significant change among health care professionals can be recognized when responding to the statement, "I am comfortable educating my patients on risk factors for stroke and stroke prevention." Before the presentation, only 40% of participants agreed that they were comfortable educating their patients (8% strongly agreed, 32% agreed); this was significant as a

majority lack comfort providing the primary education stroke patients would rely upon to assist the patient if they were suffering a second and potentially more severe stroke. That comfort level increased to 96% postpresentation (40% strongly agreed, 56% agreed); again, the information provided made the participants significantly more comfortable teaching patients about stroke and potentially reducing its reoccurrence in their patients.

The final statement dealt with the comfort level of health care professionals: "I am confident with the topic of poststroke literacy." Responses to this statement demonstrate the lack of confidence the participants were willing to admit about their knowledge about stroke. Only 16% of participants were confident (16% agreed), meaning fewer than 25% of health care professionals in this population would be capable of discussing poststroke literacy with patients. Participants were given enough data during the presentation so that 96% were comfortable postpresentation of having that vital discussion (44% strongly agreed, 52% agreed). This section of the study demonstrated that the data are available to help health care professionals more capably assist stroke patients with the level of literacy and thus reduce their risk of stroke recurrence.

**The Use of Available Tools To Improve Stroke Outcome**

Three statements in the survey dealt specifically with the manner in which health care professionals assess and educate their patients about stroke and their thoughts on how valid those assessments and training can be in deterring the reoccurrence of stroke.

"I use the AHA/ASA FAST acronym when assessing stroke patients" was the first statement before the presentation. Based on the responses of health care professionals, there may have been some confusion concerning the methods they use to assess their patients, and so before the presentation only 36% of the respondents agreed that they use the AHA/ASA FAST acronym

to evaluate their patients with 60% answering, “neither,” which could be interpreted as a question concerning their knowledge of the acronym, not stroke evaluation methods per se. Postpresentation, 96% of respondents either strongly agreed (44%) or agreed (52%) that they used these methods demonstrating that the respondents were using the AHA/ASA FAST methods without knowing the acronyms.

**Questions About the Amount of Time Required To Educate Patients**

The staff’s feelings were assessed to examine the amount of time they had available to evaluate patients with stroke patients boarded in their non-stroke and non-neurology units due to staffing or bed availability. The statement— “I don’t have the amount of time required to educate patients on stroke literacy”—addressed several issues among health care professionals including time management, scheduling, staffing, and the economics of health care. Before the presentation, 52% felt they did not have enough time to educate their patients, 0% strongly agreed, 40% had no opinion (“neither”), and 8% disagreed that time was an issue (4% strongly disagreed, 4% disagreed). This means half of the respondents felt they had enough time during patient visits to properly educate that person regardless of their general literacy level. These findings changed drastically postpresentation. Respondents overwhelmingly agreed that they did not have enough time to train their patients on stroke prevention: 92% agreed with the statement (12% strongly agreed, 80% agreed). Forty percent of respondents prepresentation did not have an opinion, while afterward only 8% were neutral.

“Educating my high-risk patients on stroke might prevent new or reoccurring strokes” was the final statement in the survey. This statement did not spur the big changes in responses that the previous statements did but did represent a shift in how the health care professionals responded to their reactions about how necessary their training of these high-risk stroke patients

may be. Before the presentation, 84% of the respondents believed that their education of the stroke patients might prevent further stroke(52% agreed and 32% strongly agreed). Interestingly, 16% responded with, “neither,” thereby not demonstrating an opinion about the validity of their education for high-risk patients. After viewing the presentation, 100% (72% strongly agreed, 28% agreed) responded that their teaching of stroke patients could prevent future strokes.

**Summary**

These statistics above demonstrate the benefits of effective education. Many of the participants initially doubted the veracity of education on stroke patients and the effect of that education experience in preventing another stroke. The staff’s responses after being educated demonstrated a new understanding of how their efforts could make a significant difference in the lives of their patients. The staff believes that proper education would increase stroke literacy in their patients and improve the patient’s outcome.

## Chapter 5: Discussion, Conclusions, and Recommendations

According to Mullis et al. (2019), a minimal amount of evidence exists concerning how best to reinforce the care of long-term stroke survivors beyond the first twelve months after stroke, and recent projects of increased specialist input postrelease from the medical center have had varied results. In addition, the researchers stated that "no formal primary care-based holistic model of care with clinical trial evidence exists to support stroke survivors living in the community, and that stroke survivors report that many of their needs are not being met" (Mullis et al., 2019, pp. 1–2). It seems that most studies focused on either generalized health literacy or improving provider's general understanding of health literacy. It is my hope that this DNP project's findings can help spur more research into the use of focused health care staff education about stroke and educating stroke patients.

### Interpretation and Inferences About the Findings

According to Willey et al. (2009), understanding stroke risk factors and warning signs and symptoms in addition to the awareness of available treatment options may be inadequate in high-risk populations. Multiple studies suggest that stroke treatment is sometimes delayed due to the failure of symptom recognition by the patient, family, or general bystanders with approximately 60% of stroke-related deaths occurring outside the hospital setting. Compounding this problem is that many stroke patients are still being transported by private vehicle instead of a 911 activation, further delaying treatment. In addition, low health literacy continues to be a significant problem for persons over age 65 (AHA/ASA, 2016). Usual barriers that hinder health literacy involve being unable to access needed health care information, inability to understand and handle health information, low educational level (below high school), and living in a low income community (Naidu, 2008). With that in mind, it was noted that education should be

geared at the nursing and other health care staff who are caring for patients at risk of having a stroke or those who have had a stroke.

