Improving Stroke Nursing Orientation through a Stroke Learning Resource

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A practicum report submitted to the

School of Graduate Studies

In partial fulfillment of the requirements for the degree of

Master of Nursing

Memorial University of Newfoundland

December 2018

St. John’s, Newfoundland and Labrador

Abstract

Background: Canadian Stroke Best Practice recommends that patients suffering from an acute stroke be treated on an interprofessional stroke unit with recommended levels of medical, nursing, physiotherapy, occupational therapy, speech language pathology, social work, and dieticians. Potential gaps in knowledge and complexity of required care highlight the need for more nursing education. There is currently a lack of stroke specific resources available for nurses during orientation. **Purpose:** To develop a stroke learning resource which highlights Canadian Stroke Best Practice Recommendations, interprofessional roles and responsibilities, and the essential nursing role on an acute stroke unit. **Methods:** The learning resource was developed based on information obtained through a review of the literature, consultations with key professionals, and an environmental scan of stroke resources available in four Atlantic provinces. **Results:** A learning resource that highlights important information related to the care of patients who have suffered a stroke was developed. It contained stroke background information, including warning signs for strokes, stroke types, risk factors, and deficits based on brain regions. The resource focuses on best practice stroke care including the importance of excellent collaboration of nursing with the members of the interprofessional team. Images, quizzes, and role play associated with stroke care were added to the resource to improve nursing orientation and to optimize patient care. **Conclusion**: The resource would be useful as a self-study tool to prepare nurses to work on a stroke unit. It could be shared with orientating nurses and it could be useful for experienced nurses to mentor others which could translate into better patient care in this area**.**

Acknowledgements

Furthering my education required hard work, dedication and the support of family and friends. I would like to acknowledge several individuals who have assisted me throughout the past three years.

I would like to thank my practicum supervisor, Jill Bruneau, for her guidance, encouragement, patience and assistance throughout my practicum. You helped guide me and encourage me when it seemed like things would never get done. Thank you for everything.

I would like to acknowledge the nursing staff on 4SB whom I worked with for years and who took the time to complete my questionnaire and interviews. Your expertise helped guide the creation of this resource.

I would also like to thank my husband, Philip Grace, who has been endlessly patient with my interest in furthering my education. Thank you for listening to my complaints, helping keep me on track and always encouraging me to push further.

Table of Contents

Acute stroke care requires highly knowledgeable nursing staff with the necessary background, critical thinking, and clinical skills to provide optimal stroke care. With no stroke specific orientation on the acute stroke unit at the Health Science Centre in St. John's, NL there is a gap in stroke nursing knowledge. This gap in stroke knowledge can be filled by developing and introducing a stroke learning resource. This learning resource will promote Stroke Best Practice Recommendations for nursing to optimize patient care outcomes post-stroke.

Background

The Public Health Agency of Canada (PHAC) defines stroke as an acute neurological injury resulting from either an ischemic cerebral infarction, lack of blood flow, or brain hemorrhage, bleeding on the brain (2016). Initial signs of stroke include: dizziness, visual problems, difficulty moving or feeling one side of the body, problems speaking or comprehending speech, and sudden headache (PHAC, 2016). If symptoms last for less than an hour it is known as a transient ischemic attack (TIA), or mini-stroke which is often a sign of future concern (PHAC, 2016).

A stroke is the leading cause of adult disability in Canada, and the third leading cause of death, with approximately 10,000 Canadians dying each year from stroke and over 400,000 Canadians living with stroke related disability or dysfunction (PHAC, 2016). Stroke risk factors include age, smoking, diabetes, obesity, high cholesterol, stress, and physical inactivity (Heart & Stroke Foundation (H&S), 2017). Age is the biggest risk factor for stroke and the population is aging, while at the same time strokes are becoming more common in younger people meaning that the stroke population, those requiring rehabilitation services, and those living with disability will continue to rise over the next

20 years (H&S, 2017). A specialized acute stroke unit which employs interprofessional team members trained in stroke care can optimize rehabilitative care goals reducing mortality, length of hospital stay, increases functional independency and improves quality of life post-stroke (Hebert et al., 2016).

Current Issue

There is currently no stroke specific orientation for nurses joining the acute stroke unit on 4SB at the Health Science Centre in St. John's, NL. The unit services have changed to include Stroke Best Practice Recommendations, increased interprofessional staff ratios, an emphasis on rehabilitative care to optimize patient care outcomes, and a focus on early rehabilitation and discharge planning. Though these services have been implemented into the unit there was no change in orientation practices, and training has been left to the senior staff mentoring nursing staff new to the unit.

Proposed Solution

The purpose of this practicum is to develop a learning resource containing pertinent Stroke Best Practice information, interprofessional roles and responsibilities, especially nursing roles and how they interconnect with other disciplines to ensure nursing staff are well educated and can optimize patient care and recovery. The learning module can be utilized during orientation by nurses mentoring students or as a self-study guide to improve stroke knowledge. The resource will include stroke background information and images, especially in relation to stroke deficits or disabilities related to brain region. It will highlight Stroke Best Practice Recommendations which nursing staff are responsible for implementing and understanding. Interprofessional roles, responsibilities, and how they interconnect with nursing roles will also be included with

an emphasis on nursing roles. The resource will also include quizzes periodically throughout to measure learning and a role play exercise to educate nursing staff on aphasic communication difficulties and ways to provide effective communication for those with these disabilities.

The overall goal of this practicum project was to develop a learning resource aimed at improving orientation for nursing entering the stroke unit. A perceived gap in current stroke knowledge impacts Stroke Best Practice and lessening this gap in knowledge can improve nursing care and optimize patient outcomes.

Practicum objectives

The objectives of my practicum were as follows:

1. To identify and meet with the nurses and the members of the stroke team to determine their learning needs in relation to stroke care.
2. To determine relevant content related to stroke care best practices, for inclusion in a learning resource tool.
3. To develop a learning resource for the nursing care of stroke patients within an interprofessional team environment.
4. To demonstrate the various advanced practice nursing competencies, such as research, leadership and consultation & collaboration.

The following practicum report will provide an overview of the methods, discuss the literature review, describe the consultation process and environmental scan, and finally, present the learning resource. Following this, a review of the advanced nursing

competencies that have been demonstrated through the completion of this project will be presented.

Overview of Methods

Development of the stroke learning resource required a critical review of the literature, consultations with key stakeholders, and an environmental scan of current stroke resources available in the Atlantic provinces. A literature review was required in order to: 1) identify current literature surrounding Stroke Best Practice Recommendations for rehabilitation; 2) determine whether there is a gap in stroke nursing knowledge; 3) identify stroke interprofessional team members roles and responsibilities; 4) identify the nursing role in stroke care; and 5) identify frameworks that can be used to guide the development of the learning resource. Information from the literature review was used to guide interviews with key stakeholders, in the creation of the questionnaires, as well as the content for the learning resource.

The consultation process included interviews with key stakeholders and questionnaires administered to the staff on the acute stroke unit. The purpose of the interviews and questionnaires was to identify current stroke orientation, practice protocols on the acute stroke unit, interprofessional roles and responsibilities, and staff opinions on effective teaching and learning strategies. Interviews were conducted with the nursing manager, clinical educator, stroke coordinator, and nursing staff to gain insight from managerial, administration, and frontline staff of the acute stroke unit. The questionnaires were administered to the interprofessional team members on the acute stroke unit to gain insight from professionals in current practice.

An environmental scan was conducted of all websites and resources available in the Atlantic provinces to determine current stroke resources which could be utilized in the development of the learning resource. Current utilization of resources were summarized for each province to determine commonalities and to obtain any organizational evaluation of these resources. Resources were evaluated for pertinent stroke information, interprofessional roles and responsibilities, Stroke Best Practice Recommendations, and the nursing role in optimizing stroke care. These resources and information were then used to assist in the development of the stroke learning resource.

Summary of Literature Review

A literature review was conducted to identify current stroke research on stroke care, stroke best practice, stroke rehabilitation, interprofessional responsibilities, nursing stroke care, and effective teaching and learning strategies. Literature summary tables were also constructed to help analyze the studies included in the review. A copy of the literature review and summary tables are available in Appendix A.

Search Strategy

An electronic search of the current literature was conducted between January-March 2018. The primary research databases explored included CINAHL, Cochrane Library, PubMed, and DynaMed. These websites were accessed via Memorial University of Newfoundland's online library. Inclusion criteria included health-related articles, primarily nursing, English language, and stroke-focused. Articles were excluded if they were duplicates, language other than English, and health care issues other than stroke. Key words and topic searched were "stroke", "best practice", "knowledge gaps", "nursing stroke care", and "stroke education". Articles which fit these criteria and topics were

analyzed for study strength and quality using the Public Health Agency of Canada Critical Appraisal Tool Kit and the Joanne Briggs Institute Qualitative Assessment and Review Instrument (JBI-QBRI).

Twelve articles ultimately met the inclusion and exclusion criteria and were selected to be included in the review. Nine studies in the review were qualitative: five mixed-methods, one literature review, one case-study study, and two exploratory research. Three studies were quantitative: two pre-post design, and one non-randomized controlled trial.

Evidence of Knowledge Gaps Related to Stroke

Registered nurses must assess and identify risks, support their patients, constantly modify their plan of care, effectively manage multiple stroke patients, and be an active member of the interprofessional team. This range of roles in addition to the complex nature of stroke care creates a complex nursing environment which highlight potential gaps in stroke knowledge.

Stroke patients are placed on anticoagulation drugs to assist with clots or to prevent future clots, therefore it is important for nurses to have significant knowledge on anticoagulation medications. The literature highlights that 50% of nursing staff did not know the appropriate dose or timeframe for administrating the clot-busting drug TPA for ischemic stroke (Harper, 2006). Fifty-five (55%) of nurses in Harper (2006) study did not know that aspirin is recommended within 48 hours for ischemic stroke but not hemorrhagic while 57% of participants in Ferguson et al. (2016) study did not know the risks and benefits of anticoagulation drugs. Another 48% of participants did not know the possible interactions of aspirin or warfarin with ibuprofen and topic salicylates such as

increased risk of gastrointestinal bleeding (Ferguson et al., 2016). This shows a general lack of knowledge on stroke anticoagulation medications.

The literature also highlighted a general lack of knowledge on stroke assessment and treatment. A mixed methods assessment project developed in Ontario utilized pre-online and post-online questionnaires and focus groups to rate participants confidence in caring for stroke patients (Carter, Rukholm, & Kelloway, 2009). This study showed that only half of the participants indicated average confidence in providing care. Harper (2006) study indicated that 100% of participants lacked the knowledge surrounding temperature and blood pressure requirements in stroke care. While Barrere, Delaney, Peterson, & Hickey's (2010) needs assessment identified that nursing staff indicated a need for review of basic stroke care, patient teaching, and the nursing role on the interprofessional team. Fifty-seven (57%) of nursing staff stated that prior knowledge did not provide adequate skill, while 84% of participants in a pre-program assessment reported a lack of knowledge as a barrier to consistent stroke care (Long, Kneafsey, Ryan, & Berry, 2002; Reynolds, Murray, McLennon, & Bakas, 2016).

