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By

Varsha Singh

DNP Scholarly Project Committee

Dr. Mary Ellen Roberts-Chair

Dr. Kristi Stinson

Dr. Erica Frangione-Edfort

Submitted in partial fulfillment of the Requirements for the degree of

Doctor of Nursing Practice

Seton Hall University

2018

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By

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Dedication

This doctoral project is dedicated to my husband, Raj, who has been my life coach and guide throughout my doctoral degree work. My bright, patient and wonderful children, Simmi and Aditya, who encouraged me and cheered me at every step forward. My family provided me the support I needed to succeed and continued to have faith in me. Their encouragement and unconditional support kept me going and motivated me to continue my doctoral pursuit. They are witness to my passion to improve the quality of stroke care and to some extent play a role in reducing disability associated with stroke. I miss my wonderful mother, the late Mrs. Veena Jethva, who was a powerful presence in my life. She taught me to appreciate life, stay strong despite adversity and be kind to everyone around me. Some very special thanks for my cheerleader brother Nayan and sister Vandana who never stopped believing in me. I feel blessed to have these nurturing people around me who inspired me and encouraged me to stay strong every minute of this journey. My degree is not my own, it has the time investment of everyone around me. Love you all for telling me never to give up. Hare Krishna!

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Abstract

More than 795,000 American adults have a stroke annually. About 610,000 are first or new strokes. Almost 140,000 Americans of all ages die of a stroke every year (Centers for Disease Control and Prevention [CDC], 2017). Stroke requires emergent treatment and an exact clinical order pathway to ensure better patient outcomes and compliance with the standards of care defined by regulatory bodies such as the Joint Commission (TJC) and the Centers for Medicare and Medicaid Services (CMS). While stroke management teams often include an Advanced Practice Nurse (APN), there is a lack of a standardized protocol across New Jersey (NJ) and ambiguity about the role of APNs managing stroke. This quality improvement educational initiative, Stroke Clinical Order Pathways Education (SCOPE) for APNs, was conducted for APNs in NJ to emphasize the importance of the stroke clinical pathway order sets (Appendix A) to improve quality of care for stroke patients and to clearly define the role of APNs.

This Doctor of Nursing (DNP) educational initiative utilized the American Heart Association national guidelines for stroke management and current CMS and TJC criteria for the stroke core measures (Appendix B) quality reporting and combined these strategies to create an evidence-based stroke education initiative for APNs. Between November 2017 and February 2018, the SCOPE for APNs was presented at four sites in northern NJ. The participants attended a one-hour educational session that included a pre-test and post-test (Appendix C), and program evaluation (Appendix D). In total, 28 APNs and 27 RNs attended these sessions.

Background

Introduction to the clinically focused problem

Stroke is a medical emergency. Every minute that stroke treatment is delayed about 1.9 million neurons are at risk of disintegration and subsequent cell death leading to permanent dysfunction of bodily mechanisms governed by the affected group of neurons in the brain. The overall goal of stroke treatment focuses on reducing ischemia and preventing infarction of the affected area and resulting brain cell damage (Powers et al., 2015). Hence, ‘Time is Brain’ is the most common phrase used among stroke specialists to emphasize the crucial nature of stroke management (Saver, 2006).

Someone in the United States of America (US) has a stroke every 40 seconds, and every four minutes someone dies as a result of a stroke (Centers for Disease Control and Prevention [CDC], 2017). More than 795,000 American adults have a stroke annually. About 610,000 are first or new strokes (CDC, 2017). Stroke is the leading cause of serious long-term disability and the third leading cause of death in the US (AHA/ASA, 2017; CDC, 2017). Stroke reduces mobility in more than half of stroke survivors age 65 and above (Mozzafarian, Benjamin, Go, Arnett, Blaha, & Cushman, 2016). Almost 140,000 Americans of all ages die of a stroke every year (CDC, 2017). The estimated direct and indirect cost of stroke to the US in 2017 totaled \$34 billion (CDC, 2017). Various issues have been identified as causative factors resulting in long-term disabilities secondary to stroke including delayed assessment of symptoms.

Since the 1950’s, the need to reduce the morbidity and mortality associated with stroke has been identified. In the late 1990’s and early 2000’s an increase in the number of hospitalizations secondary to stroke underscored this need (Gorelick, 2013). Three major

events led to improvement in care. First, in 1996, the FDA approved the use of intravenous recombinant tissue plasminogen activator, a thrombolytic agent to dissolve blood clots and reduce ischemia/infarction (Zivin, 2009). Then in 2001, the US Congress initiated the Paul Coverdell National Acute Stroke Registry to identify best practices in stroke care. Through state grants, the registry collected information on stroke care from the initial emergency response through hospital discharge and identified that an uneven distribution of stroke care existed, from both a geographic and a quality perspective. Based on this information, best practice methods, the core measures, were established by CDC in 2008 to promote high quality care and to prevent stroke recurrence and mortality (CDC, 2017; Gorelick, 2013).

In 2003, the American Heart Association (AHA), the American Stroke Association (ASA) and the TJC recommended acute care facility certification as primary or comprehensive stroke centers (Gorelick, 2013). Then in 2004, the NJ Stroke Act established the designation criteria for primary as well as comprehensive stroke centers, and the health commissioner led the initiative by introducing grants for those hospitals that intended to develop a strong stroke program. The ten stroke core measures, a combined set of quality indicators that reflect evidence-based care that improves patient outcomes by providing step-by-step criteria / guidelines, were set as the standards of care (Fedder, 2008). These core measures are regulated and monitored by The Joint Commission (TJC), the Center for Medicare and Medicaid Services (CMS), the NJ Department of Health and Det Norske Veritas (DNV) (Centers for Disease Control and Prevention [CDC]), 2018).

Because of the heightened importance of stroke care in the US, CDC included sixteen objectives in Healthy People 2010 that were dedicated to stroke care (CDC, 2017). This implemented the next important step in stroke care, prevention.

Contributing factors/current practice

This project idea was the outcome of a problem that constantly emerged during the active clinical practice of the DNP student as a stroke coordinator and neuroscience nurse practitioner, and as a member of the New Jersey Stroke Coordinator's Consortium (NJSCC) for over 7 years. NJSCC represents 65 hospitals in New Jersey, 52 of which are designated primary stroke centers and 13 are designated comprehensive stroke centers. Two frequent topics of concern emerged at meetings: the lack of consistency in the use of the core measures and the lack of APNs empowerment and position on stroke teams. In a 2017 survey, NJSCC found that only 17% of the hospitals utilized Licensed Independent Practitioners (LIP) such as Advanced Practice Nurses to determine the thrombolytic treatment for stroke patients. While stroke management teams often include an Advanced Practice Nurse (APN), there is a lack of a standardized protocol across New Jersey (NJ) and ambiguity about the role of APNs managing stroke (Chukwuneke, Sanfillippo, Dwyer, Ciacciarelli, & Singh, 2017).

