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Enhancing the Accuracy and Effectiveness of the National Institute of Health Stroke Scale in a Rural Emergency Departmennt

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by

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Abstract

A rural facility in the foothills of North Carolina found a need for process improvement regarding the emergency department and completion of the NIHSS. The DNP student and the Stroke Coordinator along with the Quality Improvement Coordinator agreed with the need for education of staff concerning accurate assessment and documentation of the NIHSS. The DNP project implemented additional training for the emergency department nurses and paramedics in the form of face-to-face classes with a PowerPoint. A pre-and post-survey was conducted to gauge the comfort level of staff with the NIHSS and stroke processes of the rural emergency department. The Stroke Coordinator collected data to assess the effectiveness of the DNP project. Results showed that completion of admission NIHSS charting increased from 63% to 80% after implementing the education for completion of admission NIHSS. Resources were given to the Stroke Coordinator to continue education of rural emergency department staff.

Keywords: stroke, NIHSS, emergency department, rural, National Institute of Health Stroke Scale

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Problem Recognition

In the United States, there is an ever-present issue of unhealthy living. One of the most well-known issues related to modifiable risk factors is stroke. Stroke remains the fifth leading cause of death in the United States and the leading cause of disability (Davis & Lockhart, 2016). There are nearly 6.8 million individuals living with a disability caused directly by a stroke (Davis & Lockhart, 2016). Emergent interventions and treatment are key to helping decrease damage or residual effects. The brain ages 3.6 years each hour and 2 million brain cells die each minute that treatment is delayed (Davis & Lockhart, 2016). Once recognition occurs, Emergency Medical Services should be notified to transport the patient to the nearest stroke center.

The emergency department is critical for the stabilization, identification, and intervention of any stroke. Upon arrival at the emergency department, the patient is quickly assessed, while certain standards of care are implemented. The Joint Commission standards for stroke care are required to be met for the patient at different times. The standard "door-to-drug" time is within 60 minutes or less; however, many stroke centers and emergency departments are working to give treatment as fast as possible due to the damage that occurs as every minute passes. One standard given by Joint Commission is for the completion of the National Institutes of Health Stroke Scale (NIHSS) before any treatment (Wells-Pittman & Gullicksrud, 2020). The NIHSS is comprised of a 15-item assessment tool that looks at consciousness, eye movement, visual fields, limb strength, sensation, and language; scores can range from 0 to 42 (Wells-Pittman & Gullicksrud, 2020). While the American Heart Association recommends the use of a stroke severity scale and preferably the NIHSS, they recognize there are other scales that may be utilized

(Wells-Pittman & Gullicksrud, 2020). Regardless of the variety in scales, every patient who has a stroke receives an NIHSS; therefore, it is important that staff feel comfortable using and implementing the scale.

Problem Statement

The emergency room can often be a fast-paced environment that sees a multitude of problems on a wide spectrum. At times, this can cause there to be a lack of specialized care in certain fields, specifically neurology. Rural areas may go weeks between stroke patients, thus there seems to be a need for education on stroke processes and scoring of NIHSS within the emergency department setting, specifically related to difficult stroke scale assessments on patients who may have an altered mental status or a communication barrier. Due to the need for timely assessment and quick intervention, it is key to have emergency department nurses who feel competent in implementing appropriate standards of care for stroke patients. In a rural emergency department setting, there appears to be a lack of appropriately completed documentation of the NIHSS, specifically in the neurologically compromised patient.

Literature Review

A literature review was conducted by searching a variety of databases and search engines. These databases were accessed through the digital library and included ProQuest, Access Emergency Medicine, and CINAHL. Key terms for the search included Stroke, NIHSS, emergency department, National Institute of Health Stroke Scale, stroke care, and rural.

A review of the literature found there to be many documented studies and research to support time-dependent treatment and emergent neurological assessment to be

key in improving patient outcomes. This would include accurate and efficient stroke scale assessment and documentation. However, while there was plenty of studies and articles regarding the NIHSS and strokes in the US, many were completed more than 5 years ago.