These various studies highlight the knowledge gaps in different aspects of stroke care, whether it is medication knowledge, stroke care protocols, nursing confidence in providing care, nursing education, or the role of nursing on the interprofessional team. Nurses identified lack of knowledge, confidence, and the complexity of strokes as barriers to optimizing care.

Novice Nurses' Challenges

Another major aspect discussed in the literature is how novice nurses entering a new clinical field have identified three main challenges which influence their

expectations and experiences when starting clinical practice: 1) functional competency, 2) communication problems, and 3) leadership challenges (Hezaveh, Rafii, & Seyedfatemi, 2014; Silva et al., 2010; Dyess & Sherman, 2009). Functional competency requires to a lack of accuracy and confidence in clinical skills such as identifying veins, blood collecting and intravenous insertion (Hezaveh et al., 2014). Communicative problems refer to nurse's trouble communicating with staff, patients and families due to lack of self-esteem and confidence while novices (Hezaveh et al., 2014; Dyess & Sherman, 2009). Finally, novice nurses have issues with leadership such as ineffective time management, inability to delegate tasks, ineffective collaboration with team members, and inability to take responsibility for assignments (Hezaveh et al., 2014; Silva et al., 2010). Each of these challenges can be improved with effective knowledge, time and experience which can be shared by a nurse mentor.

Complexity of Stroke Care

Stroke nurses work in a complex environment which requires them to maintain multiple roles, high-level decision-making skills, strong clinical judgment and flexibility in the field (Dyess & Sherman, 2009). Nursing staff are responsible for the ongoing physical and emotional assessment of stroke patients according to the Canadian Stroke Best Practice Guidelines. This requires initial assessment, vital sign monitoring, and identifying potential risks such as falls, UTI, pressure sores and deep vein thrombosis risk (Herbert et al., 2016; Long et al., 2002). Nurses must also coordinate and communicate with interprofessional team members to schedule rehabilitative therapy and other activities of daily living (Herbert et al., 2016; Long et al., 2002). They also provide technical and physical care such as enteral feeding, swallowing screening and medication

administration while integrating therapy with other interprofessional roles (Herbert et al., 2016). Finally, nursing staff are also responsible for providing emotional support for patients and families while actively engaging both in care activities and rehabilitation (Herbert et al., 2016). This multitude of roles adds to the complex nature of stroke care and a learning resource which highlights these roles could optimize nursing care.

Effectiveness of Nursing Education

Nurses entering the current stroke unit lack stroke specific orientation and therefore may not be prepared for the duality of two differently functioning units. A well-designed learning resource introduced during the orientation period can provide novice nurses with the opportunity to develop strong background knowledge on strokes, improve clinical thinking and increase critical decision-making skills (Scheckel, 2016).

Malfitano, Turner, Piper, Burlingame, & D'Angel (2013) study evaluated the effectiveness of a dedicated stroke nurse coordinator on stroke education and improved practices. This study highlighted that stroke education compliance increased from 58% from the first year, 86% during implementation of education intervention and 96% following educational intervention. The education role supported stroke care improvement interventions and strategies for increasing education about risk factors, medications, signs and symptoms, and interprofessional roles (Malfitano et al., 2013). Another study which explored stroke education, dysphagia screening, and smoking cessation as part of stroke care evaluated nursing knowledge before, during, and after implementation of education measures (Barrerre et al., 2010). Didactic sessions were designed to reach part-time and full-time nurses with a combination of live presentations, videos, self-learning modules, interactive games, handouts, and posters (Barrerre et al.,

2010). Stroke education increased from 42% prior to 86% post, while dysphagia screening improved from 47% to 90% showing a significant improvement in knowledge following education measures (Barrerre et al., 2010). Reynolds et al., (2016) time series study on stroke competency also highlighted a significant improvement in knowledge of appropriate neurological assessment following implementation of an educational program with a increase from 4.0 pre-program to 5.18 post-program. Educational programs and resources can improve stroke knowledge, thereby increasing nursing confidence and skill in providing care.

Theoretical Framework

Theoretical frameworks guide nursing education and research and there are many different theories which can be used to develop research projects. The stroke learning resource requires self-efficacy, self-learning, and adult learning which are highlighted in the constructivist learning and cognitive developmental theories. The major theories which guided the development of the learning resource were the adult learning theory which is problem-centered and requires independent study and self-reflective, as well as the novice-to-expert theory which requires the nurse to gradually develop their knowledge and improve over time and education (Candela, 2016).

Summary of Consultation Process

Information gathered from the literature review and key concepts which would be used in the learning resource were used to create interview questions and questionnaires with administration and key members of the acute stroke unit.

Rationale

The purpose of the interviews with administration was to explore their role in stroke education and their position regarding the value and usefulness of a stroke learning resource for the acute stroke unit on 4SB at the Health Science Centre. Interviews and questionnaires with nursing staff occurred in order to determine staff viewpoints on: 1) nursing roles, 2) current stroke knowledge, 3) current orientation practices, 4) interprofessional roles and responsibilities, and 5) effective teaching and learning strategies. Information provided by administration and staff would indicate current orientation practices and guide the development and effectiveness of the learning resource.

Consultation Findings

Interviews were conducted with the clinical educator, stroke coordinator and two senior nursing staff to determine their viewpoint on nursing orientation, stroke education, nursing stroke care, and their viewpoint on the development and implementation of a stroke nursing learning resource. Ten questionnaires were also completed by interprofessional team members on the acute stroke unit which focused on staff viewpoints on these topics. Based on one-to-one interviews and questionnaires it was clear that stroke specific orientation is not provided at Eastern Health and the development of a learning resource would be forthcoming. Interviewees were supportive of a learning resource and felt that it would enhance nursing education on the stroke unit.

Staff highlighted that the nursing role is multifaceted and that effectives communication and collaboration within the interprofessional team is imperative for a highly functioning stroke unit. They indicated that a self-learning module or resource

could provide novice staff with key knowledge prior to entering the field and that it could be a resource they utilize during orientation. In the future, follow up surveys or interviews of the novel learning resource could indicate whether this resource is effective or useful for staff.

Ethical Considerations

Informed consent will be implied based on the individuals choosing to participate in the interviews or completing the questionnaires. Participants will remain anonymous, being identified by their professional rather than name. Questionnaires and interview answers were kept locked in the charge nurse's office and in a locked filing cabinet. The human research ethics authority screening template was completed identifying the project as quality/evaluation which does not require ethical approval from the Human Research Ethics Board of Newfoundland and Labrador. The completed template is available in the full consultation report.

Summary of Environmental Scan

To determine current stroke resources which could be utilized in the learning resource, an environmental scan was conducted of the Atlantic provinces since they are like Newfoundland and Labrador (NL) regarding population and location.

Rationale

The purpose of the environmental scan was to identify available resources and stroke unit practices for the hospitals in NL, Nova Scotia (NS), New Brunswick (NB), and Prince Edward Island (P.E.I.). Search parameters focused on stroke care practices, teaching resources, rehabilitation practices, and interprofessional roles which were available to the public. Resources and practices were summarized for each province to

determine similarities, differences and any organization evaluation of resources which could be utilized in the development of the learning resource. Websites were identified and reviewed, especially if they were similar between provinces.

Summary of the Resources

The websites and resources for each of the Atlantic provinces were reviewed for stroke orientation, Stroke Best Practice Recommendations, stroke education, interprofessional roles, and educational materials. While some hospitals within the provinces contained more information than others, most provided a general description of available stroke services for the area such as acute, rehabilitation, and community services garnered towards stroke care. Rehabilitation services and interprofessional team member roles and responsibilities were discussed in very general terms without going into any specifics. Important resources utilized for the learning resource include the Heart and Stroke Foundation, the NL Brain Injury Association and the Nova Scotia Hearing and Speech Centre.

The Heart and Stroke Foundation is a Canadian based program available and identified by every province. The website defines stroke, lists the signs of stroke, treatment options, risk and prevention strategies, and rehabilitation services. Their Let's Talk About Stroke information guide contains pertinent information on strokes, risks, deficits, rehabilitation expectations and recovery guidelines for family and patients. It was a very useful information to help guide the development of the learning resource and contained background information on stroke, interprofessional team members and the recovery expectations following an acute stroke (Heart & Stroke Foundation, 2005).

The NL Brain Injury Association website contains information surrounding the various types of brain injuries including how injuries to specific areas of the brain can cause specific deficits (Brain Injury Association, 2018). It also highlights communicative disabilities and interprofessional team members who would be involved in rehabilitative care (Brain Injury Association, 2018). This website was useful in distinguishing the different types of brain regions and the deficits associated with brain region in the learning resource.

The Nova Scotia Hearing and Speech Centres (NSHSC) linked viewers to provincial stroke programs, stroke brochures, swallowing resources, and speech resources (NSHSC, 2018). It also went into significant detail on the communicative disabilities associated with strokes and provided a 75-minute communicative workshop designed for improving communication between health care workers and aphasiac patients. This resource was useful for designing the communicative area of the resource and the role play element which was created to highlight the difficulties of communicating with an aphasiac patient (NSHSC, 2018).

These resources were also useful for guiding the development of the learning resource and indicated which resources were currently available. Though each of these different resources helped guide the creation of the resource, there was no resource which contained a condensed version of all the important information into one small resource which could guide stroke nurses. Most resources were very general and not nursing specific.

Development of the Learning Resource

The literature review and consultations highlighted the gap in stroke knowledge and stroke specific orientation for the acute stroke unit. A learning resource which highlights pertinent stroke background information, Stroke Best Practice Recommendations, interprofessional team member roles, and nursing roles can provide novice nurses with the necessary information before starting on the unit thereby optimizing knowledge and ultimately patient care. Resources from the environmental scan were utilized during development to create a comprehensive stroke care resource. Images, quizzes and role play elements were added to ensure effective teaching and learning since many students are visual learners and role play adds the element of realism and problem solving.