Stroke management demands a complex and methodical clinical order system as well as concurrent interdisciplinary communication to expedite care. Any delay in treatment can have a significant impact on the quality of life of the patient and can carry a greater financial impact related to diagnostics and possible surgical interventions (Gorelick, 2013). Delay in early treatment may have significant consequences on patient outcomes, including possible increase in

the level of disability, poor patient satisfaction and a much more complex post-stroke status (Fedder, 2008; Gorelick, Gorelick, & Sloan, 2008).

Expediting care through the clinical order pathway for stroke (Appendix A) focuses on rapid evaluation of the patient on arrival to the emergency room. This includes obtaining the last time the patient was known to be well and ordering a CT scan of the head, the gold standard diagnostic test to differentiate between ischemic and hemorrhagic stroke (Powers et al., 2015). Since all hospitals do not have standardized practice guidelines, some patients linger in the emergency room awaiting diagnosis rather than being immediately sent for a CT scan and transfer to a neuro unit. The role played by the APN as a clinical leader to manage stroke is, therefore, highly significant in terms of leadership and critical thinking as a nurse professional (Perry, 2006; Rattray, 2017), not only providing direct patient care but in a leadership role to institute the clinical pathway and use of the core measures.

Description of the project

Target population

The SCOPE for APNs project was a one-hour educational program developed to provide evidence-based information for APN from acute and primary care practices, professionals who are potentially in a position to quickly implement core measures and assure rapid diagnosis and treatment of stroke patients. SCOPE targeted APNs at every level of expertise, from novice to expert.

Purpose and expected results

The overall aim of the SCOPE for APNs was to improve knowledge regarding emergent care for stroke patients thus decreasing brain cell death and resultant disability or death. The short-term outcome of SCOPE for APNs was improved scores from the pre to the post-test indicating improved knowledge of the signs and symptoms of stroke and the importance of expedited stroke care, and the relationship of clinical pathways and core measures to improved stroke outcomes.

There were several long-term outcome expectations. Because APNs who function in different specialties may not be proficient with stroke care, improving their knowledge of the stroke clinical order pathway and core measures and their relationship to better outcomes, it was hoped that this education project would improve participant level of knowledge and confidence in providing rapid diagnosis and initiating the diagnostic CT-scan and treatment of stroke patients. For APNs already working in stroke care, by reinforcing information regarding the effectiveness of stroke clinical order pathways and core measures it was hoped that this increased knowledge would support them to strive for independent, leadership positions within the neuro community and implementation of clinical protocols at their facilities to improve consistency of stroke care.

An effective method to improve learning by APNs at different levels of knowledge and practice experience is to provide information through a structured educational session (Green & Newcommon, 2006). Reaching out to those APNs who may not have adequate experience with stroke care will serve to educate novices and validate the knowledge of expert APNs (Gillespi & Peterson, 2009; Hicks & Black, 2013).

Risks and benefits

The educational sessions were open to any APN practicing in New Jersey who wanted to participate regardless of his/her practice setting or specialty. The exact nature of the participation was disclosed to all the participating organizations and APNs. The participation was on a voluntary basis and no incentives offered to attend the session. The participants were instructed that they were under no obligation to take the pre-test or post-test. However, to ensure the quality of the study they were asked as participants to take the pre-test, attend the full education session without missing any portion, and then complete the post-test as well as the session evaluation.

No identifying data was collected from the participants. It was optional to declare their age and their practice specialty. The disclosures were announced prior to the presentation. The non-conflict disclosure was announced at the beginning of every presentation and the slide of the disclosure statement was included in the power point presentation of the education material. It was clearly disclosed that this quality improvement program was neither funded by a grant nor financially supported by any sponsor. As the education topic involved clinical practice recommendations, it was also disclosed that there was no discussion of any pharmaceutical product which was not approved by FDA.

The benefit of the program was better educated APNs regarding stroke care. They have the potential to use this information to improve their care of stroke patients regardless of the setting. Another potential benefit is that participants may bring their knowledge to their organization to initiate or improve stroke care protocols for use in different practice settings.

Significance for nursing

The neuroscience specialty is the most challenging specialty for APNs due to the complexity of the physiological underpinnings. APNs play a significant role in providing stroke

care but, currently, certain barriers exist. Importantly, many strokes do not typically present with classical signs and symptoms (Appendix E) making diagnosis and timeliness of care difficult. Secondly, not all strokes occur in settings where a neuroscience nurse is present. In addition, many APNs do not feel confident to assume leadership roles in stroke care. The Stroke Clinical Order Pathway for APNs has the potential to improve all these areas, which is important for nursing and for patients.

With increased knowledge of the evidence-based care of stroke patients and understanding of the urgency of specific stroke care management APNs will be able to become more proficient in their clinical practice. APN in any practice setting will have the knowledge to begin implementing care immediately by ordering a CT scan and contacting the neuro staff for immediate implementation of care based on scan outcomes. Sound and evidence-based knowledge elevates practitioners' level of confidence, boosts their morale and helps encourage their development toward a leadership role in stroke care.

While the medical chief resident and neurology fellow usually function to provide department oversight, many hospitals and healthcare organizations now perceive APNs as their frontline responders in collaboration with the neurology department (Villanueva, 2008; NJSCC, 2017). In fact, studies have demonstrated that neuroscience APNs play a key role on the multidisciplinary stroke team and have tremendous ability to implement the evidence-based guidelines for stroke to provide high quality and efficient care to patients (Hill,2013). However, in most NJ hospitals, APNs are not recognized as lead members of the stroke team (NJSCC, 2017). Improving knowledge leads to increased confidence and ability to make strides as a leader in a particular clinical arena.

Evidence indicates that early instruction of the APN in disease specific care and empowering them with an evidence based clinical pathway has positive implications on patient care and advances the nursing role within the healthcare organization (Anderson et al., 2010; Green & Newcommon, 2006). The significance of this quality improvement educational project to both nursing and healthcare organizations is to empower the APNs within the healthcare system to initiate an evidence-based pathway for stroke management, and to become participants and leaders on stroke teams.

Literature Review

Theoretical foundation

Most healthcare organizations in NJ view APNs as midlevel providers although in almost every situation APNs are independently functioning professionals who work without supervision or any review by their collaborating physicians. APNs are educated to oversee holistic care for patients and to utilize all their nursing and critical thinking skills to achieve positive outcomes.

APNs working in acute care receive their basic education as masters prepared APNs, and then build their specific specialty knowledge through practice and continuing education. The theoretical framework for the SCOPE for APN project was developed using the *Novice to Expert* model of the nursing theorist Patricia Benner (Benner, 1984; Davis & Maisano, 2016) which proposes that nursing expertise improves over time and experience (Appendix F).

Benner's model of different levels of nursing competence revolves around the contributing factors garnered in their experiences such as practice setting (primary care, acute care or long-term care) and exposure to a disease specific population. Benner's theory was

developed to improve functioning of registered nurses, but her five levels of nursing competence can be applied to advance practice nurses as well (Gillespie & Paterson, 2009). Thus, a new APN employed as an APN for the first time or an experienced APN beginning work in a different setting or with a different patient population are both considered novice nurses. A novice nurse, per Benner's theory, is the lowest of five levels of nursing experiences that strongly influence their knowledge and competency.