Stroke

Marcolini (2016) summarizes the statistical data on stroke in the United States (U.S.), indicating that stroke continues to be the leading cause of disability in the U.S. Statistically 50% of stroke suffers will be left with a permanent disability, 25% will require some type of assistance with activities of daily living, and 25% will remain in a facility for at least 6 months poststroke (Marcolini, 2016, p. 1). Along with statistical data regarding stroke incidents, Marcolini then reviews important decision-making for the treatment of stroke specifically in emergency medicine. These include time-sensitive treatments dependent upon imaging, labs, inclusion/exclusion criteria, and patient history. Based upon the type of stroke and location, along with the time frame since the onset of symptoms, the biggest takeaway is the concern for rapid and concise assessment. Alteplase must be initiated within 3, but up to 4 ½ hours, of the onset of symptoms based upon co-morbidities and risk factors (Marcolini, 2016, p. 8).

Bowman (2017) completed a case review of two patients that received care in a rural emergency department setting using telemedicine. The case review highlights the importance of the emergency department nurse and their function during the initial moments of care for a stroke patient. In these case studies, it shows the importance of the emergency room nurse in helping to complete the NIHSS with a neurologist over a telemedicine platform. Being able to know the verbiage and steps to the NIHSS is critical for any emergency department nurse or paramedic. Patient outcomes at 90 days of

recovery from a stroke show no difference in those who received Alteplase at a rural telemedicine facility or a tertiary stroke center (Bowman, 2017).

In 2021, an update from the American Heart Association and the Stroke Council was published regarding prehospital and emergency treatment of stroke. Ashcraft et al. (2021) published an overview of the nursing and interdisciplinary care of the acute stroke patient (p.1). This included the eight D's of stroke care which are: detection, dispatch, delivery, door, data, decision, drug, and disposition. Nurses have been leaders in providing care that is multi-faceted including education, collaboration, and implementation of treatment in time-sensitive situations. The eight D's help to identify major steps in the recognition and treatment of an acute stroke (Ashcraft et al., 2021). Most importantly, the article emphasizes education regarding implementing the NIHSS on normal, intubated, comatose, and aphasic patients. Ashcraft refers to this table as the nursing Pearls for Performing the NIHSS. The article provides additional guidance on stroke care from activation of the emergency response system to admission to a specialized stroke unit.

Stroke and Emergency Department

A retrospective data analysis was performed by Uchino et al. (2020) using data from 19 emergency rooms located in Ohio during the COVID-19-19 pandemic (p. 2544). Using over 900 stroke alerts initiated across the facilities, data showed that while the response time was decreased within the emergency department, case volume and arrival times were increased. These emergency departments included comprehensive stroke centers, primary stroke centers, free-standing emergency rooms, and telemedicine. The data showed an overall 30% reduction in stroke patient numbers during the COVID-19-

19 pandemic. This may be the reasoning behind a decrease in newer emergency-based stroke research in the last few years. The pandemic has changed day-to-day processes including those in the medical field.

Stroke and NIHSS

Hewitt et al. (2021) conducted a randomized control trial to determine the correlation between the admission NIHSS and patient outcomes at 6-months post-stroke (p.1). They created a 20-question survey distributed in four ways: face-to-face, telephone, online, and by mail. The questionnaire included 10 questions from the PROMIS-10 v.1.2, with an added five stroke-specific questions, three additional ADL questions, and two questions from the ICHOM Stroke Standard Set (Hewitt et al., 2021, p.1). The study was created to assess the perceived quality of life by stroke survivors and if that correlates with medical scoring or not. Overall, they found that women with the same NIHSS as men had a lower PROMIS-10 score at 6-months, as well as hemorrhagic strokes over ischemic strokes. In conclusion, the study did find a correlation between the severity of a stroke and the 6-month outcome of a stroke patient (Hewitt et al., 2021, p.3).

Thompson et al. (2018) created simulated data to determine the impact of missing NIHSS data on stroke mortality (p.1). They analyzed data from 7,654 stroke patients in the Michigan Stroke Registry and filled in missing stroke information to help with the correlation between the 30-day mortality and stroke severity scored on the NIHSS. They simulated data in groups of low volume hospitals seeing 100 patients or less, medium volume hospitals seeing 300 patients or less, and high volume hospitals seeing 500 patients. The Centers for Medicare and Medicaid Services [CMS] use the stroke severity and 30-day mortality rates to help with reimbursement and funding for hospitals. Overall,

the simulation proved there to be a detrimental effect between missing NIHSS and accurately profiling stroke mortality, supporting the need for accurate and complete stroke documentation.