Stroke Background and Definitions

The first section of the learning resource defines stroke as a neurological injury which can be ischemic, hemorrhagic, or transient ischemic attack (TIA). An ischemic stroke occurs when a blood clot blocks an artery, hemorrhagic occurs when a blood vessel bursts, while a TIA is a short-term drop in blood flow to a part of the brain (H&S, 2005). The five warning signs of stroke and risk factors associated with increased risk of stroke are also highlighted. The resource provides images of the brain regions including the traits of a healthy brain and deficits associated with an injury to specific areas of the brain, i.e. frontal, occipital, temporal, parietal and the cerebellum (PHAC, 2016). Finally, the brain is divided into right and left-sided hemispheres and the deficits associated with injury to specific side. This provides nurses with the appropriate background knowledge

surrounding strokes and brain injuries, so they can link injury with deficits and begin anticipating stroke care needs.

Stroke Best Practice Recommendations

The next section of the learning resource highlights Stroke Best Practice Recommendations relevant for nursing staff. The early steps for stroke management are emphasized including a computerized tomography (CT) scan within 24-48 hours of hospitalization, admission to a specialized stroke unit with interprofessional staff training in stroke care within 24 hours of admission, early plan of care and mobilization of the patient (Hebert & Teasell, 2015). The nurse's role in early mobilization, venous thromboembolism (VTE) prophylaxis, depression screening, oral care, dysphagia, nutrition, and temperature, seizure, and continence management are discussed according to Stroke Best Practice Recommendations (Hebert & Teasell, 2015).

Interprofessional Team Members

The role of each interprofessional team member and how they interconnect with nursing staff is discussed within the next section of the learning resource. The role of the physician, social worker, physiotherapist, occupational therapist, speech language pathologist, and dietitian are presented. Copies of admission orders, swallowing screening, and communication boards are provided for nursing staff to familiarize themselves with for future care (H&S, 2005).

Nursing Role in Stroke Care

The final section of the resource focuses on the role of nursing in stroke care. Nursing is divided into six main interconnected roles: 1) assessment, 2) coordination and

communication, 3) technical and physical care, 4) integration of therapy, 5) emotional support and 6) family involvement (Summers et al., 2009).

Nurses complete physical assessments for pressure sores, wounds, deep vein thrombosis, poor skin integrity, fall risk, pneumonia and incontinence. Nurses complete cardiac monitoring via telemetry during the first 48 hours post-stroke and vital sign monitoring every four hours for the first 48 hours (Summers et al., 2009). It is important for stroke patients to maintain proper range of temperature, blood pressure, oxygenation and blood glucose during the initial phase of acute stroke recovery to avoid further cerebral damage (Summers et al., 2009).

Coordination and communication refer to the nurse's role in communicating with the patient, family members and other interprofessional team members. Nurses coordinate care and communicate with other interprofessional team members to ensure the primary caregivers have the necessary knowledge while developing care and therapy plans. They are also responsible for referrals to other specialities and delegating care to support workers and must plan their day around interprofessional team members (Long et al., 2002).

Nursing physical care includes personal care, toileting, rehabilitative and mobility exercises. Technical care indicates providing nutritional support, medication administration, wound care, swallowing tests, tube feeding and screening for infection (Long et al., 2002).

Integration of therapy requires nursing staff to coordinate with other interprofessional team members such as physiotherapy and occupational therapy to ensure patients receive rehabilitative therapy daily. This requires coordinating with other

members of the interprofessional team to schedule activities without overlapping other disciplines (Long et al., 2002).

Since nursing staff are at the forefront of providing care, they play an important role in emotional support for the patient and family members. They are in the ideal position to monitor for depression and can ensure that the family and patient are actively involved in the rehabilitation care plan which can improve functional recovery and decrease length of hospital stay (Long et al., 2002).

Aphasia Role Play

The final piece of the learning resource is role play and case studies on aphasia. Aphasia, or difficulty communicating, manifests in different ways depending on the location of the stroke and injury. Commonly, it means that patients cannot speak or have difficult communicating in appropriate sentences. The role play exercise requires nursing staff to switch between being the nurse and being the patient who is unable to communicate. Nurses are put in the position of being unable to speak and having to find an alternative way of communicating their wishes and needs. This exercise highlights how frustrating aphasia can be for both the patient and nurse, thereby emphasizing the need for empathy and compassion when communicating with stroke patients to improve patient care.

Advanced Nursing Practice Competencies

Through the development of this Master of Nursing practicum three of the four advanced nursing practice competences outlined by the Canadian Nurses Association (CNA) (2008) were demonstrated: research, leadership, and consultation and collaboration.

Research Competency

Advanced practice nurses identify, analysis, infer and distribute evidence-based findings within the health care system to optimize patient care (CNA, 2008). Throughout the course of my practicum, I completed a literature review on current stroke research, consulted with key stakeholders to identify a learning need on the stroke unit, and did an environmental scan of all resources current available which could be used to develop the learning resource. Finally, I used the information gathered to develop a stroke learning resource which could be utilized during nursing orientation to improve nursing knowledge and optimize patient care which demonstrates research competency.

Leadership Competency

The leadership competency requires nurses to identify learning needs or educational gaps within the nursing role, and mentor nurses or other interprofessional team members. The nurse must advocate for learning needs, contribute to professional growth, while collaborating with the interprofessional team members and evaluating current literature and programs (CNA, 2008). Throughout this practicum project, I identified the gap in stroke knowledge on the stroke unit and the lack of stroke specific orientation in Eastern Health. Through interviews and questionnaires, I highlighted that staff were aware of this gap and agreed that a learning resource could be beneficial for educating orientating nurses. By developing the learning resource and focusing on future novice nurses, I am utilizing the leadership competency.

Consultation and Collaboration Competency

The CNA (2008) states that advanced practice nurses can consult, communicate, and collaborate with patients and other health care professionals within the health care

organization at a provincial, national, and international level. I accomplished this competency through consultation with my practicum supervisor, and interviews with key stakeholders such as the stroke manager, clinical educator, stroke coordinator, and senior nursing staff. Completing interviews with interprofessional team members and nursing staff gave me insight into research gaps and guided me in the development of my learning resource.

Conclusion

The stroke unit is a complex nursing environment which requires nursing staff to excel in a multitude of roles, display high decision-making skills, strong clinical judgement and provide complex care. Nursing staff are currently starting on the stroke unit without stroke specific orientation leaving a gap in stroke knowledge and potentially decreasing optimal patient care. The development of a stroke learning resource which can be utilized by nursing staff as a self-study tool or for senior nurses as a resource while mentoring novice nurses can provide the necessary knowledge on Stroke Best Practice Recommendations and enhance patient care. This project was created to improve nursing stroke knowledge and engage nurses in providing current evidence-based practice.

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Appendix A

Literature Review

An acute stroke occurs when a neurological injury occurs in the brain; the injury may be ischemic, loss of blood flow, or hemorrhagic, bleeding on the brain, which leads to cellular death (Public Health Agency of Canada (PHAC), 2016). According to Canadian Best Practice Guidelines, patients admitted to hospital following an acute stroke should be treated in an interprofessional stroke unit containing appropriate levels of medical, nursing, occupational therapy, physiotherapy, nutrition, social work, and speech language pathology staff (Lindsay et al., 2008; Hebert et al., 2016). Patients arriving at a hospital experiencing symptoms of a stroke are assessed and diagnosed by a neurologist, then receive a computed tomography (CT) scan, and are admitted to an acute care stroke bed within 24-48 hours (Lindsay, Gubitz, Bayley, & Phillips, 2013). The interprofessional stroke team then complete physical, functional, and cognitive assessments; allowing them to collaborate with the team and patient to develop a patient-centred rehabilitation plan (Hebert et al., 2016). The Neurology/Medicine unit of the Health Science Centre is divided into two units: the medicine unit and the stroke unit; therefore, nursing staff must be able to switch between two very different specialities. The orientation period is an optimal time for nurses to learn about their unique role on the stroke unit which is the focus of this literature review.

Rationale for Practicum Project

The goal of this practicum project is to develop a learning module that could be implemented during the orientation of nursing staff to a specialized the stroke unit. The focus of the learning resource would be on general nursing duties such as, physical care, toileting, mobility exercises, assistance with feeding, nursing rehabilitation responsibilities, interprofessional roles, and the importance of interprofessional

collaboration and patient communication and education. A review of the literature has been conducted to identify research on the following topics: stroke care, stroke best practice, interprofessional responsibilities, stroke rehabilitation, and effective learning strategies for nurses. A discussion of the theoretical framework which guides the creation of the learning resource is highlighted.

Integrated Literature Review

The development of a learning resource for novice nurses working on a stroke unit requires adherence to the Canadian Best Stroke Practices (Hebert et al., 2016). An electronic search of the current literature was conducted in between January-March 2018. The primary research databases utilized included: CINAHL, Cochrane Library, PubMed, and DynaMed. The initial key words were "stroke" and "best practice" which lead to over 271 articles. Narrowing the parameters to "stroke", "best practice" and "Canada" limited the articles to Canadian research which indicated 26 articles of interest. Research was also conducted using the terms "knowledge gaps", "nursing stroke care", and "stroke education" to determine the deficits in stroke care knowledge. Teaching and learning strategies were also researched to identify the most common strategies utilized in nursing research and their effectiveness in educating nurses. To decrease the number of research articles inclusion and exclusion criteria were created.

Inclusion/Exclusion Criteria

Inclusion criteria used for this literature review included health-related articles; primarily nursing, English language, and primarily focused on the topic of stroke care. Articles were excluded if they were duplicates, languages other than English, and health care issues other than stroke. Articles were critically appraised using the Public Health

Agency of Canada (PHAC) Critical Appraisal Tool Kit. The PHAC Tool Kit was used to determine strength and quality of the study design. Appendix A contains the literature summary tables which review each individual article for methods, key results, strengths, limitations, conclusion, study strength, and study quality. Qualitative research was analyzed using standardized critical appraisal instruments from the Joanna Briggs Institute Qualitative Assessment and Review Instrument (JBI-QARI). These qualitative articles were analyzed for nursing theories, major themes, teaching or learning strategies. Focus for the analysis was on retrieving information relevant to the development of a learning resource or e-learning, as well as the barriers or benefits of these learning strategies for stroke care teaching.

Nurses Knowledge Deficits about Stroke Care

New graduates and experienced nurses entering a complex field of nursing find themselves novices who must learn their roles and responsibilities on the floor and as a member of the interprofessional team. The registered nurse as a member of the interprofessional team is responsible for assessment, coordination of technical and physical care, patient and family communication, continuation of therapy, teaching, education, and emotional support for patient and families (Long, Kneafsey, Ryan, & Berry, 2002). Nurses must assess and identify risks, support their patients, constantly change their plan of care, effectively manage multiple stroke patients and be an active member of the interprofessional team. These responsibilities, in addition to the complex nature of stroke care, create a complex nursing environment which may cause some concerns for novice nurses in this field. Potential gaps in knowledge and complexity of required care highlight the need for more education for nurses prior to working on a

stroke unit. The introduction of a stroke learning resource during orientation which highlights the important stroke care information, identifies roles and responsibilities, provides simulation and role play, and prepares nurses for the expectations of the unit will decrease the anxiety associated with changing units and provide nursing staff with more knowledge and skills to optimize patient care.