General stroke knowledge must be taught to patients about the cause of their stroke, the type of stroke (whether ischemic or hemorrhage), and the location in the brain and the part of the body that is affected. Especially important are recommended actions the patient should take in the event of another stroke (Ellis, Barley, & Grubaugh, 2013). Other teachings include awareness of common warning signs and symptoms of stroke such as confusion, visual disturbances, speech issues (dysarthria/aphasia), numbness or weakness of the extremities (hemiparesis or hemiplegia), balance issues, and sudden headache of unknown cause. Lastly, familiarity with or identification of known stroke risk factors are also important (e.g., hypertension, uncontrolled blood sugar levels, abnormal cholesterol, obesity, and tobacco use; Ellis, Barley, & Grubaugh, 2013).

Available resources are patient-focused, as they should be. For poststroke patients,education is provided based on the guidelines by the AHA, ASA, and NINDS. Assessing these patients for their understanding of their diagnosis and what is needed to improve their outcome is not routinely done in health care settings. A more comprehensive approach targeting the health care staff, enriching their understanding, and providing them with the right tools would be useful in decreasing stroke reoccurrence. Additional resources are available to team members that are not members of the neurology group and available through training.

**Implications of Analysis for Leaders**

The most effective techniques that most staff members agreed on were using teach-back methods and allowing the patient or family members to take notes, highlighting important parts in materials or handouts provided. They also agreed that explaining the diagnosis, prevention, or

treatments in simple words was an excellent way to educate their patients. Providing one-on-one education verbally with simple pamphlets, educational materials, or picture cards identifying stroke sites were viewed as practical and effective educational techniques.

There are many pictures and images in currently available AHA/ASA and NIH materials, so it was suggested during the presentations that adding some tapes (audio or video) for teaching would be beneficial as well. If the patient has very low literacy, other techniques discussed were the use of larger words and color-coding on prescription bottles. Denny et al. (2017) mentioned that video-based educational interventions are associated with improved stroke literacy, self-efficacy, and patient satisfaction. Other suggestions included consulting available pharmacists about medications, recovery programs to help with rehabilitation or other issues, social workers to locate recovery programs, shelter, or primary care providers, and psychologists, when necessary, to address poststroke depression.

Recommendations to staff included assessing their patients for any information on coexisting medical issues, compliance, interests, current living status (street/shelter), and use of current government health programs and resources. For example, it was suggested that a cardiovascular disease center add education about stroke prevention and poststroke care to the discharge teachings of patients at risk for stroke. Because there is a very close relation with heart disease and stroke, this might be effective long-term. The participants were encouraged to help patients access free clinics, community programs, and locate food banks to help with proper nutrition when needed, in addition to discussing with their patients the benefit of using local programs such as the YMCA to assist in an exercise regimen.

The staff members were informed that the most recent 2017 Heart Disease and Stroke Statistics report from the AHA/ASA mentioned that approximately 60% of stroke deaths

occurred outside of an acute care hospital. Recommendations were made based on the assessment of recent clinical trials that recognized the advantage of intense blood pressure reduction, which reduced the risks of stroke. Adherence to a Mediterranean-style diet that was higher in nuts and olive oil was associated with a reduced risk of stroke as well (Benjamin et al., 2017).

Health care facilities and primary care providers (including family practice providers) would benefit from increased stroke literacy. The CDC, NIH, and AHA/ASA provide health care staff safe, effective, and long-lasting ways to teach the populace about stroke. To reach this goal, providers will have to educate themselves, patients, and patients' caregivers or families. The health care staff must actively advocate for an increase in poststroke health literacy to help improve stroke outcomes. Providers should continue to recommend the educational materials suggested for patients by the NIH, NINDS, CDC, and AHA/ASA. While many providers saw this education session as an excellent tool for stroke prevention, the thought was that the neurology units see the majority of the stroke patients. Therefore, routine education that can serve as a primary prevention method for the reduction of strokes should also be necessary for acute care units not tasked with caring for these patients continuously.

Educating the health care staff on essential topics to improve patient outcomes is a welcome idea in almost all health organizations. However, there exists the likelihood that some of the health care staff may not be interested in a given topic, nor may they want to interrupt their work routine to learn something new or helpful. The goal was for the health care staff to communicate the following to their patients:

1. The need for increased stroke literacy
2. The sign and symptoms of stroke or stroke reoccurrence

3. Medications used for stroke prevention

4. Being aware of poststroke issues such as depression or fatigue

5. The importance of poststroke follow-up and care

**EBP Findings and the Relationship to DNP Essentials I – VIII**

What was found at the end of the educational series using the interactive class, pre- and posttest, was that the development and implementation of this EBP program designed to increase literacy and understanding of the patient's poststroke needs has the potential to reduce readmissions and improve outcome. Patients and families, per nursing staff, would be appreciative and ready to take on their new role being better equipped and having increased knowledge regarding stroke and risk factors for stroke. These findings show promise that the implementation of poststroke education programs for the staff can help reduce the incidence of reoccurring strokes.

**Essential I.** Scientific underpinnings for practice:

Poor health literacy continues to affect the lower income and less educated people in U.S. society. The effects of stroke are devastating and stroke sufferers who have a second stroke are often crippled permanently or terminally. This project clearly demonstrated the benefits of improved education for less educated patients. This project used evidence- based practice in the clinical setting to determine whether improved education for low literacy stroke patients reduced the incidence of future strokes.

**Essential II.** Organizational and systems leadership for quality improvement and systems thinking:

The purpose of this is to improve practice to benefit stroke patients at all levels of health care. The improvement of stroke education and increased understanding of stroke risk by those

patients with low health literacy can further improve their quality of life. Improving the education of health care professionals about stroke can have a profound effect on their patients' general care and quality of life.