Stroke, Rural, and Emergency Department

Jauch et al. (2018) completed quality improvement measures surrounding stroke care in five rural non-primary stroke centers in the southeast. The goal for Alteplase administration, or tPA, is "door to drug" within 60 minutes. In these five hospitals, this was only occurring 1.9% of the time for those patients presenting with stroke symptoms. The study also highlights the difficulties found in getting care for an acute ischemic stroke [AIS] in a rural setting. Researchers identified that while there are more than 1,000 Primary Stroke Centers [PSC] in the U.S., 44% of individuals in the southeast live within 60 minutes of one, causing the number of individuals seen and treated for an AIS in a Primary Stroke Center within the "Stroke Belt" to be 14.7% compared to 27.3 % in other parts of the country (Jauch et al., 2018). Quality improvement at these facilities was set up in a four-step process: baseline assessment, targeted education, ongoing data collection, and follow-up. Interventions were performed over a 6-month period. After the intervention, 5.2% were administered Alteplase in the GWTG timeframe of 60 mins, up from the 1.9% mentioned previously. The percentage of patients before the process improvement who were getting Alteplase greater than 60 mins out was 67.3%, which decreased to 22.2% after implementation. Evidence also supported that hospitals that depend on tele-stroke capabilities have the same productivity and efficiency as those centers without it, thus concluding that education and process improvements can make a

difference in stroke care given in the emergency department, and those using telemedicine can be as successful as those that have neurology on campus.

Rural and Emergency Department

According to the Council of Graduate Medical Education [COGME] (2020), 60 million, or one in five residents, live in rural areas in the United States (p.1). Multiple disparities are found in rural areas compared to urban counterparts including higher rates of mortality due to heart disease, respiratory disease, cancer, stroke, and unintentional injury. Of the 2,000 U.S. counties classified as rural, over 170 lack a hospital within their borders, and transportation to a medical facility can take over an hour (COGME, 2020). According to data published in March 2020 by the Health Resources and Service Administration, almost 70% of areas lacking primary medical health professionals were rural or partially rural areas. This includes an issue with staffing shortages in medical facilities ranging from nursing assistants to physicians or surgeons (COGME, 2020). The council then recommends the U.S. Health and Human Services to focus funding for training, to be community-based instead of acute services based, putting the focus on a patient-centered way of care for the future.

National Institute of Health Stroke Scale

Lyden (2017) gives a critical review of the history of the NIHSS from the initial development of the scale to the modern and abbreviated scale used today. The initial scale was created in 1980 for use with Naloxone and neurological assessments (Lyden, 2017). This 15-category scale was then modified to our currently used 11-category scale for the use of rt-PA or Alteplase in clinical trials which became a permanent scoring tool in 1995 (Lyden, 2017).

Reeves et al. (2015) analyzed NIHSS data from over 1 million patients ranging from the years 2003 to 2012 in 1,704 stroke-certified hospitals. The goal of this study was to examine the varied trends in documenting the NIHSS in "Get with the Guidelines" [GWTG] stroke-certified hospitals. The researchers found that the percentage of completed NIHSSs has increased from 27% in 2003 to 70% in 2012. There were also noted variations in the percentage of completed NIH Stroke Scales to be higher in those patients who visit the emergency room via ambulance, with a last known well [LKW] time, and with the possibility of thrombolysis as treatment (Reeves et al., 2015). The study also found evidence of hospitals with significantly lower documentation rates that reported higher NIHSS scores (Reeves et al., 2015).

Needs Assessment

Target Population/Community

In the 2000s, the Joint Commission recommended the establishment of primary stroke centers which are described as having stroke units, written protocols, and an integrated emergency response system (Howard & Howard, 2020). Eleven states, including Alabama, Arkansas, Georgia, Indiana, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia, have been identified as the "stroke belt" due to increased stroke rates compared to other states (Howard & Howard, 2020).

The targeted population for this DNP project was nurses working in a rural emergency department setting in Surry County, North Carolina. Emergency department nurses are responsible for performing accurate NIHSS and further neurological exams, in addition to notifying health care providers of stroke symptoms a patient may be exhibiting.

Sponsors/Stakeholders

Sponsors of this DNP project included the Stroke Coordinator and Quality Improvement Coordinator. The Stroke Coordinator is responsible for educating staff, conducting audits, and collecting data related to stroke care. The Quality Improvement Coordinator is responsible for process improvement, implementation, and review of current policies in the facility. This DNP project is also heavily sponsored by the emergency department manager who values education and high-quality care given by her staff.

Stakeholders of this DNP Project included future patients, the Board of Trustees which includes the Medical Director, Chief Executive Officer, and several other notable members of the community.