Knowledge Gaps Related to Stroke

Registered nurses provide frontline direct care to individuals suffering from an acute stroke, however, knowledge gaps in stroke care exist and provide an opportunity to improve nursing stroke care. The best method of determining gaps in nursing stroke education is to engage current stroke nurses in surveys, questionnaires, and focus group meetings to identify what is the current knowledge and what may be improved on through future education. Surveys completed by nursing staff identified gaps in knowledge surrounding stroke medications including types, dosages and potential side effects which must be monitored. They also identified gaps in assessment, advocating for patients and competence in providing care.

Evidence of gaps in education. Stroke patients may recent a number of anticoagulation drugs to assist with clots or to prevent future clots. It is important for nursing staff to have a strong understanding of the necessary anticoagulation drugs which patients may receive, however, they seem to have a lack of knowledge surrounding stroke medications. Surveys completed by emergency room nurses who are the primary care providers during an admission state that 50% of nurses did not know the recommended timeframe of 60 minutes from onset of stroke for administrating the clot busting drug TPA for an ischemic stroke (Harper, 2006). Approximately 70% of nursing staff did not

know the recommended dose of 0.9mg/kg of TPA for ischemic strokes, while another survey surrounding anticoagulation for stroke patients identified 41% of participants disagreed and 13% strongly disagreed on whether to suggest thromboprophylaxis, or anticoagulation, in stroke patients which shows a general lack of knowledge surrounding stroke prevention and care (Ferguson et al., 2016; Harper, 2006). 55% of Harper's (2006) study did not know that aspirin is recommended within 48 hours of an ischemic stroke, while 57% of participants in Ferguson et al (2016) study stated that they lacked knowledge of the risk and benefits of different anticoagulants. Another 48% of nurses incorrectly answered questions related to the possible interactions of ibuprofen and topic salicylates with aspirin and warfarin, such as increased gastrointestinal bleeding or the enhancement of warfarin (Ferguson et al., 2016). Between 42-58% of participants did not know how vitamin supplements affect warfarin therapy and most respondents answered "don't know" for questions surrounding antibiotics interactions for warfarin (Ferguson et al., 2016). This shows a general lack in knowledge surrounding anticoagulation drugs which are often utilized during stroke care.

Stroke care also requires the general knowledge of stroke assessment, vitals monitoring and treatments for difficult stroke problems, however, there is a lack of knowledge surrounding when to treat stroke patients. A mixed methods assessment project developed in Ontario to identify the educational needs of currently nursing staff utilized web casting and videoconferencing to improve stroke education (Carter, Rukholm, & Kelloway, 2009). They utilized pre-online and post-online questionnaires and focus groups to recruit participants which included a section to rate participants perceived confidence in caring for stroke patients (Carter et al., 2009). Prior to the

program, 49% of participants rated themselves as having "average confidence" in assessing stroke patients, 51% in solving difficult stroke problems, and 49% in providing information between the interprofessional team (Carter et al., 2009). Harper's (2006) study stated that 100% of participants lacked the knowledge that a temperature of 37.2º'C should be treated, while 90% did not know that a blood pressure of 220/120 must be treated in ischemic stroke.

Barrere, Delaney, Peterson, & Hickey (2010) completed a needs assessment to identify educational needs of nursing staff which must be improved to become a Primary Stroke Centre. Group meetings indicated a need for review of basic stroke assessment, care, and patient teaching, as well as the introduction of the nurse's role in the interprofessional team (Barrerre et al., 2010). Long et al (2002) utilized questionnaires to determine nurse's perception surrounding their readiness for providing rehabilitation services, despite only 57% response rate, the majority stated they prior education did not provide them with adequate skills and knowledge for rehabilitation. A time series survey surrounding the implementation of a stroke competency program to improve nurse's knowledge showed that 84% of participants in the preprogram assessment reported a lack of knowledge of the required stroke activities as a barrier to consistent stroke care (Reynolds, Murray, McLennon, & Bakas, 2016). They also stated that 49% of participants indicated that the stroke material was too complex/difficult to understand (Reynolds, et al., 2016). Long et al (2002) also indicated that 58% of individuals felt that more training was needed across a range of topics, including physiology, rehabilitative services, and roles of physiotherapy and occupational therapy.

These various studies highlight the knowledge gaps in different aspects of stroke care, whether it is medication knowledge, stroke care protocols, confidence in care, providing education to patients, and their roles in the interprofessional team. Nurses identified lack of knowledge, confidence and the complexity of strokes as barriers to providing care. Barrerre et al. (2010) individual and group focus meetings with nursing staff also indicated a need for review of general stroke assessment, care, and education surrounding new stroke practices.

Novice Nurse's Challenges

Novice nurses entering a new clinical area have identified three challenges which influence their experiences when beginning clinical practice: 1) functional competency, 2) communicative problems, and 3) leadership challenges (Hezaveh et al., 2014; Silva et al., 2010; Dyess & Sherman, 2009). Experienced nurses entering a new field find themselves in the position of being a "novice" within the new area, as well as a learner (Dellasega et al., 2009). It is assumed that experienced nurses will have less difficulty entering a new unit, however, feelings of inadequacy, new required knowledge and skills, and co-workers' expectations can cause anxiety and stress for even the most experienced nurse (Dellasega et al., 2009).

The first challenge identified by novice nurses is functional competency which refers to a lack of accuracy with clinical skills (Hezaveh et al., 2014). Some examples of required clinical skills for stroke care are identifying veins, collecting blood, care prior to a diagnostic test, and care for advanced nursing skills such as tracheostomy and nasogastric feeding devices (Hezaveh et al., 2014). High complexity care such as stroke care requires high-level decision-making skills which can challenge nurses causing

insecurity, anxiety, and fear of failing their patients (Dyess & Sherman, 2009; Silva et al., 2010). Transitioning to a new unit requires strong support either through mentorship and proper orientation which can allow nurses to gain confidence in their skill (Hezaveh et al., 2014; Silva et al., 2010; Dyess & Sherman, 2009).

The second challenge described by novice nurses beginning on a unit are communication problems with colleagues, patients, and families (Hezaveh et al., 2014; Dyess & Sherman, 2009). The literature shows that lack of self-esteem, lack of confidence, trouble communicating with interprofessional members, or being unaware of the importance of communication between team members is often a challenge in implementing new learning resources or unit practices (MacKenzie et al., 2017; Hezaveh et al., 2014; Ilott et al., 2014; Dyess & Sherman, 2009). To counteract communicative issues nurses should receive interpersonal communication training such as interprofessional role-play conversations and conflict resolution to teach them how to communicative between colleagues and patients (Dyess & Sherman, 2009).

The third challenge that nurses experience is related to leadership such as inefficient time management skills, inability to delegate tasks, inability to take responsibility for assignments, and ineffective collaboration amongst colleagues (Hezayeh et al., 2014; Silva et al., 2010). Learning their role within the interprofessional team requires time and the development of harmonious relationships between colleagues as the team and nurse develops confidence in their position and responsibilities (Silva et al., 2010). Stroke unit nursing highlights the importance of developing goals, collaborating with interprofessional team members and constant active rehabilitation to improve physical, functional and cognitive ability (PHAC, 2016). The learning resource

will engage new stroke nurses; improving stroke knowledge, identify important clinical skills, increasing respect and trust within collaborative teams (Lumague et al., 2006).

Complexity of Stroke Care

The stroke care nurse works in a complex environment which requires multiple roles, high-level decision-making skills, a strong clinical judgement, excellent time management skills, and flexibility (Dyass & Sherman, 2009). The nurse's contribution to an interprofessional rehabilitative stroke team is centred on six main interconnected roles: assessment, coordination and communication, technical and physical care, the integration and continuing of therapy, emotional support, and family involvement (Long et al., 2002). Nurses must also be aware and respect other health care professionals' roles, contributions and expertise, clarifying roles improves their confidence in collaborating and improves their own professional identity (MacKenzie et al., 2017; Lumague et al., 2006).

Ongoing Assessment of Stroke Patient Needs

According to Canadian Stroke Best Practice Recommendations initial assessment of stroke severity, type and rehabilitation needs are completed by core rehabilitation team members which includes; physician, nurses, and other interprofessional team members, within the first 48 hours to determine the level of rehabilitative and medical care the patient shall require (Herbert et al., 2016). Nurses are also responsible for identifying potential problems during assessments which may hinder rehabilitation such as: pressure sores, wounds or poor skin integrity, fall risk, urinary tract infections, and pneumonia (Long et al., 2002). Nursing staff also complete assessment of bladder and bowel control, creating toileting regimens based on assessment to improve continence (Long et al.,

2002). Stroke best practice also highlights the importance of monitoring fall risk, identifying risk factors and ensuring individualized fall prevention for stroke patients, tasks which are completed by the nursing staff (Herbert et al., 2016). The registered nurse also monitors for the risk of deep vein thrombosis (DVT) in stroke patients with poor circulation and decreased mobility due to disability, they focus on prevention of the occurrence of DVT by promoting mobility and ensuring as much independence in activities of daily living (ADLs) while working with their patients (Herbert et al., 2016).

Coordination and Communication of Team

Nurses must always be aware of therapy times or appointments and coordinate with other interprofessional teams to ensure patients receive rehabilitative therapy including early mobilization as recommended by stroke best practice (Herbert et al., 2016; Long et al., 2002). Strong communication between interprofessional team members is required to adequately plan and coordinate stroke care between multiple disciplines to ensure the patient receives the optimal care provided (Herbert et al., 2016). The nurse is responsible for ensuring their patient attends daily care activities, appointments, and therapy throughout the course of their shift.

Technical and Physical Care

Nursing staff assist with physical care; such as personal hygiene, and technical care; such as medication administration, nutritional assistance, wound care and health screening (Long et al., 2002). Stroke best practice recommends a swallowing test, Toronto Bedside Swallowing Screening Test (TORBSST), within the first 24 hours to determine if the patient has any dysphagia, swallowing difficulty, which may cause choking, nutritional decline and pneumonia. Stroke nurses are trained to complete this test

at the bedside and recommend further testing if needed (Herbert et al., 2016). According to stroke best practice the nurse's role in nutrition is to

follow the recommendations of the stroke dietician, monitor for swallowing difficulties, insert nasogastric feeding tubes, and provide enteral nutritional support for those patients which require tube feedings (Herbert et al., 2016).