**Essential III.** Clinical scholarship and analytical methods for evidence-based practice:

Evaluating the effects of low health literacy on the education and prevention of stroke is a method for improving the lives of stroke victims and their families. The use of the Likert scale survey and the paired *t* test to analyze the effects of how patients are affected by the lack of medical knowledge is a an efficient way to determine the benefit of an improved education system and user-friendly materials. This essential focuses on identifying a gap in practice or a practice problem. Health care professionals analyzed their empirical process and educational techniques and were then presented with advanced analysis and methods to determine how to advance stroke education.

**Essential IV.** Information systems/technology and patient care technology for the improvement and transformation of health care:

Through research and analysis of empirical data, I determined those technological and patient care educational techniques that best served the low health literacy community and developed improved coaching techniques for stroke sufferers in an effort to enhance the patients' experience. Utilizing technology to help gather and examine data related to this project increased the efficiency of the data examination. Using SPSS 25.0 made analysis of the available data more efficient; health care staff from different departments and different professions were measured evenly.

**Essential V.** Health care policy for advocacy in health care:

The above DNP essential addresses how "becoming involved in health care policy and advocacy has the potential to affect the delivery of health care across all settings" (Chism, 2016, p. 17). The majority of patients who suffer from low health literacy are underprivileged, undereducated, and of low socioeconomic status. Working in a stroke clinic with a diverse group of patients who had suffered a stroke helped in determining what educational materials could most effectively prepare the healthcare staff caring for these individuals. Focusing on improving the staff's literacy may have a profound affect on patient outcomes. Raising awareness of the educational needs for low literacy patients can have a positive effect on the lives of patients and their families, potentially improving the general health of patients and their families.

**Essential VI.** Interprofessional collaboration for improving patient and population health outcomes:

Health care professionals from several positions (NPs, RNs, and physicians) participated in this project in an effort to provide safe, quality care for patients, thereby improving the patients' stroke outcomes. The improved educational plans and materials generated by this study should enhance the interaction between health care staff from all positions and ease any conflicts as the group work together to enhance the patient-care experience.

**Essential VII.** Clinical prevention and population health for improving the nation's health:

The participants advocated for the less fortunate in our society in an effort to improve their health and life in general. The evaluation and interpretation of data to improve patient care is a foundation of nursing practice. The enhanced educational materials that resulted from this study may result in patients with low health literacy improving their patient outcomes.

**Essential VIII.** Advanced nursing practice:

These advances in education for low literacy stroke patients could potentially improve nurses' care of the persons in their care, giving those patients a better understanding of their illness and giving the nurses a stronger foundation for care. I demonstrated that an improved education for low health literacy patients might result in a reduced incidence of future strokes and improved general health.

**Assessment of Staff's Comfort Level With Teaching Stroke Literacy**

Because of specialized training, a few of the participants in this study reported feeling more comfortable educating patients with symptoms of stroke or poststroke, especially having the tools to do so. Offering a poststroke literacy education class was an idea that was enthusiastically embraced by the nursing staff. This class was designed to improve stroke outcomes, and it achieved that by helping the nursing staff determine the needs of the patients, their families, and their caregivers. To help with this effort, participants were provided with a small booklet with signs and symptoms of stroke defined by the NIH and the AHA. The agenda for the class follows.

**Improving the Poststroke Literacy Educational Agenda**

- Define stroke, literacy, and stroke statistics
- Risk factors for stroke and warning signs
- S/S of stroke from AHA/ASA, NIH/NINDS.
- Types of stroke and their cause
- Location of thrombi
- Location of stroke and effects on the body
- Imaging of stroke: CT scan and MRI
- Assessing neurological deficits with the NIHSS

- Neurological findings and complications
- Atrial fibrillation and risk for stroke
- Stroke prevention, including medication regimen (risk and benefit).

**Common Risk Factors of Stroke**

The risk factors for stroke discussed included primary (genetic) or secondary (acquired disorders). Hypertension, dyslipidemia, diabetes mellitus, smoking, obesity, and atrial fibrillation topped the significant factors. Also included in the risk factors are patent foramen ovale, carotid or vertebral artery dissection, factor V leiden mutation, oral contraceptive, and hypercoagulable state, which is any alteration of the coagulation pathways that predispose to a thrombus. Common stroke symptoms discussed were:

1. Sudden trouble with speaking or communication problem
2. Sudden problems with seeing in one or both eyes
3. Sudden weakness of the face, arm, or leg
4. Sudden dizziness, loss of balance, or difficulty with walking,
5. Sudden severe headache with no known causes

**Education on Neuroimaging as Part of Improving Stroke Literacy**

Danziger (2018) noted that "neuroimaging plays a vital role in the workup of acute stroke by providing information essential in order to triage patients accurately, expedite clinical decision making concerning treatment, and improve outcomes in patients presenting with acute stroke" (p.1). Imaging helps provide a more detailed look into stroke and the effect on the brain and body and helps the health care staff understand how the diagnosis of an ischemic or hemorrhagic stroke is made. Imaging using CT scans and MRIs were discussed as part of the educational process. The staff members thought this was positive and helped to increase their

knowledge of the different types of stroke, the location that was infarcted, and how that correlated with the patient's presenting symptoms. The imaging also helped them see the brain damage that was causing the patient's neurological deficits.

**Education on Poststroke Medications as Part of Stroke Literacy**

Numerous factors are associated with increased susceptibility to medication errors in stroke populations, including cognitive impairments, advanced age, impaired communication because of aphasia, and other issues (Michaels et al., 2010). Preventative regimens such as antiplatelets, anticoagulants, and antilipid agents were discussed as part of the educational process to improve poststroke literacy. The most common antiplatelets used poststroke are aspirin and clopidogrel. Anticoagulant therapy includes low molecular weight heparin or warfarin for patients with atrial fibrillation or pulmonary embolism. New oral anticoagulants were discussed as well.