According to Benner (1984), each stage is marked by a different level of clinical competence, so too for APN in any specialty. Novice APNs in stroke care have no experience in situations in which they are expected to perform. They are in their first year within this setting or with this population, and they have very limited ability to predict patient outcomes. The same novice APN, however, with a strategically designed educational program can gradually transform into an advanced beginner and eventually become competent and proficient in his/her practice (Davis & Maisano, 2016).

Advanced beginner APNs demonstrate marginally acceptable performance because they have had prior experience in actual situations, usually for one to two years. They have the ability to recognize recurring events and the ability to act upon them independently. Advanced beginner APN in stroke care may recognize where and how to use protocol guidelines but will still need to seek assistance from an experienced APN.

Competent APNs have been working in the same or similar position for two to three years. They are organized, efficient and have confidence in their abilities. They understand how they must react in most situations. APNs in stroke care are able to manage care based on past experiences, utilize stroke protocols and consider long term goals.

Proficient APNs perceive practice situations as wholes and understand them in terms of long-term goals. They see *the bigger picture* after 4-5 years in similar practice settings. They are able to view situations and manage or modify events and their outcomes instead of reacting to them. Proficient APNs in stroke care are able to look at the comprehensive care of the patient, and move beyond that to promote quality assurance, participate in educational sessions and recommend changes to systems in the work environment.

Expert APNs practice almost intuitively and are able to identify and modify situations without inefficient consideration. They perform fluidly and with great proficiency because of their acquired analytical ability garnered over years of practice in similar situations. Expert APNs in stroke care are able to initiate and implement the stroke clinical pathways in a fluid manner based on patient assessment. Expert APN are in a position to become lead stroke coordinators, educating, creating policies and developing an environment in which outstanding stroke care is seamlessly provided.

As a novice or beginner APN, APNs may experience some degree of lack of knowledge, unawareness and anxiety when faced with a challenging situation, but then the same APNs can gradually transform into experts in their practice (Davis & Maisano, 2016). SCOPE for APNs was developed to provide evidence-based education for APNs and was based on the concept of APNs functioning as leaders and critical thinkers. This evidence-based education project has the potential to enhance the practice of a novice/beginner APN by providing a firm foundation of information and knowledge regarding stroke care management, thus SCOPE was focused on not only APN working in neuroscience or stroke care, but also APN working on other units in acute care settings where improving their assessment and rapid use of the stroke clinical order pathway and core measures could save lives. Importantly, the information learned in SCOPE for APNs

coupled with time spent in the neuroscience specialty, will improve APN knowledge and confidence and assist them to develop the necessary clinical and leadership skills as they move along the continuum from novice to expert neuroscience nurses.

Empirical studies

Acute stroke management requires a focused, sequenced series of interventions that are time sensitive. Awareness of the pathophysiology of stroke, ever changing guidelines for stroke management as well as varying hospital protocols are a challenge for many clinicians. Even though APNs have the ability to support the smooth implementation of the treatment course, there are barriers in terms of hospital privileges, autonomy, role recognition and interdisciplinary communication gaps that can work adversely and add to the challenges (Anderson, Willson, Peterson, Murphy, & Kent, 2010).

Seehusen (2010) reported on a Cochrane review of 27 studies that met inclusion criteria, of hospitals using clinical pathways. The pathways in these studies were successful in reducing length of stay secondary to improved patient care, and thus reducing overall healthcare costs. Interestingly, one area where length of stay was not reduced was stroke rehabilitation. Whether this was related to time to initiation of core measures was not indicated.

Frangione-Edfort (2014) conducted a descriptive study that surveyed 79 healthcare professionals working in the field of stroke care in 34 NJ healthcare facilities. The purpose was to study compliance with processes and guidelines for patients with a diagnosis of stroke receiving care in the first 10 minutes of care, and with the stroke core measures. All facilities

were in the 87 percentiles or lower for compliance. The results indicated several reasons for lack of compliance: lack of education, lack of protocols, incomplete documentation, and lack of knowledge by health professionals. One of the recommendations was for greater use of APNs in stroke units.

It is a highly daunting task for acute care hospitals to maintain compliance with all 10 stroke core measures. The New Jersey Stroke Coordinators Consortium (NJSCC) was formed in 2007 to address this issue for every acute care hospital in New Jersey, especially those aiming to excel as primary or comprehensive stroke centers. The stroke teams in these facilities across the state have strived to create stroke protocols and increase the number of APNs on stroke response teams (Bowen, 2016; Censullo, Mokrcek, & Newmark, 2007). Yet, an unpublished survey by the NJSCC (2017) of NJ hospitals found that only 17% used licensed independent practitioners such as APNs to work with neurologists to determine treatment options for patients in the emergency room with a stroke diagnosis (Chukwunke, Sanfillippo, Dwyer, Ciacciarelli, & Singh, 2017).

Dalton (2013) used surveys and interviews in a cross-sectional study to understand the perception of the APN role by hospital clinicians such as junior doctors, nurses and other APNs in Great Britain. Four themes were identified: diverse definitions of the APN role between medical and surgical departments and the APN role during day compared to night, vagueness and ambiguity about the role overall, communication and education needs, and constraints and barriers in practice. The study revealed that more education was needed to emphasize how APNs can function within their full scope of practice.

There is wide agreement that nurses and APNs can perform in any disease specific area with the proper education and preparation. It can be in preventative healthcare or it can be a leadership position such as a Stroke/ Neuroscience APN (Davis & Wright, 2012; Gocan & Fisher, 2008). As noted by Frangione-Edfort (2014), one of the barriers to improved care is difficult and inadequate documentation. One way to empower APNs in autonomous roles is through focused education and support (Villanueva, Blank-Reid, Stewart-Amidei, Cartwright, Haymore, & Jones, 2008). Clinical decision support offers providers clinical knowledge and patient-specific information to enhance patient care decisions. An automated clinical decision support system was developed to prevent secondary strokes in veterans by providing clinical decision support that guides nurse practitioners and other healthcare providers in clinical practice guidelines. Outcomes showed a significant increase in documentation ($p < .05$) when protocols were accessible and convenient (Anderson et al., 2010).

Mainali et al. (2017) conducted a non-randomized quality improvement study to assess the feasibility of nurse run acute stroke protocols following a one-month educational phase. They examined the effectiveness of nurse education regarding stroke protocols in reducing the time from patient admission to administration of tissue plasminogen activator (tPA). The average time from admission to CT-scan was significantly reduced by 4.5 minutes ($p < .04$) with subsequent timely administration of tPA.