Organizational Assessment/SWOT Analysis

Strengths

The organization is a small, private non-profit hospital located in the foothills of North Carolina. The hospital is considered a primary stroke center and has worked to develop and grow its stroke program for many years. In the last year, there has been much change in their stroke program including a new Stroke Coordinator. One of the biggest strengths is the buy-in and dedication of the emergency room manager and Stroke Coordinator.

Weaknesses

As with any change in an organization, there can be some changes in nursing staff, which can cause issues with compliance. The organization does not have many certified nurses, specifically stroke certified nurses, and the emergency room department

uses a large percentage of paramedics as staff who do not complete the NIHSS in their day-to-day job. The amount of stroke cases in a rural ED setting may be significantly less than in an urban tertiary stroke center, therefore, creating a lack of usage and the possibility of a lack of concern from the staff.

Opportunities

Discussions have revealed opportunities for growth and improvement. Staff has shared they want the education and need the opportunity to learn about stroke and neurological assessments. The Quality Improvement Coordinator was also on board with this process improvement and intervention for the emergency room staff. One of the largest opportunities identified in the rural emergency department selected for this DNP Project is the lack of accurate assessments and charting. The Stroke Coordinator at the facility states that misses amongst assessments and charting are found in around 31% of the stroke patients.

Threats and Barriers

With much of today's nursing staff feeling burned out and overwhelmed having been through the recent pandemic, there is concern that personal attitudes and theories would threaten the success of this DNP project.

Available Resources

While resources may be sparse, there are still a good number of options within the organization and community. The Stroke Coordinator is available to provide insight into current resources and needed resources. There is a strong relationship within the organization and local county emergency services should that be needed. The stroke program at the facility is also tied to a larger healthcare organization's tele-neurology

program which then provides added resources. The larger healthcare organization currently has a class in place discussing difficult NIHSS patient assessments which may introduce the opportunity to view and pull information from their Stroke Coordinator as a resource.

Desired and Expected Outcomes

The desired outcome of the DNP project was to see a decrease in the number of incomplete or undocumented NIHSS per protocol. The Stroke Coordinator has identified that approximately 1/3 of admitted or transferred patients are missing an NIHSS in the emergency department. While this is an improvement according to previous months' audits, it is expected that with additional education there will be a continued improvement in the completion of the NIHSS.

Team Selection

Project team members included:

- The Stroke Coordinator
- The emergency department manage
- A Neuro experienced nurse practitioner
- The Quality Improvement coordinator

Cost Benefits and Analysis

The direct cost associated with the implementation of this DNP project was related to salary costs of nursing staff attending the educational sessions. Thirteen staff attended a 1-hour education session. The average hourly rate per registered nurse in North Carolina is roughly $33.15 an hour (U.S. Bureau of Labor Statistics, 2021), which equates to approximately $430 in non-productive work time. Additional supply costs

related to paper were estimated to be $20. This cost was minimal to the cost of accreditation and renewal from the Joint Commission [TJC]. A medical review company, BHM Healthcare Solutions (2015), states the cost of an accreditation survey is somewhere in the ballpark of $10,000- $45,000 depending on the size of the facility.

Goals, Objectives, and Mission Statement

Goal

The goal of this DNP project was to enhance and improve accuracy and assessment of stroke using the National Institutes of Health Stroke Scale [NIHSS] in a rural emergency department setting.

Objectives

1. Conduct a survey with emergency department staff related to perceived personal weaknesses and strengths related to stroke care.
2. Develop a curriculum, with input from the Stroke Coordinator, related to weaknesses and strengths of stroke care identified by emergency department staff.
3. Implement stroke curriculum (1-hour classes)
4. Observe a decrease of 15% misses in stroke scale assessments and documentation within the first 3 months following the stroke curriculum implementation.

Mission Statement

The mission of this DNP project was to empower rural emergency room nurses with the education and tools needed to feel comfortable in using the NIHSS to assess stroke patients and document their assessment accurately every time.

Theoretical Underpinning

The Neuman Systems Model was used to guide this DNP Project. Neuman's theory gives a holistic perspective with a goal of wellness (Nadeau & Walker, 2017). The groundwork of the model involves two components: the client's response to stressors and nursing interventions to prevent or assist the client with negative responses to stressors (Nadeau & Walker, 2017). In the systems model, the primary intervention is the prevention of stressors to the body and the negative effects that can occur from stress. This includes health maintenance and the promotion of health from a holistic perspective for a person (Petiprin, 2020). The secondary intervention, once a stressor has been introduced to a person, is to decrease the amount of damage that occurs. This includes strengthening a person's defense mechanisms and removing the stressor. Tertiary prevention helps to support a person and decrease or add to the energy needed for reconstitution or recovery (Petiprin, 2020).