Studies have shown that direct thrombin and direct factor Xa inhibitors have been used as oral anticoagulants for prevention of embolic stroke and are offered as a treatment for atherothrombotic stroke. These medications work through an inhibiting effect against thrombogenesis in AIS patients (Oertel & Fagerty, 2017). Direct oral anticoagulants (DOACs) are available for the prevention of stroke in nonvalvular atrial fibrillation and include dabigatran, which is a direct thrombin inhibitor, rivaroxaban, apixaban, and edoxaban, which is a factor Xa inhibitor (Oertel & Fagerty, 2017). In their study, Oertel and Fagerty (2017), concluded that DOACs were as effective as warfarin for stroke prevention in elderly patients with nonvalvular atrial fibrillation. It was mentioned that compared with warfarin, DOACs were also associated with reduced risk of intracranial hemorrhage. The authors stated that DOACs have a faster onset

and offset of action. There is less food and drug interactions of DOACs, which may be an advantage over warfarin for some patients (Oertel & Fagerty, 2017).

Statins, an antilipid agent, are often used as a part of the stroke prevention regimen. According to Amarenco and Tonkin (2004), "statins have been shown to have beneficial effects in patients with known CHD as well as in primary prevention of cardiovascular disease in high-risk cohorts. Statins lower stroke incidence in high-risk patients (those with CHD, diabetes mellitus, or hypertension), including patients with normal baseline levels of serum cholesterol" (p. 47). Oertel and Fagerty (2017) suggested that providers consult pharmacy for dose recommendations. In addition, the researchers suggested that providers balance the patient's stroke risk against potential bleeding risk when determining the best anticoagulation treatment plan. It is also important to consider the patient's needs and preferences when making this important decision (Oertel & Fagerty, 2017).

**Education on Stroke Prevention**

The staff was encouraged to observe patients for other issues that may arise after a stroke. These issues include depression, fatigue, and other mental or cognitive problems that can diminish the client's comprehension of stroke signs and symptoms. Poststroke depression has been proven to contribute to worsening stroke outcomes. In their study, Robinson and Jorge (2016) addressed the risk factors for developing poststroke depression, which included "genetic factors, age, gender, medical and psychiatric history, type and severity of the stroke, lesion location, degree of disability, and social support" (p. 223).

Nursing staff answered a few questions after the educational presentation about the techniques they had or could use going forward. Based on the discussions with nurses and the significant impact of the presentation as shown in the improvement in survey responses, I found

that programs designed to increase literacy and understanding of patient educational materials had the potential to reduce readmissions and improve patient outcomes. According to the nursing staff, patients and families were appreciative and ready to take on their new role, feeling better equipped with increased knowledge about stroke and the risks factors for stroke.

**Limitations of the Study**

There were some limitations to this DNP project, including the small sample size (*N* = 25). However, this sample included almost all the nurses, a couple of the physicians, and three NPs. The study was conducted at an acute care hospital in Washington state. Limitations to the study included a less than favorable amount of participants; the original goal was to recruit 50 health care staff, but due to scheduling, staffing, and patient care, only 25 participants were obtained. The interventional radiology technicians were unable to attend because of staffing issues. The two medical assistants were unable to participate because of the knowledge gap in comparison to the nurses, pharmacists, and physicians.

Another limitation was that the majority of participants were experienced health care professionals with over 10 years of experience and only around 25% of participants had five or fewer years in their field . Another limitation was that only six respondents were under 30 years of age—three nurses and three pharmacy fellows. This lack of staff under 30 left a gap of valuable data about how that age group addresses lack of literacy. The population of the health care staff, especially the nurses, all had bachelor's degrees, the pharmacist/fellows had doctorates, and the NPs had their master's degrees. Of note, the hospital requires a bachelor's degree or higher for the nurses in specialty units.

Despite these limitations, this study revealed significant improvement and a potential to increase stroke literacy in high-risk patients, including veterans and homeless patients. Recuiting

participants from a non-magnet or for-profit health care facility may have formed a more comprehensive sample size for this study. Another researcher could have added to the accuracy of this project because I was formerly an acute care stroke NP for more than three years. The prior knowledge in that role may have added some degree of bias in the study. Finally, as with any investigative study with a small sample, the results are tentative and cannot be generalized.

**Recommendations for Future Research**

As previously stated, some of the literature confirmed that challenges in health literacy directly relate to an individual's minimal use of the health care system, which leads to poorer health outcomes. Not every stroke causes memory and cognitive impairment, but an alteration in memory retention is considered when teaching patients about stroke and stroke prevention. The suggestion is to have culturally appropriate, personalized, and justifiable educational campaigns tested in high-risk populations as part of public health initiatives focused on stroke (Willey et al., 2009). Additional research is required to increase the understanding of the relationship between health literacy to key educational outcomes for the prevention of stroke, whether initial onset or prevention of a second occurrence, and to define the right methods to educate these individuals within the high-risk populations (Koutnik-Fotopoulos, 2014).

Integrating this quality improvement project in a larger population sample of healthcare staff caring for poststroke individuals would allow for a more comprehensive analysis and evaluation of the need for a robust stroke educational program geared towards increasing poststroke health literacy in the healthcare staff. One randomized, controlled trial study currently in progress includes the development of a multifactorial primary care model to address the longer-term needs of poststroke patients (Mullis & Aquino, 2019). Further research is required in several areas including more effective methods that may be used by a practitioner.

More potential areas of assistance should be researched. Some conceptual and operational aspects should be investigated during future research. Consideration of the observations in this study may permit more well-informed conclusions in future studies. The hope is that this DNP project's findings can help spur more research into the use of focused health care staff education about stroke and educating stroke patients.