Rosswurm and Larabee (1999) reported on their effective model to improve evidence-based clinical practice through use of a systematic process. Kavanagh, Connolly and Cohen (2006) described the use of this model for implementation of the American Stroke

Association's Acute Stroke Program in a small acute care community hospital and compared patient care procedures before and after implementation of the program. There were 30 acute stroke patients in the pre-implementation group, and 41 post implementation. To improve communication among health care providers, a stroke team was developed, and consistent order sheets of the stroke core measures were developed. Patient care was improved with all measures above national benchmarks. This supports the use of standardized measures and education to improve patient outcomes. Although APNs were not part of the teams in this study, use of APNs has been supported as improving patient care (Anderson et al., 2010; Davis & Wright, 2012).

There is evidence in the nursing literature that an educational program created with evidence-based content for nurses actively working in stroke units can impact their practice and influence patient outcomes (Censullo, Mokracek, & Newmark, 2007; Edwards, 2006). While the complex care of a stroke patient requires a highly experienced professional with accurate clinical judgement, the volume overload in emergency rooms and concurrent critical patient demands can shift healthcare providers' attention leading to delay in treatment. A standard stroke care algorithm in such situations can assist APNs to provide care that can lead to better patient outcomes. Lack of a stroke clinical order set or any algorithm is commonly associated with non-adherence to all the required stroke core measures (Elder, Lemon, & Costello, 2015).

In a qualitative study, Rattray et al. (2017) conducted semi-structured interviews over a three-year period to examine the role of advance practice professionals (APN and PA) in stroke care at 11 Veterans Administration hospitals. Five of 11 facilities chose to staff the

stroke coordinator position with an advance practice professional (APP), an APN or PA. Analysis indicated that APP played an important role in coordinating evidence-based information and facility level approaches to acute stroke care, including creating clinical protocols and enhancing communication.

The outcome assessment in nursing practice is the key that provides evidence for accountability and improvement in the system of stroke care. Practice using stroke clinical pathways and the core measures are strongly linked and strengthen nursing's position in the care of stroke patients (Lindsay, Kelloway, & McConnell, 2005). The literature supports the important role of nursing in the care of stroke patients, and the need for education and practice to improve that role from novice to expert. A focused education for APNs can enhance the increase in knowledge and skills (Olaisen et al., 2014).

Methodology of the project

The SCOPE for APNs was a one-hour educational program, with a pre and post-test, and a program evaluation. The pretest for the APN served as a self-assessment for the APN to identify his/her role and level of understanding of stroke management before the education. The posttest provided an opportunity to self-assess his/her level of knowledge after the education session. An educational module was provided as a resource for future review and guidance in clinical practice.

The educational presentation was created using evidence-based information from peer-reviewed journals, as well as current stroke statistics, stroke core measures and literature from national organizations such as the American Heart Association (2017), Power et al.

(2015), and the Joint Commission (TJC, 2016). The New Jersey Stroke Program statistics as well as information about hospital stroke designation status was reviewed (CDC, 2017)

Phases of the Project

Phase I - Needs assessment

The need to improve rapid diagnosis and initiation of diagnostic tests is an issue identified by the DNP student, both as a clinical neuroscience nurse and as a member of the NJSCC. This issue, and the need to improve the knowledge base of APNs working in acute and primary care settings, was one of the many discussions held on an on-going basis at the NJSCC meetings. A survey by the NJSCC (2017) found that there was lack of a standardized protocol for stroke care among New Jersey hospitals. Most of the primary and comprehensive stroke centers adopted or created protocols based on AHA guidelines (2015) to comply with the core measures. When the DNP student approached members of the NJSCC regarding developing an educational program on stroke clinical pathway for APNs, there was agreement and support to create an educational presentation that could be used for APNs of all specialties so that every APN might gain knowledge about stroke care.

The needs assessment included a review of the stroke protocols from two major acute care hospitals, brainstorming questions during NJSCC meetings, and one-on-one conversations with various stakeholders such as neuroscience nurse practitioners and stroke coordinators representing primary as well as comprehensive stroke centers in New Jersey. The needs assessment also included review of the literature regarding the historical roots and current best practice recommendations for stroke care.

Phase II – Obtaining support from stakeholders

A stroke specialist APN was contacted and asked to serve on the Scholarly Project Committee in the role of mentor. This mentor was chosen for her stroke expertise, specifically for her years of experience as a clinical stroke coordinator at a major acute care hospital in northern New Jersey. Her DNP scholarly project was a descriptive survey about acute stroke treatments in New Jersey that determined the effectiveness of processes and guidelines for stroke patients receiving care in New Jersey acute care hospitals in 2010. She is a faculty member for DNP students at a well-known university in New Jersey and is a stroke subject matter expert. The mentor agreed to meet in person as needed, review the project, attend the educational sessions and provide guidance throughout the project.

An APN and stroke coordinator who is a founding member of the NJSCC was asked to act as an advisor to the project. Her knowledge of the history of stroke care, as well as her expertise in stroke care management was seen as valuable for the project. She agreed to assist wherever needed.

The DNP student discussed the design and methodology with fine details during the initial planning phase with the DNP faculty advisor, the project mentor as well as the APN advisor from the NJSCC. After meticulous planning of the project, approval was obtained from the DNP faculty advisor to conduct the SCOPE for APNs as a one educational presentation. The face-to-face meetings with the DNP faculty adviser at the university campus, electronic communications with the DNP faculty adviser, project mentor and APN advisor as well as attendance at professional nurse practitioner's meetings and brainstorming with members of the NJSCC shepherded the scholarly creation of this educational project.

Initial conversations were also held with NJSCC members, representing over 52 NJ hospitals, regarding use of their hospitals for implementation of the project. Many members expressed interest in hosting the project sessions.

Phase III- Implementation

Preparation of the educational material.

A power point presentation was prepared based on the review of current acute stroke management guidelines (Power et al., 2015), the stroke core measures (CDC, 2017; TJC, 2016) and recommendations for APN stroke care practice from the New Jersey Stroke Coordinators Consortium and American Association of Neuroscience Nurses (Villanueva et al., 2008). The power point presentation as well as the pre-test and post-test was reviewed multiple times with the mentor, the DNP faculty adviser and the APN adviser from the NJSCC. All the edits and suggestions were incorporated into the final SCOPE for APNs power point presentation.

To value the time and commitment of the participants, the educational presentation was submitted and approved for 1.0 continuing educational (CE) credit to the American Association of Nurse Practitioners. Approval was sought from the faculty adviser prior to submission for CE approval.

Pre-test and post-test questions were developed using the content outline under the advisement of the mentor, the DNP faculty adviser and the NJSCC APN advisor. Ten multiple-choice questions were developed based on the APN interventions that are required to meet compliance with the stroke clinical pathway and stroke core measures. The same ten questions were asked in the pre-test and post-test (Appendix C). All the materials were reviewed with and

approved by the DNP faculty adviser, the mentor and the NJSCC APN advisor prior to the SCOPE for APNs presentation.