Integration of Appropriate Therapy

Best practice suggests three hours of rehabilitative therapy per day, five days a week delivered by interprofessional stroke team members. While physiotherapy and occupational therapy complete the majority of rehabilitative therapy, nursing staff also participates in therapy while completing physical care, toileting, and walking patients throughout the day (Herbert et al., 2016). The nurse's role in therapy includes creating a safe, therapeutic environment and encouraging patients to participate in activities of daily living. Secondarily they work with occupational and physiotherapy to determine alpha-FIM scores which identify physical and cognitive disability in terms of burden of care (Foley et al., 2012; Long et al., 2002). FIM scores have been used in best stroke practice and are known to be valid and reliable measures to assess stroke (Herbert et al., 2016; Foley et al., 2012).

Emotional Support for Patients

Emotional support requires the nurse to develop a holistic, caring relationship where the nurse can reassure patients, assist them in creating personal goals and encourage them to remain positive and work towards rehabilitative goals. They assess their patient's cognition, mood, and fatigue to monitor for post-stroke depression, which affects 30-60% of stroke patients, by consistently screening for depression, mood

changes, and cognitive changes (Herbert et al., 2016). Nursing staff ensure families are aware of the risk of depression, educate them on identifying mood changes and complete screening two weeks and four weeks post-stroke to monitor for depression (Herbert et al., 2016; Long et al., 2002).

Encouraging Family Involvement

Family involvement requires the nurse to communicate actively with the family, involve them in ADLs, stroke care protocols, monitoring for adverse effects and provide emotional support when needed (Long et al., 2002). The nurse also has a role in educating patients and families on recurrent risk factors for strokes such as: inactive lifestyle, hypertension, high cholesterol, and ineffective blood flood which can all cause stroke or the recurrent of stroke in the future (Herbert et al., 2016).

The nurse has a multitude of roles within the stroke unit which interacts with the other members of the interprofessional team; rehabilitation activities are guided by physiotherapy and occupational therapy, emotional support and family involvement may include social work, nutritional support may require assistance from the dietician or speech language pathology, while medical issues require the neurologist. Students or novice nurses and experienced nurses entering an interprofessional rehabilitation unit do not always realize the range of roles, interconnectivity between colleagues or the amount of communication required to ensure positive collaboration (Lumague et al., 2006; Long et al., 2002). The creation of a learning resource or strategy to be used during orientation can improve the nursing educational gaps and give them an advantage prior to entering such a highly complex unit.

Benefit of Stroke Education

Nurses entering the current stroke unit may not be prepared for the duality of two differently functioning units and therefore a learning resource introduced during orientation will help prepare them for entering a new field. A well-designed learning resource can provide students, novice nurses or experienced nurses entering a new field of practice with the opportunity to develop strong background knowledge on strokes, they can also participate in a higher level of thinking and improve their clinical decision-making skills (Scheckel, 2016). To counter the challenges nurses have entering the clinical field including: functional competency, communicative troubles and leadership issues; a learning resource can be developed. As collaboration is a large part of stroke rehabilitation, nurses must be able to communicate at an interprofessional level and develop a repertoire that allows them to feel safe, confident and empowered enough to work collaboratively with team members, and advocate for their patients (Speakman, 2016; Lumague et al., 2006). Working within an interprofessional collaborative team requires sharing knowledge and expertise, relinquishing some autonomy, associated with shared responsibility, shared problem-solving and shared decision-making (Speakman, 2016). Interprofessional teams can also improve role clarity, team functioning, and communication between members (MacKenzie et al., 2017).

Effectiveness of Nursing Education

First and foremost, the effectiveness of nursing education must be highlighted to show the benefit of improving education. Pre-test/post-test designs are often utilized to show the effectiveness of implementing an educational intervention. A study evaluating the effectiveness of a dedicated stroke nurse coordinator on stroke education and

improved practices collected data at three measurement points: the year before introduction of stroke coordinator, year during implementation, and the year after implementation of the coordinator (Malfitano, Turner, Piper, Burlingame, & D'Angelo, 2013). The study highlighted that stroke education compliance increased from 58% in the prior year, 86% during implementation, and 96% following a year with the stroke coordinator. The coordinator role supports stroke care improvement interventions and strategies for increasing education surrounding risks factors, medications, signs and symptoms, and interprofessional roles (Malfitano et al., 2013). Another study which explored stroke education, dysphagia screening and smoking cessation as part of stroke care evaluated nursing knowledge surrounding these measures before, during, and after the implementation of the Joint Commission Core Education Measures that related to nurse assessment and education (Barrerre et al., 2010). Didactic sessions were designed to reach part-time and full-time nurses with a combination of live presentations, videos, self-learning modules, interactive games, handouts, and posters (Barrerre et al., 2010). Education surrounding smoking cessations remained at 100% prior to implementation and 100% post-implementation, however, stroke education increased from 42% prior to 86% post, while dysphagia screening jumped from 47% to 90% showing a significant improvement in knowledge following the education measures. The nurses staff also indicated that they were better able to detect subtle nuances of patients showing distress and could better respond to their patients needs following the educational case studies, examples and experiences they were taught (Barrerre et al., 2010).

A time series design was used to determine if a stroke competency program would improve nursing knowledge and observance of evidenced-based stroke practices. The

nursing staff completed surveys before implementation of the program, immediately after the program and 3 weeks follow up (Reynolds et al., 2016). Neurological assessment scores increased from a mean of 4.0 preprogram to 5.18 post program with a follow up of 5.11 while family stroke education and dysphagia screening remained steady between each series (Reynolds et al., 2016). This information highlights a significant improvement in knowledge of appropriate neurological assessments following program implementation for nursing staff (Reynolds et al., 2016).

Alinier, Hunt, Gordon, and Harwood (2006) tested the effect of a scenario-based simulation training on nursing clinical skills and competence using a pre-test/post-test design, participants were randomly assigned to a control group, which followed the normal curriculum, or the experimental group, which contained regular training, and hands-on simulation training. A 15 station Objective Structured Clinical Examination (OSCE) was utilized as an evaluation tool for assessing practical skills. The aim of the study was to give students more direct group clinical experience in a safe environment (Alinier et al., 2006). The average score for the first OSCE was 48.82% for the control group and 47.54% for the experimental group, however, the second OSCE scored 56.00% for the control group and 61.71% for the experimental group, a significant increase between control and experimental group scores (Alinier et al., 2006).

These various pre-test/post-test studies highlight the effectiveness of improving education for nursing to increase knowledge, improve clinical assessment and skills surrounding stroke care. With the increase in internet usage amongst the current generation using blending learning, technology-enabled programs, and e-learning may

increase participation and improve knowledge retention. Simulations, case studies, and role play may also be effective teaching strategies.

Educational Interventions

The stroke unit learning resource will be an interactive internet-based learning module containing passive learning in the form of stroke background knowledge, active learning in the form of case studies, simulation, games and role play, and interactive learning in the form of inquiry-based collaborative interaction with other learners during orientation (Scheckel, 2016; U.S Department of Education, 2009; Ruiz, Mintzer & Leipzig, 2006). Phillips (2016) indicates that increased participation can be achieved if there are a variety of novel activities offered during the presentation of data such as: videos, pictures, case studies, interprofessional activities, group assignments, and online modules. Research indicates that students are more actively engaged in learning which is fresh, challenging with a high variety leading to a combination of motivation and simulation (Bradshaw & Hultquist, 2017). Nursing students and faculty agree that non-traditional strategies such as collaboration and cooperative learning, active involvement and participation in learning experiences are needed for effective learning (Bradshaw & Hultquist, 2017). Research also indicates that technology-based learning activities such as blended learning and e-learning are becoming commonplace and actively engage the current student population allowing for independent learning and research (Bradshaw & Hultquist, 2017).

Blending Learning

A common theme within the stroke literature is the use of blended learning; the systematic integration of traditional and electronic approaches to teaching and learning.

The reviewed literature discussed different resources including dysphagia training, stroke knowledge translation strategies, case-based versus game-based learning, and other blended learning (Ilott et al., 2014; Menon, Bitensky, & Straus, 2010; Telner et al., 2010). They discussed effectiveness, cost, knowledge gain, and potential to enhance teaching of clinical skills for nurses.

Telner et al. (2010) conducted an equivalence trial at a medical conference to determine whether game-based learning is more effective than case-based learning, with participants receiving similar training surrounding stroke prevention and management. 17 participants completed case-based group training while 18 completed game-based training, with a knowledge test immediately following training and a post-test 3 months later (Telner et al., 2010). It was noted that game-based participants had a higher attention and satisfaction, and knowledge received between the different types of training were similar, though retention was higher in game-based training (Telner et al., 2010). This signifies that game-based training could be a good motivation for recruiting for future training and that participants have higher satisfaction with new innovative teaching strategies.

Blended e-learning also allows individuals easier access to information both at home or work and has the potential for workplace e-learning which offers the opportunity to contextualize learning by discussing real-life examples (Ilott et al., 2014; Menon et al., 2010). A single-group pre/post study was used to evaluate a dysphagia e-learning resource for learning effectiveness and cost-related benefits if implemented at the workplace (Ilott et la., 2014). Pre-intervention surveys highlighted the participant's current practices and knowledge, while post-intervention surveys showed improved

knowledge surrounding some practical and theoretical knowledge surrounding dysphagia in stroke patients (Ilott et al., 2014). Follow-up surveys highlighted changes in practice related to medicine management, thickening fluids and oral hygiene for dysphagia patients following the learning resource intervention (Ilott et al., 2014). The resource cost was approximately $2688 for 17 study sessions, totalling 108 hours in training (Ilott et al., 2014).

Menon et al. (2010) also recommended using interactive e-learning resource to share active knowledge translation (KT) strategies surrounding stroke rehabilitation, citing that 82-88% of clinicians state they do not have the time to actively search and appraise best practice research. The creation of a readily available source of active rehabilitation based on best practice would improve knowledge uptake and application for clinicians (Menon et al., 2010).

Literature shows that blended e-learning resources are no less effective than traditional classroom-based learning, they provide professionals the opportunity to condense material into one resource which is readily available at home or work (Menon et al., 2010; & Telner et al., 2010). Ilott et al. (2014) briefly discussed the cost-effectiveness of their program, stating that it would be more accessible, require less face-to-face time and could be self-taught at home which are advantages to any e-learning resource.