**Summary**

The results of this study showed that there was a statistically significant increase in Likert scale survey scores across time for each question, $p < .001$. The educational presentation was a success. The main interest, it seemed, concerned the location or the site of the stroke and how that affected the patient. The DNP presentation was therefore extended to further educate the staff on that topic, which should enhance their confidence when explaining stroke to their patients.

Based on the literature, it is safe to assume that individuals with poor health literacy may not understand the written or oral data given by their providers, including physicians, nurses, pharmacists, or therapists. Therefore, these patients may have problems with reoccurring strokes, keeping their medical appointments, properly navigating health services, following medical directions, or properly taking prescribed medications. What was noted from this interaction was that nurses and other health care providers should recognize the veteran's or homeless client's distinctive culture and lifestyle. The health care staff must also recognize the vast range of health issues related to homelessness and the holistic approach that should be taken in their care. The client's ability to understand their stroke prevention regimen needs to be assessed. The homeless client may not understand the disease process or the causes of stroke.

The practitioner has to assess the patient's knowledge of current health issues and provide education as necessary. About providing stroke literacy education to their patients, overall, because of specialty training, a few of the providers reported feeling comfortable assessing patients with symptoms of stroke or poststroke. In a study by Ellis, Barley, and Grubaugh (2013), it was noted that because of their reduced understanding, many poststroke patients might not participate in the necessary preventative activities to assure good health and help reduce the risk of a stroke reoccuring. More precisely, a poststroke patient might be aware and understand the reason behind their stroke but is still unable to identify the common stroke risk factors or signs and symptoms of a stroke (Ellis, Barley, & Grubaugh, 2013). Programs in place for stroke education should be aimed at improving stroke awareness and prevention. The conclusion of their study was that awareness of poststroke literacy and stroke care is essential to a better stroke outcome.

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# Appendix A: IRB Approval

July 30, 2019

Marthilde Brzycki
Department of Nursing
Abilene Christian University

Dear Marthilde,

On behalf of the Abilene Christian University Institutional Review Board, we are pleased to inform you that the amendment you requested for your project (IRB# 18-124 ) entitled

has been approved. If you wish to make any further changes to this study, please complete and submit another Amendment Request Form.

We wish you the best in your continued research.

Sincerely,

Megan Roth

Megan Roth, Ph.D.
Director of Research and Sponsored Programs

Appendix B: National Institute of Health Stroke Scale


**1A / Level of Consciousness**

- ○ Alert; keenly responsive **0**
- ○ Arouses to min or stimulation **+1**
- ○ Requires repeated stimulation to arouse **+2**
- ○ Movements to pain **+2**
- ○ Postures or unresponsive **+3**

**1B / Ask Month and Age**

- ○ Both questions right **0**
- ○ 1 question right **+1**
- ○ 0 questions right **+2**
- ○ Dysarthric/Intubated/Trauma/Language Barrier **+1**
- ○ Aphasic **+2**

**1C / 'Blink Eyes' & 'Squeeze Hands' (Pantomime Commands if Communication Barrier)**

- ○ Performs both tasks **0**
- ○ Performs 1 task **+1**
- ○ Performs 0 tasks **+2**

**2 / Test Horizontal Extraocular Movements**

- ○ Normal **0**
- ○ Partial Gaze Palsy: can be overcome **+1**
- ○ Partial Gaze Palsy: corrects with oulocephalic reflex **+1**
- ○ Forced Gaze Palsy: cannot be overcome **+2**

**3 / Test Visual Fields**

- ○ No visual loss **0**
- ○ Partial Hemianopia **+1**
- ○ Complete Hemianopia **+2**
- ○ Patient is bilaterally blind **+3**
- ○ Bilateral Hemianopia **+3**

*Continue to next page for the remainder of NIHSS exam* ▸

# STROKE SEVERITY SCALE: NIH STROKE SCALE (NIHSS) CONTINUED

**4 / Test Facial Palsy (Use Grimace if Obtunded)**

- ○ Normal symmetry **0**
- ○ Minor paralysis (flat nasolabial fold, smile asymetry) **+1**
- ○ Partial paralysis (lower face) **+2**
- ○ Unilateral complete paralysis (upper/lower face) **+3**
- ○ Bilateral complete paralysis (upper/lower face) **+3**

**5A / Test Left Arm Motor Drift**

- ○ No drift for 10 seconds **0**
- ○ Drift, but doesn't hit bed **+1**
- ○ Drift, hits bed **+2**
- ○ Some effort against gravity **+2**
- ○ No effort against gravity **+3**
- ○ No movement **+4**
- ○ Amputation/joint fusion **0**

**5B / Test Right Arm Motor Drift**

- ○ No drift for 10 seconds **0**
- ○ Drift, but doesn't hit bed **+1**
- ○ Drift, hits bed **+2**
- ○ Some effort against gravity **+2**
- ○ No effort against gravity **+3**
- ○ No movement **+4**
- ○ Amputation/joint fusion **0**

**6A / Test Left Leg Motor Drift**

- ○ No drift for 5 seconds **0**
- ○ Drift, but doesn't hit bed **+1**
- ○ Drift, hits bed **+2**
- ○ Some effort against gravity **+2**
- ○ No effort against gravity **+3**
- ○ No movement **+4**
- ○ Amputation/joint fusion **0**

**6B / Test Right Leg Motor Drift**

- ○ No drift for 5 seconds **0**
- ○ Drift, but doesn't hit bed **+1**
- ○ Drift, hits bed **+2**
- ○ Some effort against gravity **+2**
- ○ No effort against gravity **+3**
- ○ No movement **+4**
- ○ Amputation/joint fusion **0**

**7 / Test Limb Ataxia (FNF/Heel-Shin)**

- ○ No Ataxia **0**
- ○ Ataxia in 1 limb **+1**
- ○ Ataxia in 2 limbs **+2**
- ○ Does not understand **0**
- ○ Paralyzed **0**
- ○ Amputation/joint fusion **0**