Neuman's Systems Model looks at a person as a multidimensional, multi-layered human being. This includes five subsystems: physiological, psychological, sociocultural, spiritual, and developmental. Neuman goes on to explain that there can be internal and external stressors to a person's environment. These include intrapersonal, interpersonal, and extra-personal stressors which can upset the balance of a person's environment (Petiprin, 2020). The idea of health and wellness is equated to perfect harmony and balance amongst these systems.

The model looks at nursing as an influencer on a person or their family's environment. Able to prevent stress, create an action plan to resolve the stress, and restore balance to a person once a stressor has been introduced. There are six main

nursing interventions listed in Neuman's Systems Model. First, is an assessment of the patient which is key to analyzing actual and potential stressors. It gives the nurse a chance to appraise a patient's lines of defense, support systems, coping mechanisms, and observe the interaction between a patient and their environment (Petiprin, 2020). Secondly, the nurse then makes a diagnosis based on data provided which includes health-seeking behaviors, activity intolerance, ineffective coping, and ineffective thermoregulation (Petiprin, 2020). The remainder of the steps includes goal setting, planning, intervention, and evaluation. During the evaluation process, nursing then determines if the balance has been restored or if the patient has returned to a stable state (Petiprin, 2020).

This theory was considered for this DNP project related to the stressors and sudden changes in a patient and their environment occurring during a stroke. It is a sudden illness unforeseen by most that cause a disruption to the normal processes occurring in one's environment. The emergency department is the first stop after emergency services have intervened; therefore, making the nurses in the department key factors in supporting, educating, and reducing stress in this situation.

Project Timeline

This DNP Project followed the following timeline:

- Week 1: Sent out an email to all staff, and posted sign-up sheets on the unit to remind staff of education.
- Week 2-6: Completed education via PowerPoint for staff to view during education.

- Week 5: Reviewed education and percentage of involvement with the Stroke Coordinator and emergency department manager.
- Week 6-8: Personal reflection and reviewed pre-post evaluations.
- Week 10-11: Met with Stroke Coordinator to review data collected regarding NIHSS completion since the intervention.
- Following Data Collection
    - Month 3: Completed data collection and reviewed for completion of the project.

Evaluation Plan

This project utilized a pretest-posttest design. Participants attended a 1-hour NIHSS educational session in the facility's simulation lab. The material was delivered by PowerPoint. The DNP project leader also used a mannequin to demonstrate the proper assessment techniques required for completing the NIHSS.

Participants were asked to complete the NIHSS Survey (Appendix A) before and after participation in the NIHSS educational session. The NIHSS Survey is a 10-item questionnaire, based on a 5-point Likert scale. Answer choices range from Not Comfortable to Very Comfortable. The NIHSS Survey was created by the DNP Project Leader, and reviewed by the Stroke Coordinator and DNP Project Chair for face validity.

The DNP Project Leader worked with the Stroke Coordinator to compare completion rates and accuracy rates of the NIHSS pre and post-implementation of the educational sessions. The Stroke Coordinator completes monthly chart audits on the completion and accuracy of the NIHSS. She provided aggregate audit data on the completion rate and accuracy rates of the NIHSS for 1-2 months pre-implementation of

the educational sessions. One month of post-implementation data has been reported; however, the second month of post-implementation data is still pending. Data were analyzed utilizing a paired-samples t-test and descriptive statistics.

Project Implementation

This DNP project was implemented in a private, non-profit hospital in North Carolina. Thirteen emergency room staff served as participants. Participants included full-time, part-time nurses and paramedics.

The DNP Project leader hosted multiple 1-hour NIHSS educational sessions in January 2022. Participants attended one class. Participant sign-up sheets for sessions were placed on the whiteboard, that was used for Stroke updates and education in the Emergency Department. Sessions were held in the simulation lab. Educational materials were delivered via PowerPoint and using the mannequin to demonstrate proper assessment techniques. Participants were allowed to engage in return demonstration if desired.