Presentation Sites:

Once the materials for SCOPE were ready and the DNP faculty adviser approved the timeline, the marketing of the SCOPE for APN was started to ensure timely and adequate participation. APNs from every possible specialty were encouraged to participate in this educational session. The initiative was not limited to one practice site, and the goal was to offer SCOPE for APNs to as many APNS as possible. The sessions were open to any APN practicing in the state of NJ, hence it was hoped that it could be administered at any site where an APN participant could commit to attendance.

The ten hospitals in northern NJ that had previously expressed interest in hosting the SCOPE for APNs educational session were again contacted. One hospital agreed to host the program, and two presentations were held at that facility. Because the program offered CE credits from an outside speaker, the other acute care facilities were unable to agree to the request within a reasonable timeframe. Other venues were then explored. A third presentation was held at a community center in northern NJ, and a fourth was held at the NJ Hospital Association in central NJ.

Flyers (Appendix G) were developed by the DNP student and distributed to several sites: the NJ State Nurses Association, 10 northern NJ hospitals, including the one where two sessions were held. Information regarding the program was also posted on the websites of the Forum of Nurses in Advanced Practice and the American Association of Nurse Practitioners. Flyers were emailed to nurse leaders at the 10 hospitals in northern NJ who agreed to post the flyers in areas

where they were visible to APNs. They were also shared with NJSCC members, the project mentor and the APN advisor. A timeline was developed to complete the presentations before February 2018.

Project Presentation:

The first session of the SCOPE for APNs was conducted on November 28, 2017, and subsequent sessions were conducted in December 2017, January 2018 and February 2018. Presentation standardization was maintained by using the same power point presentation and the same narrative notes under each power point presentation slide.

At every presentation, APNs registered by signing their names on a numbered registration form, and then a pre-test was assigned with their corresponding registration number. Each participant returned the pre-test before the actual educational presentation began. Instructions were given to fill out both the pre-test and post-test without any discussion among the participants. Each participant was also asked to sit for the entire educational session. Numbered post-tests were distributed and collected at the end of the program. Pre-tests and post-tests for each participant were then stapled together to prevent the loss or mismatch and were secured in a closed envelope. APN were requested to self-identify their level of expertise in stroke care as per Benner's model. Additionally, an anonymous program evaluation was provided to each participant to rate the presentation content, style and speaker's ability to disseminate the education. CE certificates (Appendix H) were distributed on completion of the post-test and program evaluation.

Project Outcomes

Quantitative.

This project utilized the simple pre-test post-test comparison to see if there was any difference in the scores. A total of 55 nursing professionals attended the SCOPE for APNs at four separate sessions between November 2017 and February 2018. Once all the sessions were completed, the pre-tests and post-tests were matched and stapled together for accurate review. Out of 55, six pretest posttest forms were excluded as the forms were incomplete, either the post-tests were missing, or the pre-test and post-test questions were not answered completely. Finally, 49 pre-tests and post-tests were evaluated and calculated for the score.

Each pre-test and post-test was reviewed thoroughly. The pre-test as well as the post-test answers were matched with the answer key and the answers were marked correct (C) or incorrect (I). The correct answers were equivalent to 'one' (1) point while the incorrect answers were equivalent to 'zero' (0) points, for a possible score of 10 points.

After scoring the pre-tests and post-tests, the scores were carefully checked twice for accuracy and entered in electronic form into SPSS version 24. The data were analyzed and statistical calculations for mean, median, mode and comparison between pre-test and post-test were performed (Table 1).

A separate spreadsheet was created to understand the participation of different APN specialties (Table 2; Graph 1). There were 28 APN participants. Only 16 indicated their APN certification. The majority were Adult/Gero (N=9), six were Family Nurse Practitioners, and one was a Pediatric Nurse Practitioner. Four APN worked in stroke care, four in critical care, and one each in administration, women's health or education. One specialty area was not given. There were 21 Registered Nurses (RN) participants from different specialties. Of these, thirteen indicated that they worked in stroke care areas. Additionally, the APNs self-identified their level of expertise based on the Benner's Model of Novice to Expert levels. Out of 28 APNS, 4 APNs

considered themselves as 'Expert' while 2 APNs considered themselves proficient. 7 self-identified themselves as Advanced beginners, 9 identified themselves as Competent and 6 considered themselves as a Novice APN.

Table 1 reveals the pre and post-test results. The pre-test mean score was 7.16 with a standard deviation of 2.154. The post-test mean score was 8.65 with a standard deviation of 1.362. A paired samples t-test found a statistically significant difference between pre- and posttest scores ($p < 0.000$) with a 95% confidence interval for the difference in mean scores.

Participants completed a program evaluation (Appendix I). Overall, the participants found the program useful. They found the presenter knowledgeable (100%), the program information cohesive (98.1%), and the teaching methods appropriate (98.1%). Importantly, over 95% of participants strongly agreed that the program increased their current knowledge and 95% would recommend it to a colleague.

Qualitative.

Stroke care has substantially evolved over the past 10 years and so has the APN role. APNs have an opportunity to be leaders in this neuroscience specialty. APNs in stroke care can empower their role through the use of disease specific stroke clinical order pathways that guide interventions. Additional learning has the ability to improve practice in the clinical role based on sound evidence-based knowledge.

The SCOPE for APNs is an educational reference for APNs who may want to advance their career as a neuroscience nurse practitioner. With new, advanced technologies emerging in stroke care, such as Tele stroke and web-based consultation, the potential for APNs in stroke care is limitless.

At the end of the program, participants of the SCOPE for APNs verbalized that they had an increased awareness of stroke care and improved knowledge about stroke clinical pathways and core measures. Several who worked in stroke and emergency care were enthusiastic about using their new knowledge in the clinical setting and sharing this information with colleagues.

Several participants also verbalized that this program had helped them recognize their potential to excel in stroke care. Several participating APNs recognized the opportunities to develop their role as a critical thinker and leader in stroke care. It was also mentioned that the SCOPE for APNs would be an excellent orientation guide or a resource on the stroke unit for new APNs and RNs.

Project implications.

SCOPE for APNs has the potential to provide a clear guideline for management of a complex diagnosis such as stroke. According to Benner, APNs can develop from a novice level to expert through practice and education. As a disease specific program, utilizing clear, concise clinical steps, a novice APN can see the connection of this program to specific patients. By continuing to manage patients with strokes in this orderly evidence-based method, and by continuing to improve their knowledge through programs such as SCOPE for APNs, they will be able to easily move from novice to advanced beginner and eventually to expert.

The sample size for this quality improvement initiative was small which allowed time for the DNP student to answer questions and have a dialogue with participants rather than just a didactic session. Additional sessions, perhaps round table discussions would be a good adjunct for future SCOPE for APNs presentations. An analysis of post-test score comparison between

experienced Stroke APNs and APNs from other specialties may also guide the future educational programs about Stroke.

There is a tremendous opportunity to refine this educational module based on the feedback and responses from the participants. Ideally, SCOPE for APNs as an educational module across the state of NJ could be instrumental in creating a standardized stroke clinical order pathway that is uniform across all healthcare organizations in the state. As a member of the NJSCC, and an actively practicing neuroscience APN, the DNP student has an opportunity to participate in such a strategy to improve stroke care.