*Continue to next page for the remainder of NIHSS exam* ▸

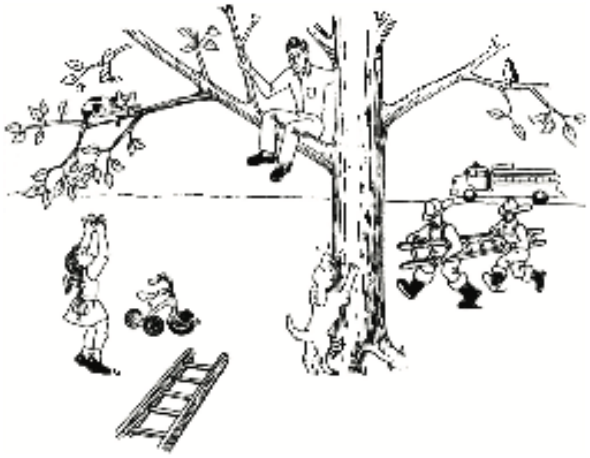
# STROKE SEVERITY SCALE: NIH STROKE SCALE (NIHSS) CONTINUED

**8 / Test Sensation**

- ○ Normal; no sensory loss **0**
- ○ Mild-moderate loss: less sharp/more dull **+1**
- ○ Mild-moderate loss: can sense being touched **+1**
- ○ Complete loss: cannot sense being touched at all **+2**
- ○ No response and quadriplegic **+2**
- ○ Coma/unresponsive **+2**

**9 / Test Language/Aphasia**

**Describe the scene; name the objects; read the sentences.**



**You know how.**

**Down to earth.**

**I got home from work.**

**Near the table in the dining room.**

**They heard him speak on the radio last night.**

- ○ Normal; no Aphasia **0**
- ○ Mild-moderate Aphasia: some obvious changes, without significant limitation **+1**
- ○ Severe Aphasia: fragmentary expression, inference needed, cannot identify materials **+2**
- ○ Mute/global Aphasia: no usable speech/auditory comprehension **+3**
- ○ Coma/unresponsive **+3**

*Continue to next page for the remainder of NIHSS exam* ▸

## STROKE SEVERITY SCALE: NIH STROKE SCALE (NIHSS) CONTINUED

**10 / Test Dysarthria. Read the words.**

**MAMA**

**TOP — TOP**

**FIFTY — FIFTY**

**THANKS**

**HUCKLEBERRY**

**BASEBALL PLAYER**

- ○ Normal **0**
- ○ Mild-moderate Dysarthria: slurring but can be understood **+1**
- ○ Severe Dysarthria: unintelligble slurring or out of proportion to Dysphasia **+2**
- ○ Mute/Anarthric **+2**
- ○ Intubated/unable to test **0**

**11 / Test Extinction/Inattention**

- ○ No abnormality **0**
- ○ Visual/tactile/auditory/spatial/personal inattention **+1**
- ○ Extinction to bilateral simultaneous stimulation **+1**
- ○ Profound hemi-inattention (ex: does not recognize own hand) **+2**
- ○ Extinction to >1 modality **+2**

## STROKE SEVERITY SCALE: LOS ANGELES MOTOR SCALE (LAMS)

| ITEM | SCALE DEFINITION | SCORE |
|---|---|---|
| FACIAL DROOP | Absent = **0**<br>Present = **1** | |
| GRIP STRENGTH | Normal = **0**<br>Weak Grip = **1**<br>No Grip = **2** | |
| ARM DRIFT | Absent = **0**<br>Drifts Down = **1**<br>Falls Rapidly = **2** | |

Appendix C: Stroke Severity Scale From AHA/ASA

## STROKE SEVERITY SCALE: RAPID ARTERIAL OCCLUSION EVALUATION SCALE (RACE)

| ITEM | INSTRUCTION | RESULT | SCORE | NIHSS EQUIVALENT |
|---|---|---|---|---|
| FACIAL PALSY | Ask patient to show their teeth (smile) | Absent (symmetrical movement)<br>Mild (slight asymmetrical)<br>Moderate to Severe (completely asymmetrical) | 0<br>1<br>2 | 0-3 |
| ARM MOTOR FUNCTION | Extending the arm of the patient 90° (if sitting) or 45° (if supine) | Normal to Mild (limb upheld more than 10 seconds)<br>Moderate (limb upheld less than 10 seconds)<br>Severe (patient unable to raise arm against gravity) | 0<br>1<br>2 | 0-4 |
| LEG MOTOR FUNCTION | Extending the leg of the patient 30° (in supine) | Normal to Mild (limb upheld more than 5 seconds)<br>Moderate (limb upheld less than 5 seconds)<br>Severe (patient unable to raise leg against gravity) | 0<br>1<br>2 | 0-4 |
| HEAD & GAZE DEVIATION | Observe eyes and head deviation to one side | Absent (eye movements to both sides were possible and no head deviation was observed)<br>Present (eyes and head deviation to one side was observed) | 0<br>1 | 0-2 |
| APHASIA (R SIDE) | Difficulty understanding spoken or written words. Ask patient to follow two simple commands:<br>1. Close your eyes.<br>2. Make a fist. | Normal (performs both tasks requested correctly)<br>Moderate (performs only 1 of 2 tasks requested correctly)<br>Severe (Cannot perform either task requested correctly) | 0<br>1<br>2 | 0-2 |
| AGNOSIA (L SIDE) | Inability to recognize familiar objects. Ask patient:<br>1. "Whose arm is this?" (while showing the affected arm)<br>2. "Can you move your arm?" | Normal (recognizes arm, and attempts to move arm)<br>Moderate (does not recognize arm or is unaware of arm)<br>Severe (does not recognize arm and is unaware of arm) | 0<br>1<br>2 | 0-2 |
| | | **Any score above 4 is a Stroke Alert and high likelihood of an LVO** | | |

# Appendix D: Letter of Support From Unit Manager/Director



## FW: Presentation on Stroke literacy, education, and prevention

From: Brzycki, Marthilde [redacted]
To: [redacted]
Cc: [redacted]
Date: Monday, April 1, 2019, 7:13 AM PDT

---

**From:** Brzycki, Marthilde [redacted]
**Sent:** Monday, April 01, 2019 7:11 AM
**To:** [redacted]
**Subject:** RE: Presentation on Stroke literacy, education, and prevention

Good morning,

I can do as many as possible to cover your whole staff!