Prior to starting the educational session, participants were provided informed consent (Appendix B). Following informed consent, participants were asked to complete the NIHSS Survey. Once surveys were distributed, the DNP project leader left the room. Participants completed the survey and submitted completed surveys to an envelope located at the front of the room. Participants had the option to not complete the survey or to submit a blank survey. Once all surveys were submitted, a designated participant came and got the DNP Project Leader. Following completion of the first NIHSS Survey, the NIHSS educational session began. At the conclusion of the NIHSS educational session, a second NIHSS Survey was administered via the same process as the first survey.

Project Closure

Once the last sessions were completed, a meeting was held with both the manager and the Stroke Coordinator to brainstorm and discuss both participation and plans for future training amongst the staff. Discussion topics included thoughts regarding future threats and barriers to education in their rural emergency department, as well as neurological assessment tips and tricks to help with education. The Stroke Coordinator was given the PowerPoint presentation to use for future educational sessions. It will be specifically helpful and resourceful to train new staff in the emergency department. The Stroke Coordinator was very involved in going through the created education and possible questions related to the NIHSS.

Results

Overall, participation in the DNP project was 21.3 % (n=13). A paired-samples *t*-test was calculated to compare the mean pretest score to the mean post-test score. The mean on the pretest was 3.75 ($sd = 0.31$), and the mean on the posttest was 4.75 ($sd = 0.06$). A significant increase from pretest to posttest was found ($t(12) = -6.93974$, $p < 0.05$)

Prior to implementation of the DNP project, data from November and December illustrated accurate completion of the NIHSS stroke scale at 57-63% at admission, and 55-57% at discharge. After 1-month post-implementation, accurate completion of admission NIHSS rose to 80%; however, accurate completion of the NIHSS decreased to 30%. This data is presented in Table 1. Admission NIHSS are completed within the first 45 minutes of care, usually in the emergency department. Discharge NIHSS is completed

by the floor or emergency department depending upon holding patients in the ED and what unit they were discharged from.

Table 1

Completion of the NIHSS at Admission and Discharge from the Facility

		Admission %	Discharge %
Pre-Implementation Data	November 2021	63	55
	December 2021	57	57
	January 2022	50	25
Post-Implementation Data	February 2022	80	30
	March 2022	Pending	Pending

Conclusion

Implementation of this project met roadblocks that made it difficult to execute. It was apparent after beginning the project that there would be multiple barriers to its success of the project. The biggest barrier to the implementation process was the ever-present COVID-19 pandemic. Nurses have carried a large weight of the burden of caring for COVID-19 patients. One study, based out of Alabama, stated that when asked open-endedly about COVID-19 the number one word used was fatigue (Ali et al., 2020). COVID-19 created an environment hindered by the consensus of fatigue felt by the emergency room nurses. While management encouraged the sessions or education, there was no punitive outcome for the lack of participation. This created a huge threat to the success of the project, as originally the facility agreed to make the educational sessions mandatory. Also, some barriers to the implementation of the project were the knowledge base and lack of repetitive usage in the emergency department at this facility. Their

policy is to use the Miami Emergency Neurologic Deficit or MEND exam for most of the post-alteplase or neurological disease exams.

Although participation in the DNP project was not ideal, there was still noted improvement since implementation. The project also gave the Stroke Coordinator a framework to continue to educate staff on other units of the hospital or newer staff that come into the emergency department. This was a positive outcome shown in the percentage of admission NIHSSs completed and in the pre and post-surveys answered by the staff. During education sessions, staff were involved in active learning and asked multiple questions. There was immediate feedback during sessions stating a positive outlook on the education. The DNP project leaders suggest further education for the stroke unit in the facility. They are most likely to complete the discharge stroke scales. Based on percentages given by the Stroke Coordinator, it would be interesting to see if there would be any improvement amongst the med-Surg nurses that complete the NIHSS.

Overall, we cannot forget the goal of any health treatment or intervention is to have a positive outcome for the patient. Behind rapid administration of the NIHSS and proper documentation is the goal to implement treatment as soon as possible for an acute stroke patient. Saving them millions of neurons and increasing the likelihood to recover back to their pre-stroke baseline. Having knowledge of practices and protocols only helps to ensure the same efficient treatment for every patient every time.

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Appendix A

NIHSS Survey

Please circle and rank each item from 1 to 5, with 5 being the most comfortable and 1 being the least comfortable.