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Appendix A: Stroke Clinical Order Pathway

Emergent	Critical	Acute	Discharge
Last time known well Blood sugar BP	Airway Intubation Stabilize the spine	Post altepase management Transfer	Antiaggregates Antithrombotics anticoagulants
CT Scan First CBC, Coagulation profile, BMP, Cardiac markers,	NPO Prevent MI, HF, Aspiration Pneumonia or PE	MRI Carotid doppler Echo Stress test	Antihypertensives Statins antidiabetics Supplements Smoking cessation
Altepase inclusion/ exclusion criteria	Candidate for endovascular therapy	Cardiology consult PT/OT/Speech consult	Rehabilitation Home care Support group Follow up with Neuro/physiatrist
Dysphagia screening	Communicate with interdisciplinary	Orders after 24 hours and review results	Consider a family meeting

Expediting care through Clinical Pathways

- Evaluate fast, expedite first diagnostic is CT Head –Gold standard to differentiate between ischemic and hemorrhagic stroke.
 - MRI Brain (Follow up diagnostic) Collaborate with Radiology for faster results.
 - CBC, CMP, Cardiac Markers ,Lipid panel,HgA1C (For diabetics)
 - Consult with Ed MD, interdisciplinary to discuss treatment plan. Involve primary RN
 - Consult with Neurologist, Consult with cardiologist, Consult with Physiatrist
 - Carotid doppler, Echo and Stress Test
 - Order antithrombotic/anticoagulant within 24 hours
 - Order consult for PT,OT, Social service and Case Management
 - Documentation specialists, RN and Physician documentation improvement.
 - Data abstraction needs, familiarity with the target data capture.

Based on AHA/ASA focused update of the 2013 guidelines for the early management of patients with acute ischemic stroke regarding endovascular treatment: A guideline for healthcare professionals from the American Heart Association/American Stroke Association Stroke, 46, pp. 3020-3035 Retrieved from <https://www.ahajournals.org/doi/10.1161/STR.0000000000000074>

Appendix B: Stroke Core Measures

Stroke Core Measures

- ▶ **STK-1 Deep Vein Thrombosis (DVT) Prophylaxis**
- ▶ **STK-2 Discharged on Antithrombotic Therapy**
- ▶ **STK-3 Patients with Atrial Fibrillation/Flutter Receiving anticoagulation Therapy**
- ▶ **STK-4 Thrombolytic Therapy Administered**
- ▶ **STK-5 Antithrombotic Therapy By End of Hospital Day 2**
- ▶ **STK-6 Discharged on Statin Medication**
- ▶ **STK-7 Dysphagia Screening**
- ▶ **STK-8 Stroke Education**
- ▶ **STK-9 Smoking Cessation / Advice / Counseling**
- ▶ **STK-10 Assessed for Rehabilitation**

Adapted from the The Joint Commission. (2018). Facts about Joint Commission Stroke Certification. Retrieved From https://www.jointcommission.org/facts_about_joint_commission_stroke_certification/ and Centers for Disease Control and Prevention. (2017). *Stroke* .Retrieved from <https://www.cdc.gov/stroke/>

Appendix C: Pre-test and post-test with answer keys

SCOPE for APNs (Stroke Clinical Order Pathways Education)

PRE-TEST/POST-TEST

APN specialty _____ Credentials _____

Age _____ Gender _____ Date of education _____

Please choose one correct answer. Circle the alphabets a, b, c or d.

1. Two major categories of stroke are

- a. **Ischemic and hemorrhagic**
- b. Thrombotic and embolic
- c. Warning stroke and mini stroke.
- d. Lacunar infarction and transient ischemic attack (TIA)

2. Two challenges outside the hospital setting that are strongly associated with the Stroke Management are,

- a. Absence of state policies and funding.
- b. **Low public awareness and prolonged transport time.**
- c. Lack of support from healthcare organization for community education.
- d. Stroke is not a major threat compared to other chronic diseases.

3. The most important data point to determine the treatment trajectory for stroke patient is.

- a. History of Skin surgery
- b. Family history
- c. **Last time the patient was well**
- d. History of Atrial Fibrillation

4. Dysphagia screening or simple swallow on arrival and prior to any medication or food is critical intervention for any patients with suspected stroke because

- a. It is the hospital protocol
- b. Every stroke patient has some degree of dysphagia
- c. **Hospital Acquired Pneumonia is associated with a greater than 5-fold increase in mortality.**
- d. It eliminates the need for the comprehensive swallow evaluation in Stroke patients.

5. Altepare therapy recommendations based on last time known well is

- a. Not suggested if patient arrived after 60 minutes.
 - b. Suggested within 30-60 minutes of time of onset
 - c. Recommended within 3 hours and suggested within 4.5 hours.**
 - d. Not suggested between 3 and 4.5 hours

6. APNs focus during critical/acute stroke management in critical phase is to prevent all except
 - a. Early thrombolysis**
 - b. Myocardial Infarction
 - c. Pulmonary Embolism
 - d. Aspiration Pneumonia

7. The recommendation for the antithrombotic therapy for stroke patients who are not eligible for alteplase , IV heparin or oral anticoagulation therapy is
 - a. Start Daily Aspirin -325 mg –first day followed by 150 mg-325 mg /day**
 - b. Start subcutaneous anticoagulant for 15 days
 - c. Initiate DVT prophylaxis during the hospitalization
 - d. Consider coagulation study to monitor PT-INR daily and observe for signs and symptoms of DVT.

8. All of the following are considered as approved treatment plan for DVT prophylaxis except
 - a. Pneumatic compression stockings
 - b. Anticoagulants -IV, SQ or PO
 - c. Factor X inhibitor
 - d. Clopidogrel bisulfate**

9. Clinical Order Pathways are designed incorporate all the following elements except
 - a. Evidence based
 - b. Clinician/APN driven
 - c. Patient Education
 - d. Financial benefits through medical insurance**

10. What is the important intervention required by APN to prevent secondary stroke in a patient?
 - a. Decrease physical activity
 - b. Avoid antiplatelet/antiaggregant medication
 - c. Prescribe antithrombotic, antihypertensive and statins**
 - d. Advise family to assist with every ADLS for the patient.