E-learning

Online access has surpassed early forms of distance learning and opened student education to a higher level of multimedia access, and research shows that e-learning program which contain web-based education with the inclusion of lecture-based learning, also known as blending e-learning is effective in providing students with a higher level of

satisfaction, improved clinical skill knowledge and has been shown to close the theory-practice gap (Ilott et al., 2014). The learning resource will not replace face-to-face orientation but enhance the learning experience and allow the nurses to enter the field prepared for the changes in stroke care (U.S Department of Education, 2009). E-learning is a flexible, accessible online learning programme which can be utilised at any time or place with computer or internet access (Ilott et al., 2014; Menon et al., 2010; Menon et al., 2012). Website-based learning resources can deliver an efficient resource of providing the latest evidence to health care professionals at work or home, while simultaneously giving them the ability to reflect and revisit content at their leisure (Menon et al., 2012; Menon et al., 2010; Rochette et al., 2008). Additionally, Rochette el al. (2008) StrokEngine program was available for patients and families to peruse information, empowering them to be active in their rehabilitation. Having my learning resource available via the internet as a website-based programme will allow those nurses entering the field to begin their education at home to be readily prepared for orientation and clinical practice. A meta-analysis of job-related courses comparing web-based and classroom-based learning found online learning to be superior to class-based instruction, allowing more independence and self-direct learning (U.S Department of Education, 2009). Interactive learning shifts the attention from a passive, teacher focused learning to one that require active learner centered engagement and a stronger learning stimulus (Ruiz, Mintzer, & Leipzig, 2006).

Case Studies

To ensure active learning and critical thinking, novice nurses would then be given case studies and encouraged to work together to identify members of a stroke

interprofessional team and their roles and responsibilities to gauge their prior knowledge. Case studies represent an in-depth analysis of a real-life situation, thereby making participants actively engage in critical thinking by building on their previous knowledge and connecting it to clinical practice (Phillips, 2016). This critical thinking requires learners to question the case situations, enhance their problem solving and clinical decision-making skills. Being faced with issues surrounding a real-life situation encourages learners to make effective clinical decisions, remember relevant knowledge and interpret or adapt this knowledge to improve the specific situation (Souza & Souza, 2014). By getting participants to collaborate on these case studies, the educator is encouraging interprofessional learning and highlighting the need for collaboration between professionals (Philips, 2016). Those roles and responsibilities would then be highlighted, and nurses would be encouraged to identify what interactions nurses would expect to have with these interprofessional members. This information would then be provided in the module.

Games & Role Play

The learning resource would then turn towards games and role play to determine the level of knowledge gained via the resource and time would be made for questions or concerns (Speakman, 2016). Role play requires the learners to act out a patient situation, where one learner becomes the patient and the other learner the nurse attempting to assist their patient (Sharma, 2017). Role play for aphasic situations with stroke patients can place the nurse in their patient's shoes and allow them to feel how difficult it is to communicate without words (Marshall et al., 2016). Marshall et al. (2016) study discussed the benefits of virtual reality, simulation and role play for those post stroke

suffering from aphasia, highlighting the difficulty with communication and the significant communicative gains found in those using a virtual reality platform called EVA Park, a language simulation session. Including game-based learning, and critical thinking questions within the learning resource can also encourage active participation and improve satisfaction with the education session (Telner et al., 2010). Web-based learning, case studies, and other creative strategies such as role play, and game-based learning enhances learning competencies rather than regular lecture style teaching (Sharma, 2017; Telner et al., 2010).

Simulation

Simulation requires the artificial replication of a real-world event to improve clinical skills and knowledge (Aebersold, Kocan, Tschannen, & Michaels, 2011). There are three levels of simulation: low, medium and high fidelity. Low simulators include static models such as intravenous arms, and wounds (Cunningham, 2010). Medium simulators include mannequins with palpable pulses, blood pressure, breath and bowel sounds, they may also be used for catheterization, enemas and naso-gastric tube insertions (Cunningham, 2010). High fidelity simulators are full scale computerized mannequins with chest movements, pulses and monitoring which can be changed via computers (Cunningham, 2010). Simulation provides a high-fidelity environment which allows nursing to respond to a "real" situation without their instructors guiding them, it allows for more realism and encourages critical thinking and active hands on experience (Aebersold et al., 2011; Roots, Thomas, Jaye, & Birns, 2011). A study completed in London followed a pilot stroke simulation study where participants were presented with a number of stroke clinical scenarios including post-thrombolysis anaphylaxis, highly

increased intracranial pressure, seizure activity and high blood pressure post-stroke (Roots et al., 2011). Participants completed these clinical scenarios utilizing high-fidelity mannequins with full cardiovascular, respiratory and neurological function, each scenario took 15 minutes and a debriefing session was held following the simulation (Roots et al., 2010). Participants also completed pre and post course questionnaires to determine their leadership, communication, confidence and learning (Roots et al., 2010). While the population was too small for statistical significant with only seven participants, there was self-reported improvement in leadership, communication and confidence in providing care following the simulation (Roots et al., 2010). Another study included simulation in their stroke orientation, providing nursing staff with 16 hours of EKG interpretation via class, eight hours of hemodynamics, hands on practice with line setup and monitoring equipment via simulation and eight hours stroke general education (Aebersold et al., 2011). 35 nurses participated in the stroke training and post questionnaires highlights that the hands-on experience via simulation improved their confidence for caring for this population, especially regarding skills such as setting up lines and patient monitoring (Aebersold et al., 2011).

Summary of Educational Interventions

Current research highlights e-learning as the most productive form for the learning resource, with a mixture of passive learning and active learning, through background knowledge, case studies, simulation, games and role play with collaborative interaction to improve novice nurse's knowledge gaps and improve collaborative development. To determine nursing staff current feelings on the orientation practice on the stroke unit surveys will be administered, with a post-survey after introducing the learning resource to

current practicing nurses. Pre-surveys will encourage current nurses to highlight current orientation issues and concepts which they think need further focus to improve orientation. Post-surveys will determine whether they find the educational resource useful, informative and whether it would have assisted their own preparation for stroke nursing.

Theoretical Framework

Constructivist Learning Theories

According to Candela (2016) the Constructivist Theory is the study of how an individual learns, it highlights the construction of their own understanding and knowledge of the world through experiencing life and reflecting on those experiences. Upon encountering a new concept the learner must reconcile it with previous ideas and experiences, which leads to changing current beliefs or discarding the new information as irrelevant (Candela, 2016). Two examples of constructivist theory which guide nursing educators include: Social Learning Theory, and Sociocultural Learning (Candela, 2016).

Social Learning Theory involves learning through modelling: the observation of new behaviours as performed by mentors and coding this information into action, avoiding the practice of trial and error (Bahn, 2001; Candela, 2016). The ultimate goal of Social Learning Theory is for the novice nurse to develop a sense of self-efficacy and to gain confidence in their own skills and behaviour (Candela, 2016). Sociocultural Learning requires assisted learning where a senior educator, such as a nurse mentor, supports the learner while they attempt to solve a problem or perform a skill (Candela, 2016). The student nurse observes and acquires new skills, gradually gaining independence as the mentor slowly withdraws their support thereby encouraging self-

efficacy (Candela, 2016). These theories encourage teaching-learning strategies such as role-play, role modelling and clinical learning; where students start as novice learners focused on observation while gradually gaining independence, self-efficacy and confidence (Candela, 2016). The literature highlights that nurses entering a new field are surprised by the level of communication and have difficulty communicating with colleagues and patients (Dyess & Sherman, 2009; Hazaveh, Rafii, & Seyedfatemi, 2014; Mackenzie et al., 2017). Developing a learning resource which highlights the pertinent information surrounding stroke care, interprofessional roles and the importance of collaborating within the interprofessional team will give nurses the chance to gain knowledge and clinical skills prior to entering the clinical field thereby decreasing anxiety and improving their self-efficacy.

Cognitive Development Theories

According to Candela (2016), Cognitive Learning theorists consider learning to be an internal process in which information is integrated or internalized into an intellectual structure. Learning is sequential; an individual gains new knowledge, an idea of the task and the sequences involved in preforming it. Then the learner gains skill in performing the task (Candela, 2016). Two examples of Cognitive Theory which guide nursing educators include: Adult Learning Theory and Novice-to-Expert Theory (Candela, 2016).

In Adult Learning Theory, the adult learners focus on problem-centred learning, they are more logical and often pay more attention to information if it is personally relevant and important (Candela, 2016). Adult learning behaviours are shaped by their lived experiences and maturity, allowing them to self-direct their own education, become easily adaptable and gain strong insights into relationships between colleagues or patients

(Candela, 2016). Since adult learners are more self-directed their learning strategies include: independent study, reflective journaling, clinic-based experience, and mentor guidance (Candela, 2016). A learning resource designed around pertinent stroke unit information would be a useful source for adult learners to utilize prior to entering the unit, giving them ample time for independent study. The final theory which guides the development of the learning resource for the stroke unit is Novice-to-Expert theory. According to Candela (2016), nurse graduates gradually develop their knowledge and skills as their time in the health care workforce continues. Nurses go through a sequential levelling of skills: novice, advanced beginner, competent, proficient and then expert (Candela, 2016). Those students or nurses joining the interprofessional team for the stroke unit fall on the novice side of skills and the development of a learning resource they can utilise before starting work will give them some concrete knowledge prior to entering the stroke care field. Nurses coming from another medicine unit may have experience in preforming skills and managing their time, however, they would remain novices in terms of stroke care and interprofessional rehabilitation. Including a questionnaire on previous experience, self-reflection questions, and learning goal plan within the learning resource will allow mentor nursing staff to gain a general idea of their novice nurses knowledge surrounding stroke care, therefore allowing them to make a learning plan to ensure all necessary skills and knowledge is gained during the clinical or orientation period.

Conclusion

There is only a small amount of information available surrounding learning resources for stroke care, especially Canadian research, though U.K and American were reviewed there was still only minimal research. Interprofessional education and

collaboration is an important concept related to stroke unit care. Resources show that the nurse has several roles which interconnect with their interprofessional colleagues (Lumague et al., 2006; Long et al., 2002). Stroke unit care requires nurses to work collaboratively with other professionals and patients to determine physical, cognitive and social goals while working towards optimal rehabilitation (PHAC, 2016). Novice nurses entering the field of nursing have gained the necessary knowledge, passed registration examinations, and begun developing their communicative abilities during clinical practice (CNA, 2018; Long et al., 2002). However, those choosing to become stroke nurses must engage in a higher level of complexity and collaboration; where daily care activities, therapy, appointments and diagnostic tests must all occur around the schedules of the other interprofessional team members (Lumague et al., 2006; Long et al., 2002). Stroke nurses work together with other interprofessional members to provide a comprehensive care plan dedicated towards optimal rehabilitation and novice nurses must overcome their challenges and actively engage in the collaborative nature of the unit. A learning resource designed with pertinent stroke information, reflective and critical thinking case-studies engaging novice nurses and students in understanding interprofessional roles, and which encourages active learning can provide those new nurses entering the unit a guided information resource surrounding what to expect, therefore decreasing anxiety, improving confidence and allowing novice nurses to engage in their interactive stroke unit role.