Thanks,

Mattie

---

[redacted]
**To:** Brzycki, Marthilde [redacted]
**Subject:** RE: Presentation on Stroke literacy, education, and prevention

Hi Mattie,

That would be fantastic! The nurses have to complete 2 hours of stroke training annually, so this can count towards that for 2019.

How does the week of April 22nd sound? I usually schedule in-services for change of shift at 0730 AM to catch both days and nights. Could you do a couple repeat presentations, so we can get most of the staff?

Would this work for you:

Tues, 4/23 @ 0730-0750

Fri, 4/26 @ 0730-0750 and also @ 1545 to catch [redacted] who work evenings.

Thank you,

[redacted]

---

**From:** Brzycki, Marthilde [redacted]
**Sent:** Thursday, March 28, 2019 3:29 PM
[redacted]

Hello [redacted]

In discussing my Doctorate of Nursing topic improving stroke literacy, education, and prevention with [redacted] he informed me that your nursing staff and pharmacy might be interested in this type of educational presentation. So, I spoke to Nurses and the pharmacy team; They seem very interested on the topic.

We've also had patients with increase risk factors for stroke, and post-stroke.

Would you be interested in my sharing it with them?

Please send me some potential days and time that is most convenient for your staff (mornings, afternoons, and or weekends). The presentation is about 15-20 minutes with 5 -10 minutes for questions and answers.

Thank you,

Mattie

Marthilde Brzycki, ARNP. [redacted]
[redacted]
[redacted]

Appendix E: Permission Letter From American Heart Association



myACU powered by Google

Marthilde Brzycki [redacted]

**Permission to use stroke materials and tools**

5 messages

**Marthilde Brzycki** [redacted]

My name is Marthilde Brzycki. I am an active Nurse Practitioner in Washington state. I am also a DNP student at Abilene Christian University. I would like to obtain permission via email - as part of the school requirement, to use the AHA/ASA stroke information packets assessment tools during my educational project on stroke education and stroke prevention.
Thank you,
Marthilde Brzycki, ARNP

**American Heart Association Customer Service** [redacted] Wed, Apr 24, 2019 at 11:56 AM
To: Marthilde Brzycki [redacted]

Dear Marthilde Brzycki,

We appreciate your support in raising awareness about stroke prevention and education. Please provide the following information, so that we may better assist you:

- The AHA/ASA stroke information packets assessment tools you're referring to.
- How you plan to use the material. For example, is it for educational purposes only?

Here is a link to our downloadable information sheets, Answers by Heart. These sheets may be duplicated and distributed and cover topics like high blood pressure, heart healthy eating, and other information pertinent to reducing coronary heart disease, stroke and risk:
heart.org/letstalkaboutstroke and heart.org/answersbyheart.

Below are additional resources you may find useful:

- F.A.S.T
- Prevention Materials
- Printable Information Sheets

[redacted]

- F.A.S.T. Stroke Resources

Copyright Use Agreement: In consideration of being able to download these materials, you warrant and represent that you are a non-profit organization, medical institution or educational institution (hereafter "Institution") and your only use of the materials will be to distribute them at no charge, in hard copy, at a local health fair or educational event for educational purposes only, and you agree to:

- acknowledge AHA's ownership of the copyright, title, trademarks and all other related rights in and to the AHA Materials, and will not claim any ownership interest therein.
- not assign or grant permission to reproduce this material to any third party.
- not delete, alter, or change the materials.
- not print your Institution's logo on the materials.

The AHA copyright policy prohibits the use of Institution's logo and other printed information on the Patient Information sheets; however, Institution may add a "stick-on" label with Institution's contact information (i.e. name/phone #/address), to the pages.

We are committed to providing our customers with an exceptional service experience. Please take a moment to respond to our brief survey.

If you need more information, please do not hesitate to contact us at [redacted] or 1-800-242-8721.

Sincerely,

*Legal disclaimer: Information contained in this email is not intended or implied to be a substitute for professional medical advice. American Heart Association staff members do not answer personal medical questions.* Read more.

[Quoted text hidden]

**Marthilde Brzycki** [redacted] Wed, Apr 24, 2019 at 12:28 PM

[redacted] 

To: American Heart Association Customer Service [redacted]

Hello,
I am doing an educational presentation to healthcare professionals as part of my doctoral class project. I am referring to The F.A.S.T. acronym and using the pamphlets (explaining stroke, TIAs, preventing strokes).
Thank you,
Marthilde
[Quoted text hidden]

---

**American Heart Association Customer** [redacted]

Dear Marthilde Brzycki,

Thank you for responding to our email for additional information.

Our Let's Talk About Stroke downloadable education sheets may be duplicated and distributed. In consideration of being able to download these materials, you warrant and represent that you are a non-profit organization, medical institution or educational institution (hereafter "Institution") and your only use of the materials will be to distribute them at no charge, in hard copy, at a local health fair or educational event for educational purposes only, and you agree to:

- acknowledge AHA's ownership of the copyright, title, trademarks and all other related rights in and to the AHA Materials, and will not claim any ownership interest therein.
- not assign or grant permission to reproduce this material to any third party.
- not delete, alter, or change the materials.
- not print your Institution's logo on the materials.