Appendix D: Program Evaluation



Stroke Clinical Order Pathways Education(Scope) for APN

Activity ID # 17112002 Date: - - . Circle the number that best fits your evaluation of this program:

4=strongly agree 3=somewhat agree 2=somewhat disagree 1=strongly disagree

1. As a result of my participation in this activity, I am better able to:	
1. Identify and describe the current Stroke core measures and guidelines.	4 3 2 1
2. Identify and describe current APN role in choosing appropriate pharmacological agent and other orders pertinent to Stroke care.	4 3 2 1
3. Describe Stroke and Stroke Clinical Order Pathways including pharmacological choices that can enhance the APN role as leader and critical thinker.	4 3 2 1
4. Identify and describe the improvement in quality of care and patient outcomes tied to APN practice by using SCOPE.	4 3 2 1
2. The teaching methods used were appropriate to the objectives.	4 3 2 1
3. Speaker Evaluation. The following speaker(s) demonstrated experiential knowledge of the topic. I. Varsha Singh MSN, APN	4 3 2 1
4. The individual objectives/content topics were cohesive with one another.	4 3 2 1
5. The content provided a fair and balanced coverage of the topic.	4 3 2 1
6. Speaker(s) fully disclosed any conflict of interest and discussion of off-label usage of medication and/or medical devices at beginning of, or during the presentation.	4 3 2 1
7. The content was free of commercial bias.	4 3 2 1
8. I would recommend this activity to my colleagues	4 3 2 1
9. This activity enhanced my current knowledge base	4 3 2 1

10. What, if any, recommendations would you like to share for future improvement of this activity?

11. What topics would you like to be offered in the future?

1. _____ 2. _____

Appendix E: Signs and symptoms of stroke

SIGNS AND SYMPTOMS OF STROKE

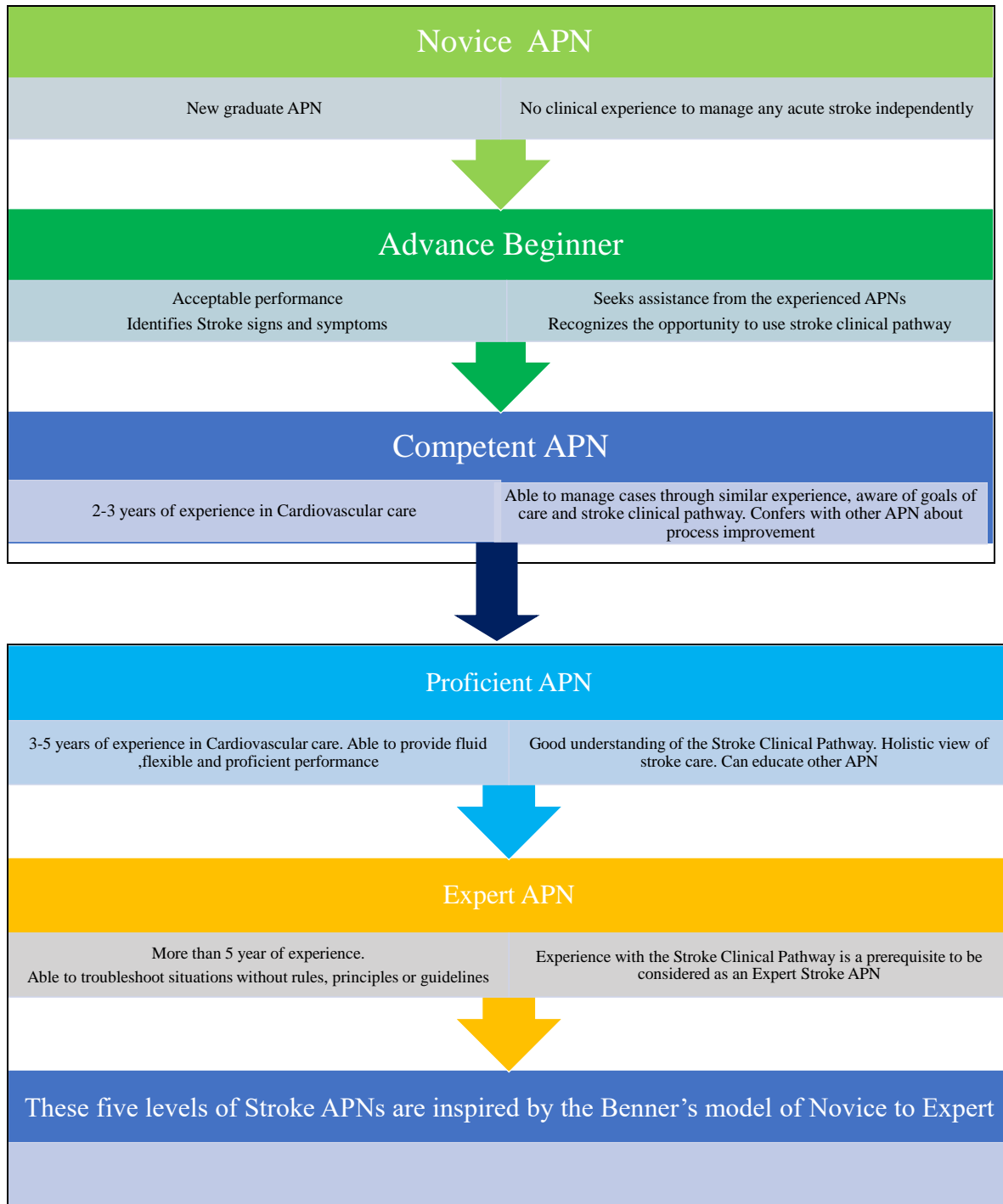
B.E.F.A.S.T.

Sudden onset...

- ▶ **B**ALANCE, dizziness, loss of coordination, leaning to one side
- ▶ **E**YES: blurred vision, double vision or loss of vision
- ▶ **F**ACIAL ASYMMETRY: facial droop
- ▶ **A**RM/ **L**EG: weakness, numbness; clumsiness on one side of body
- ▶ **S**PEECH: slurred speech, garbled speech, inability to express oneself, inability to find right word
- ▶ **T**IME: What time did symptoms start?
(Time to activate code stroke immediately)


Adapted from the The Joint Commission. (2018). Facts about Joint Commission Stroke Certification. Retrieved From https://www.jointcommission.org/facts_about_joint_commission_stroke_certification/ and Centers for Disease Control and Prevention. (2017). *Stroke* .Retrieved from <https://www.cdc.gov/stroke/>

Appendix F: Benner’s Model - Novice to Expert/Stroke APN



Based on the Benner’s model of levels of nursing. Benner, P. (1984). From novice to expert, excellence and power in clinical nursing practice. Menlo Park, CA: Addison Wesley Publishing Company

Appendix G: SCOPE for APNs Flyer



FNAP
FORUM OF NURSES IN
ADVANCED PRACTICE
OF THE
NEW JERSEY STATE
NURSES ASSOCIATION

Forum of Nurses in Advanced Practice
OF THE
NEW JERSEY STATE NURSES ASSOCIATION

uniting, promoting and advocating for advanced practice nursing

Stroke Clinical Order Pathways Education (SCOPE) for APNs

6:30 p.m.	Registration/Check -In /Pre-test
7:30 p.m.	Presentation- Varsha Singh MSN, APN-C
8:30p.m.	Post Test -Q and A /Evaluation