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Appendix A: Literature Summary Tables

Study	Methods	Results	Conclusion
Authors: Foley et al. 2012 **Objective:** To determine whether the best practice standard of 1 hour of rehabilitation was met on a single specialized stroke rehabilitation unit. **Study Design:** Case Controlled Study	-123 patients. -30 bed stroke/neurological rehabilitation program in Western Ontario. -A multivariate model to predict functional Independence Measure (FIM) gains were developed using physical and cognitive disability in stroke care. -FIM measures six areas of function: mobility, self-care, sphincter control, locomotion, communication and social cognition. -Bivariate Pearson's correlations were examined between FIM gain and potential predictor variables. -Variables that were significantly correlated ($p<0.05$) with FIM gain/day were put into the regression model. -Unstandardized Beta coefficients with standard errors (SE) and 95% confidence intervals (CI) were presented. -Two-tailed tests of significance were used for analysis.	-Average of 37 mins of active therapy from PT and OT. -13 mins of therapy from SLP. -Informal therapy from nurses and recreation therapy less than 5 mins. -Admission FIM, LOS, and therapy time were significantly correlated with FIM gain. -Therapists failed to meet the minimum standard of 1-hour therapy time. -Only 67-74% of therapy time was spent on therapeutic activities, while the remainder was used on assessment and consultation. -Patients were also unavailable for an average of 32 mins a day due to medical investigations. -Patients who received more therapy from OT experience greater FIM gains. -An increase in rehabilitation therapies were associated with shorter LOS and greater independence at discharge.	**Strength of Design:** Moderate **Strengths:** -The study allowed the researchers to isolate therapeutic intervention from non-therapeutic activities. **Limitations:** -Therapy times were self-reported and could be overestimated or biased. Observation and confirmation by an independent third party could have decreased this bias. -Informal therapy with nursing staff, recreational therapy, or anything less than 5 mins weren't included in final time. -Only time of therapy was measured, quality of care not included in study. **Conclusion:** -Patients received an average of 37 mins of therapy time, falling short of recommended 1 hour. This therapy time contributed significantly to the gains in FIM scores during hospitalization.

Study	Methods	Results	Conclusions
Authors: Hezaveh et al. 2014 **Objective:** To investigate the experiences of the unpreparedness of novice nurses. **Study Design:** Mixed Methods	-21 persons: 17 novices nurses, 4 nursing managers. -Unstructured interviews. Interviews continued until data saturation achieved. -Field notes noted the nonverbal behaviours and person's interactions with people around them. -Content analysis used to code data and determine subcategories and then categories. -Themes are determined from categories. -Member check was completed to ensure data accuracy and changes were made based on participant suggestions.	-Three major themes: (1) Functional disability which highlighted their functional deficits, including accuracy and speed of providing tasks. Identifying a vein, adjust serum drops, pre/post-surgery care, tracheostomy care, and CPR. (2) Communication problems which included communication with colleagues and patients. Novice nurses describe having difficult connecting with patients or families. Inability to report status to doctor, fear of communicating wrong. All impact the nurse's confidence and self-esteem. (3) Managerial or leadership challenges which include time management, working with nurse shortages. Trouble coordinating with other floors or being put in leadership role.	**Strength of Design:** Moderate **Strengths:** -Maximum variation sampling increases the generalizability. -Prolonged experiment which develops trust and rapport and leads to deeper data. -Participants checked the data and added or changed things as necessary leading to improved credibility. -Raw data, interviews and products of analysis were investigated and audited to provide confirmability and dependability. **Limitations:** -Themes are identified through the data, possibility of themes being missed if not enough people involved in analyzing data. **Conclusion:** -The study found three major aspects of unpreparedness for novice nurses which could be utilized for future planning in the nursing curriculum or developing programs.

Study	Methods	Results	Conclusions
Authors: Ilott et al. 2014 **Objectives:** To evaluate the learning effect and resource use of workplace-based, blended e-learning about dysphasia for stroke rehabilitation nurses. **Study Design:** Single group, pre-post study with mixed methods.	-20 registered nurses, 10 health care aids, and two ward managers. -30 of the participants were female, 2 males. -Sessions were facilitated by an experienced nurse lecturer. -Comprised of a need's assessment, e-learning program, and practical skills surrounding dysphasia and modifying liquids. -Qualitative and Quantitative data were collected. -A 16-hour pre-intervention observation focused on practice, including barriers and benefits to blended e-learning. -An 18-hour post-intervention observation occurred after the educational intervention has been completed. -4 questionnaires were administered to measure reactions to training, retention of knowledge. Behavioural changes and transferring the training to practical usage. -Data analysis used Wilcoxon signed rank test and Friedman test. Significance was set at 5%.	-All three e-learning programmes were positively evaluated with 75% agreeing they were easy to utilize. -Most rated the programmes as relevant to their professional role. -The Friedman test showed that there were statistically significant changes on five knowledge questions over the three time points. -Participants also reported positive attitudes towards dysphasia on the pre-intervention which became even more positive, perceiving more knowledge and less disagreement with treatment on the follow up survey. -Some changes in practice were observation post-intervention. -RNs also reported a change in attitude towards dysphagia post-intervention.	**Strength of Design:** Moderate **Strengths:** -In depth study surrounding one specific ward, improving trustworthiness of participants. -Evidence of sustainability six months post intervention indicates the value of learning and how it changed practice. **Limitations:** -Small sample size. -Can only infer since there is no control or comparison group. **Conclusion:** -The findings inferred the pivotal role nurses play in dysphagia management and the receptivity of experienced nurses in enhancing their knowledge and improved their practice.

Study	Methods	Results	Conclusions
Authors: Long et al. 2002 **Objective:** To identify the contribution of the nurses within a multi-professional rehabilitation team. **Study Design:** Two phased design: phase one is an ethnographic study of contrasting studies and phase two is four national expert workshops.	-49 clients. -Multiple methods and points of data collection. -Over 330 hours of observation work. -All clients were interviewed at least once, along with primary care givers and 88 staff members. -Field notes were taken, shared and discussed amongst field workers. -Purposive sampling until saturation of data achieved. -Theoretical sampling to ensure variation of age, gender and severity of illness. -Clients were followed through the rehabilitation of their illness (either fractured neck of femur, rheumatoid arthritis, or stroke) and nurse's involvement was explored. -Each client was followed up for up to 6 months.	-Nurses contribute six roles to the multi-professional rehabilitation team: (1) Assessment: monitoring for urinary tract infections, pneumonia, pain, wounds, constipation, fall risks and chest infection. (2) Co-ordination & Communication: inter-professional collaboration, sharing of pertinent information between disciplines. (3) Technical & Physical care: hygiene, wound care, nutritional support and rehabilitation exercises. (4) Therapy Integration: completing prescribed therapy or ensuring patient is ready. (5) Emotional Support: reassurance, explaining activities and answering questions. (6) Familial Involvement: supporting and involving family in care.	**Strength of Design:** Moderate **Strengths:** -Good sample size -National expert workshops provide expert authentication of findings. **Limitations:** -One location so it may limit the generalizability, and credibility of findings. **Conclusion:** -The study gave an overview of the nurse's contribution amongst rehabilitation therapy. It gives nurses at an educational level the full understanding of rehabilitation principles.

Study	Methods	Results	Conclusions
Authors: Lumague et al. 2006 **Objective**: To describe the inter-professional education (IPE) program introduced in Toronto, including goals and the benefits and barriers. **Study Design:** Clinical placement, pre-post discussion.	-9 students. -7 different health care disciplines including: medicine, nursing, occupational therapy, physiotherapy, pharmacy, social work, and speech language pathology. -Five-week IPE clinical placement. -Two group orientation sessions to introduce concepts of inter-professionalism and group dynamics. -Weekly tutorials facilitated by corporate IPE facilitators and health care professionals on the unit. -Tutorials contained patient care theme, patient case studies. -Discussion on patient care issues, student and professional perspectives and concluded with patient goals and treatment options. -Real-life examples of case studies.	-Different professionals discovered how their roles could change in an inter-professional collaborative setting. -Physiotherapist could guide nursing staff in proper lifting techniques and work with them in rehab. -They could also collaborate with staff to ensure patients receive pain medication before therapy. -Occupational therapy assisted with functional ability and providing equipment but often must interact with physiotherapy and nursing to assist with patients' goals and ensure equipment is utilized properly. -Student nurses realized the level of rehabilitation care nurses engage in on a stroke unit, actively participating in therapy while working collaboratively.	**Strength of Design:** Moderate **Strengths:** -Improved knowledge of various roles and responsibilities between inter-professional teams. **Limitations:** -Small sample size. -Many institutions do no promote shared learning amongst colleagues. -Lack of resource may affect ability to utilize an inter-professional education programme. -Scheduling conflicts between disciplines may make it difficult to meet and complete assignments. **Conclusion:** -To help students understand the complexity of collaborating inter-professional in a health care environment, more emphasis needs to be placed on working inter-professional in the education program.

Study	Methods	Results	Conclusions
Authors: MacKenzie et al. 2016 **Objective:** To determine if an inter-professional collaborative team simulation could exhibit an improvement of best practice recommendation and attitudes in Canadian Inter-professional Health Collaborative inter-professional competencies. **Study Design:** Retrospective pre-post self-reported design.	-302 students (274 on-site, 28 distance technology) divided into 55 teams of 5-7 students. -Teams met for 90-minute simulation to review and discuss patient chart and goals. -Teams prepared a 2-week collaborative care plan to prioritize issues and identify patient-centred goals. -Care plans were then submitted for evaluation. -Teams were graded based on their ability to identify patient key concerns, develop collaborative care goals, and their plan to assist with goals. -The inter-professional education (IPE) design included stroke best practice recommendations (BPR) and inter-professional practice (IPP) competencies.	-287 students (95% response rate) provided free-text comments and 248 (82% response rate) completed the inter-professional collaborative competency assessment scale (ICCAS). -A 3-way univariate full factorial ANOVA was utilized with professional and inter-professional experience between subject factors. -The ANOVA was used on 20 individual questions as well as questionnaire factors. -Significant improvement for all pre-post ratings on the ICCAS regardless of profession or previous experience. -Open ended responses identified perceived changes to role clarification, communication and teamwork.	**Strength of Design:** Moderate **Strengths:** -Large sample size. -Combination of assessment scale and open ended free-text responses. **Limitations:** -Data source is self-reported and self-perceived with a potential for bias. -Unable to determine whether accuracy of data is due to self-reflected scoring or other confounding factors. **Conclusion:** -Evaluation results support inter-professional team simulation as an effective and efficient learning experience for students regardless of previous experiences.