The AHA copyright policy prohibits the use of Institution's logo and other printed information on the Patient Information sheets; however, Institution may add a "stick-on" label with Institution's contact information (i.e. name/phone #/address), to the pages.

We are committed to providing our customers with an exceptional service experience. Please take a moment to respond to our brief survey.

If you need more information, please do not hesitate to contact us at [redacted]

Sincerely,

[redacted]

[redacted]

[Quoted text hidden]

[Quoted text hidden]

**Marthilde Brzycki** <[redacted]>

Thank you so much, I will follow your recommendations.
Marthilde
[Quoted text hidden]

Appendix F: Permission Letter From National Health Institute



myACU powered by Google

Marthilde Brzycki [redacted]

**RE: Permission to use NIH stroke Scale and NIH stroke education toolkits**

1 message

**NINDS Information Office** [redacted] Thu, Apr 25, 2019 at 1:13 PM
To: [redacted]

Dear Ms. Brzycki:

We are responding to your emails to the National Institute of Neurological Disorders and Stroke (NINDS) concerning the National Institutes of Health Stroke Scale (NIHSS).

You requested permission to use the NIHSS when making an educational presentation to other healthcare professionals for your DNP project on stroke education, assessment, and prevention. The NIHSS is in the public domain and you may use it in your presentation. It would be best to include the NIHSS in full for your presentation. We ask only that you credit the NINDS or the NIH as the source of the information whenever possible.

We would like to take this opportunity to mention other resources that may be useful to you. Because you referred to "educational toolkits from the NIH," you may already be aware of some of these materials.

You can access the NINDS online publication catalog and the list of stroke publications, respectively, at [redacted] and [redacted] For example, you may be interested in the *Know Stroke* kit: [redacted] This boxed kit of materials has everything necessary to help a health educator plan and conduct a stroke education event. Included are a facilitator's guide, with step-by-step training on how to host a stroke awareness event; brochures in English and Spanish; posters; and an award-winning 8-minute DVD and videotape featuring interviews with medical experts and stroke patients.

Also available is the *Spanish Stroke Toolkit*: [redacted] This boxed toolkit includes a 13-minute Spanish-language DVD, an 8-minute English-language DVD, and brochures in Spanish and English. The toolkit

[redacted]

also includes a bilingual, laminated, stand-alone flipchart (14" x 17"), which graphically illustrates the different types of stroke, risk factors, and symptoms.

To order via the NINDS online publication catalog at [redacted] users can visit the individual pages of the publications that interest them, add their desired publication amounts to their cart, and "Proceed to Checkout" once they are ready to complete their order.

You can also place publication orders by calling the NINDS toll-free number at [redacted]
In addition, you can place an order by replying to this email with the names and quantities of the publications that you would like, along with your full mailing address and phone number.

We would like to take this opportunity to direct you to NINDS online information that provides an overview of stroke. You can access this information at [redacted] and [redacted]

In addition, you may wish to visit the National Library of Medicine's MedlinePlus website, which has resources on a wide range of health topics. Materials on stroke are available at the following site: [redacted]

Finally, the following NINDS website lists health agencies that are sources of additional materials or referrals on stroke: [redacted]

We hope this information is helpful.

Office of Communications and Public Liaison

National Institute of Neurological Disorders and Stroke

[redacted]

**********

Subject: Permission to use NIH stroke scale and educational toolkits
Comment/Question:
Hello,
My name is Marthilde Brzycki. I am a nurse practitioner and a DNP student at Abilene Christian University. I would like to obtain permission via email (as part of the school requirement) to use the NIH stroke scale and education toolkit packet - as a demonstration tool during my educational DNP project on stroke education and prevention.

Hello,
I am an active Nurse Practitioner in Washington state. I am also a Doctoral student at Abilene Christian University. I would like to obtain permission via email (as part of the school requirement), to use the NIH stroke scale and educational toolkits from the NIH. I am doing an educational presentation to healthcare professionals for my DNP project on stroke education, assessment, and stroke prevention. Thank you.

Appendix G: IRB Certificate

# Appendix H: Likert Scale Survey

## LIKERT SCALE

| | Strongly Disagree | Disagree | Neither agree nor Disagree | Agree | Strongly Agree |
|---|---|---|---|---|---|
| Improving patient's health literacy post-stroke is important to improve health outcome | 1 | 2 | 3 | 4 | 5 |
| I am comfortable educating my patients on signs and symptoms of stroke | 1 | 2 | 3 | 4 | 5 |
| I am comfortable educating my patients on risk factors for stroke and stroke prevention. | 1 | 2 | 3 | 4 | 5 |
| I am comfortable using the NIH stroke scale. | 1 | 2 | 3 | 4 | 5 |
| I know the F.A.S.T Acronym for assessing stroke. | 1 | 2 | 3 | 4 | 5 |
| I don't have the amount of time required to educate patient on stroke literacy | 1 | 2 | 3 | 4 | 5 |
| I will use the information or education to help Increase stroke literacy in my patients | 1 | 2 | 3 | 4 | 5 |
| I am confident with the topic of post-stroke literacy | 1 | 2 | 3 | 4 | 5 |
| Educating my high-risk patients on stroke might prevent new or re-occurring strokes. | 1 | 2 | 3 | 4 | 5 |
| Educational presentations for nurses and other healthcare staff helps with patient outcome | 1 | 2 | 3 | 4 | 5 |

*Note*. Some questions derived from this survey on Survey Monkey at https://www.surveymonkey.com/r/Preview /?sm=3cCQug_2B_2BHr_ 2B2uRRTZIS2LjeIwJZxRHjPs _2B0DmNd_2FoJ7YxAVQW8fHEpveET0rFn34