1.	Explanation of the NIHSS to a family member in the room.	1 2 3 4 5
2.	Understanding the steps in the stroke protocol/process.	1 2 3 4 5
3.	Being familiar with the neuro telehealth cart and completing NIHSS with the neurologist on camera.	1 2 3 4 5
4.	Completing the NIHSS on an intubated patient.	1 2 3 4 5
5.	Completing the NIHSS on an alert and oriented patient.	1 2 3 4 5
6.	Completing the NIHSS on a patient that has altered mental status, but is not intubated.	1 2 3 4 5
7.	Understanding what the NIHSS may predict in patient outcome.	1 2 3 4 5
8.	Completing the NIHSS on a patient that has a history of stroke or weakness at baseline.	1 2 3 4 5
9.	Explanation of NIHSS in report to a transferring facility.	1 2 3 4 5
10.	Understanding of how the NIHSS was created or developed.	1 2 3 4 5

Created by: Emily Addington, RN, BSN, SCRN

Appendix B

Informed Consent Form

Title of Study: Enhancing the accuracy of the NIHSS in a rural emergency department setting.

Researcher: Emily N. Addington, RN, BSN, SCRN. Doctor of Nursing Practice-Family Nurse Practitioner student at Gardner-Webb University.

Purpose

The purpose of this DNP project is to improve the knowledge level of registered nurses and paramedics related to completion and accuracy of the National Institute of Health Stroke Scale [NIHSS] use in a rural emergency department. The goal is to increase NIHSS related education, to increase the correctness of scoring and the completion of needed assessments for patient treatment.

Procedure

What you will do in the DNP project:

Initially, you will be asked to fill out a NIHSS survey regarding your knowledge base and familiarity of the NIHSS. This is a voluntary and anonymous survey. If at any time you feel uncomfortable answering any question you may skip the question or stop the survey altogether. Following completion of the initial survey, you will participate in an educational session regarding use of the NIHSS. Following completion of the educational session, you will be asked to complete the NIHSS survey again, with the same instructions as the pre-survey. If you feel uncomfortable with either the pre- or post-survey, you have the option to not answer or stop answering at any time.

Time Required

It is anticipated that the DNP project will require about 1 hour of your time.

Voluntary Participation

Participation in the survey is voluntary. All surveys will be anonymous. Participants may choose to submit a blank survey or can choose not to submit a survey if they do not want to participate. Due to the de-identifying information once a survey is submitted it may not be retrieved.

Confidentiality

All surveys will be completed anonymously. No identifiable data will be collected from the participants. The surveys will be collected and stored in a locked cabinet in the DNP Project Leader's home. Data will be analyzed on the DNP Project Leader's home computer that is password protected. Only the DNP Project Leader will have access to the information. After completion of the DNP Project, all data will be submitted to the Hunt School of Nursing at Gardner-Webb University. The data will be stored for three years and then destroyed.

Risks

There are minimal risks associated with this DNP project. If, because of the project, you experience discomfort and would like to discuss your thoughts or feelings with a counselor, please contact the following individual for assistance.

Reach EAP & Workplace Solutions
Call toll-free 24/7: 800-950-3434
Email: info@reach-eap.com

Benefits
There are no direct benefits associated with participation in this DNP project; however, your participation in the education sessions will count towards your stroke education hours. The project's goal is to understand if specialized education increases the knowledge base and familiarity of staff performing the NIHSS in a rural emergency department.

Payment
You will receive no payment for participating in the study.

If you have questions about the study, contact:
Emily N. Addington, RN, BSN, SCRN
DNP Candidate
FNP, Hunt School of Nursing, Gardner-Webb University
(336) 756-2177
eaddington@gardner-webb.edu

Dr. Tracy Arnold
Faculty Research Advisor
Gardner-Webb University/ Hunt School of Nursing
(704) 406-4359
tarnold@gardner-webb.edu

If the research design of the DNP project necessitates that its full scope is not explained prior to participation, it will be explained to you after completion of the project. If you have concerns about your rights or how you are being treated, or if you have questions, want more information, or have suggestions, please contact the IRB Institutional Administrator listed below.

Dr. Sydney K. Brown
IRB Institutional Administrator
Gardner-Webb University
Telephone: 704-406-3019
Email: skbrown@gardner-webb.edu

Voluntary Consent by Participant
I have read the information in this consent form and fully understand the contents of this document. I have had a chance to ask any questions concerning this project and they have been answered for me. By submitting a completed survey, I am agreeing to participate in this DNP project.

You may keep this form for your records.