RSVP - By December 5, 2017

varsha.singhapn@gmail.com

This activity is approved for 1.0 contact hour(s) (.5 Pharmacology) of continuing education
by the American Association of Nurse Practitioners. (AANP) Approval Number: 17112902

www.aanp.org

Appendix H: Continuing Education Certificate

FNAP Forum of Nurses in Advanced Practice
FORUM OF NURSES IN
ADVANCED PRACTICE
NEW JERSEY STATE
NURSES ASSOCIATION
OF THE
NEW JERSEY STATE NURSES ASSOCIATION
uniting, promoting and advocating for advanced practice nursing

THIS IS TO CERTIFY THAT


HAS SUCCESSFULLY COMPLETED


Stroke Clinical Order Pathways Education(SCOPE) for APN

CONDUCTED BY: FNAP (FORUM OF NURSES OF ADVANCE PRACTICE) **Date:** 12/07/2017

Address: NJ,07090 **Approval Number:** 17112902

Venue: -New Jersey
Contact Hours: 1.0 -(0.5 Pharmacology)




Varsha Singh MSN, APN
Nurse Planner

This activity is approved for 1.0 Contact hour(s) of continuing education (which includes 0.5-hour(s) pharmacology) by the **American Association of Nurse Practitioners**. This activity was planned in accordance with AANP Accreditation Standards and Policies.

Appendix I: Program Evaluation Report

OVERALL EDUCATIONAL EVALUATION SUMMARY

Stroke Clinical Order Pathways Education (SCOPE) for APN

4=strongly agree 3=somewhat agree 2=somewhat disagree 1=strongly disagree

	4	3	2	1
1. As a result of my participation in this activity, I am better able to:				
1. Identify and describe the current Stroke core measures and guidelines.	91.9%	8.1%	0%	0%
2. Identify and describe current APN role in choosing appropriate pharmacological agent and other orders pertinent to Stroke care.	90.3%	10.7%	0%	0%
3. Describe Stroke and Stroke Clinical Order Pathways including pharmacological choices that can enhance the APN role as leader and critical thinker.	91%	9%	0%	0%
4. Identify and describe the improvement in quality of care and patient outcomes tied to APN practice by using SCOPE.	90.5%	9.5%	0%	0%
2.The teaching methods used were appropriate to the objectives.	98.1%	1.9%	0%	0%
3.Speaker Evaluation. The following speaker(s) demonstrated experiential knowledge of the topic. 1.Varsha Singh MSN, APN	100%	0%	0%	0%
4. The individual objectives/content topics were cohesive with one another.	98.1%	1.9%	0%	0%
5. The content provided a fair and balanced coverage of the topic.	91.9%	8.1%	0%	0%
6. Speaker(s) fully disclosed any conflict of interest and discussion of off-label usage of medication and/or medical devices at beginning of, or during the presentation.	99.05%	0.95%	0%	0%
7. The content was free of commercial bias.	100%	0%	0%	0%
8. I would recommend this activity to my colleagues	95.2 %	2.7%	2.1%	0% 0%
9. This activity enhanced my current knowledge base	95.2 %	2.7%	2.1%	0% 0%

Table 1: Pre-test – Post-test analysis

Table 1:		Pre-test – Post-test analysis					
			Statistic	Bias	Std. Error	95% Confidence Interval	
						Lower	Upper
N	Valid	Pre-test scores	49	0	0	49	49
		Post-test scores	49	0	0	49	49
	Missing	Pre-test scores	0	0	0	0	0
		Post-test scores	0	0	0	0	0
Mean	Pre-test scores	7.16	.04	.29	6.57	7.75	
	Post-test scores	8.65	.02	.21	8.29	9.04	
Std. Error of Mean	Pre-test scores	.308					
	Post-test scores	.195					
Median	Pre-test scores	8.00	-.34	.48	7.00	8.00	
	Post test scores	9.00	-.05	.22	8.00	9.00	
Mode	Pre-test scores	8 ^a					
	Post-test scores	10					
Std. Deviation	Pre-test scores	2.154	-.034	.173	1.730	2.492	
	Post-test-scores	1.362	-.030	.139	1.055	1.620	
Sum	Pre-test scores	351					
	Post-tests cores	424					
a. Multiple modes exist. The smallest value is shown							
b. Unless otherwise noted, bootstrap results are based on 100 bootstrap samples							

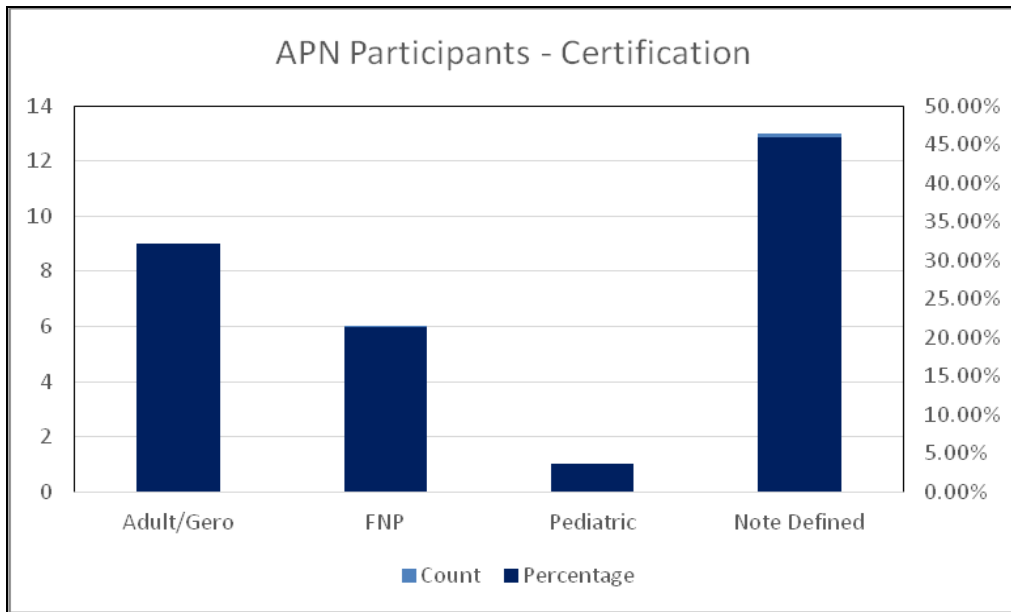
Paired Samples Correlations								
		N	Correlation	Sig.	Bootstrap for Correlation ^a			
					Bias	Std. Error	95% Confidence Interval	
						Lower	Upper	
Pair 1	Pre-test scores & Post-test scores	49	.779	.000	-.005	.043	.691	.851

a. Unless otherwise noted, bootstrap results are based on 100 bootstrap samples

Table 2: APN Certification and Specialty

APN Certification	Count	Percentage
Adult/Gero	9	32.14%
FNP	6	21.42%
Pediatric	1	3.57%
Not Defined	13	46%
APN Specialty		
Critical care	4	14.28%
Stroke	4	14.28%
Women's health	1	3.57%
Admin	1	3.57%
Education	1	3.57%
Not Defined	1	3.57%

Graph 1: APN Certification



Graph 2: APN Specialty