Study	Methods	Results	Conclusions
Authors: Menon et al. 2010 **Objective:** To explore best practice among stroke rehabilitation professions. Also, to determine barriers to improving knowledge and effective knowledge transitions (KT) strategies to improve clinical practice. **Study Design:** Literature Review	-5S pyramid used to determine e-learning resource reliability. -Bottom of the pyramid are primary studies such as those found in MEDLINE. -Then syntheses, or systematic reviews. -Then synopses, or critical appraisals of original articles and reviews. -Followed by summaries which provide comprehensive overviews of evidence. -Finally, the top of the pyramid is systems such as a computerized decision support-system. -Relevant literature surrounding evidence-based practice in stroke rehabilitation and the usage of KT strategies were summarized and discussed throughout the article.	-Adherence to best practice recommendations can improve patient outcomes post-stroke. -However, clinicians do not routinely follow best practice. -Barriers to best practice include: lack of protected work time, lack of confidence in research, lack of skills to interpret, lack of computer literacy of skills, and volume of research available. -Studies showed that active KT strategies were most effective than passive KT strategies. -Interactive e-learning resources could provide clinicians with KT strategies and solutions for best practice in an easy manner and improve dissemination of stroke information in an efficient way.	**Strength of Design:** Low-Moderate **Limitations:** -Lack of literature summary tables to identify all articles. -Article is not organized appropriately making it difficult to read. -No inclusion or exclusion criteria for articles. **Conclusion:** -E-learning opens an opportunity to disseminate stroke best-practice recommendations and knowledge translation strategies internationally.

Study	Methods	Results	Conclusions
Authors: Menon et al. 2012 **Objective:** To demonstrate the application of an evidence-based approach to usability testing of two stroke e-learning resources. **Study Design:** Mixed Methods Approach	-Purposive sampling utilized to identify potential clinicians. -14 clinicians recruited to ensure data saturation. -Consenting clinicians completed an individual 1.5 hour, in person testing session facilitated by a highly trained research assistant. -Clinicians were given a vignette with stroke information, using the information given they would search StrokEngine for further knowledge which would help answer 5 research questions relating to their case. -Clinicians were encouraged to "talk out loud" and discuss their likes or dislikes while observed by the research assistant. -Research assistant noted any visual or verbal cues indicating any positive or negative feedback for the research engine. -Questionnaires with open and close ended questions were provided as well.	-Clinicians verbal comments were transcribed verbatim and content analysis was utilized to form dominant themes. -Five major themes were identified: (1) Screen format (clear and visually appealing) (2) Layout and organization of information on homepages and modules (site was consistent and organized) (3) Ease of navigation (4) Quality of content (5) Likelihood of using StrokEngine in the future. -Three barriers were identified: (1) Screen format (links not clearly visible) (2) Layout and organization of information within a module (organization was different between in-depth review and quick review) (3) System dysfunctions (links not working properly)	**Strength of Design:** Moderate **Strengths:** -Purposive sampling was used and saturation of data was obtained. No new ideas or themes emerged. -Good inclusion and exclusion criteria. **Limitations:** -Clinician population for study was not conductive of all possible health care professional who could utilize StrokEngine. -Gender imbalance, as all clinicians were predominately female. **Conclusion:** -Those in research and medical professionals have a responsibility to work together to share evidence-based practice in a user friendly manner. This paper showcases the usability of health-related e-resources.

Study	Methods	Results	Conclusions
Authors: Telner et al. 2010 **Objective:** To evaluate clinician satisfaction and knowledge gained from game-based learning compared to traditional case-based learning in a medication education event on stroke prevention and management. **Study Design:** Experimental randomized controlled trail.	-35 family medicine physicians. -The game based on "Snakes and Ladders" and consisted of 22 multiple choice and true-or-false questions. -Each game involved 3 teams of physicians and a trained moderator. -Case groups contained 5-7 participants and a trained facilitator. -Sample size was calculated at a study power of 80%, alpha 0.05 and standard deviation of 3.5. -35 participants recruited and randomized into blocks of 6 (either case-based or game-based groups). -All participants viewed a 30-minute video about stroke prevention and management to ensure similar baseline of knowledge. -17 participants in case-based group, 18 in game-based group. -All participants completed a 40-item knowledge test and 34/35 completed a session evaluation form. -3 months later 31 participants completed a post	-Immediate post-test: on average, the game-based group scored 1.6 points lower (out of 40 questions) than the case-based group (P=0.24; lower limit 95% CI -3.8). -3-month post-test; 89% of Participants completed the 3 months follow up. On average, the game-based group scored 0.3 points lower than case-based group (P=0.83; lower limit of 95% CI -2.5). -Upon completing the evaluation form, game-based participants chose "strongly agree" for most statements. -Game-based participants also agreed that the event was enjoyable (94% vs 53%; P=0.02), that their attention was high during the event (88% vs 41%; P=0.012), and that they would return for another education session (82% vs 41%; P=0.034).	**Strength of Design:** Strong **Strengths:** -Participants were randomized between groups. -Statistics utilized to determine significance. -Test/Program is repeatable. -3 month follow up determined long term retention of knowledge. **Limitations:** -Small sample size due to recruiting difficulties since it required you of participant's time during the event. -The study only measured the knowledge even and not change in clinical practice. **Conclusion:** -Game-based knowledge was compared to case-based knowledge, especially after a 3 month follow up. -Game-based knowledge was also noted to be more enjoyable than case-based knowledge with higher participant satisfaction.

Study	Methods	Results	Conclusions
Authors: Silva et al. 2010 **Objective:** The purpose of the study was to investigate the challenges faced by the nurses during the first year of their nursing work. **Study Design:** Qualitative Exploratory Research	-31 nursing professionals. -After 20 interviews conducted, the researchers perceived that data was repeated but attempted to expand the possibility of new information by conducted another 11 interviews. -Semi structured interviews with open and closed questions, recorded with the interviewees' consent. -Atlas Ti software for qualitative data was used. -Analysis process: reading and rereading of the interviews; coding of expressions and/or phrases related to the challenges of nurses' professional practice. -Grouping of similar codes, leading to the elaboration of two categories that cover the different challenges newly graduates face when inserted into the job world.	-90% of participants were female. -38.7% started in hospital, 19.35% in family health program, 19.35% in health secretaries, 16.124% in teaching institutions and 6.48% did not share initial workplace. -Two main categories/themes that represent main challenges: (1) Team Leadership; taking charge of nursing team, overcoming prejudice of little experience and being young, conquering role changes for graduates who used to work in lesser role and are now in charge of colleagues. Also, some team members demonstrated lack of confidence and felt unprepared. (2) Competency and technical skill; usually involved with speciality areas and having to make high risk decision making. High complexity care remains a challenge, nurses may feel insecure, anxiety and even anguish when caring for high complex patients.	**Strength of Design:** Moderate **Strengths:** -Data saturation was achieved by conducting interviews until no new data obtained. -Inclusion criteria provided. **Limitations:** -Research kept to only one state. -No mention of controlling for any bias. -No discussion around generalizability or confirmability. **Conclusion:** -The study identified some challenges faced by newly graduated nurses, mainly team leadership and competency/technical skills. This suggests hat novice nurses are not well prepared for assuming a leadership role or caring for clients in high complex areas. -In order to cope with these challenges' new strategies of education and nursing practice would need to be developed to improve the well roundness of nursing education.

Study	Methods	Results	Conclusions
Authors: Dellasega et al. 2009 **Objective:** The goal of this study was to explore whether the orientation needs of seasoned nurses are similar to or unique from novice nurses. **Study Design:** Qualitative study	-Participants were monitored during the 6-month orientation period. -Each nurse functioned in a speciality area and/or supervisory positions, so they qualified as both experienced and expert nurses. -Initial 3 months a daily professional journal focused on responses to the new job situation. -After 3-month orientation period, a focus group was held to further explore the concept of transitioning into a new position. -The focus group lasted approximately 90 minutes, and was tape recorded. -The tapes were transcribed and independently coded by each of the nurses, the facilitator, and the clinical supervisor. -The focus group transcript was reviewed to identify themes related to orientation. -Journal entries were used to confirm or contradict themes as appropriate. -Themes were coded until data saturation was achieved.	-Three themes emerged from the analysis: (1) Assessing expectations – during initial weeks of orientation nurses reported stressfulness, anxiety, nervousness, and somatic response. Specific anxieties were ability to perform new job responsibilities, nature of new co-workers, conflict and job uncertainty. (2) Realistic Appraisal – confronting challenges, they have enough understanding of new job to be realistic of their appraisal. Can identify knowledge deficits and their ability to handle them. (3) Acceptance – confidence grew, and they could recognize their abilities to meet the requirements of the new job. Feeling more confident about their role. At the end of orientation, nurses reflected and had awareness of professional and personal growth.	**Strength of Design:** Moderate **Strengths:** -Data saturation was achieved. -Data obtained over a fair time period. -The nurses represented an elite group with deep experiences and expectations. **Limitations:** -Small sample size. -Possible therapeutic benefit and bias. -Nurses represent specialized role. **Conclusion:** -All further research can provide more generalizable information; the results of this study nonetheless offer insights which can help shape the recruitment and retention of experienced nurses.

Study	Methods	Results	Conclusions
Authors: Dyess & Sherman, 2009 **Objective:** The article presents findings about new graduate nurse transition and learning needs from quality research conducted in a community-based novice nurse transition program. **Study Design:** Qualitative study	-The leadership content was developed using resources such as the American Organization of Nurse Executive competencies and the Robert Wood Johnson Executive Nurse Fellows competencies. -The curriculum was developed to include 20 full-day learning sessions delivered two Fridays each month across 12 months. -The live learning sessions were complemented by asynchronous dialogues on a Web-based blackboard site. -Program participants were selected by the partner sites using general guidelines. -Participants were graduates with either an associate degree or a BN. -Candidates needed to commit to attend all the sessions and complete an evidence-based project. -The first 3 classes of NNLI included 81 participants. -A qualitative research study was designed involving pre-and post-program focus groups and using hermeneutic analysis. -Semi structured taped interviews.	-Several key themes were identified from the data analyzed: (1) Confidence and fear, (2) Less than ideal communication, (3) Experiencing Horizontal violence, (4) Perception of professional isolation, (5) Complex units require complex critical decision-making, (6) Contradictory information. -These themes lead to recommendations such as: further support throughout the first year, interdisciplinary communication skills to assist with difficulties with communication, provide strategies for responding to violence, develop a link to leadership so new grads have access to higher professionals, extend transition support for critical or speciality units, and have consistent preceptors who focus on positive encouragement and development.	**Strength of Design:** Moderate **Strengths:** -Interviews were conducted until data saturation obtained. -Conducted over the span of 1-year transition period for new graduates. **Limitations:** -Study did not account for bias, generalizability or confirmability were not discussed. **Conclusion:** -There is a heightened interest in new graduate nurses' transition and learning needs during their first year of practice. -Factors contributing to the dynamic transition and learning needs of new graduates include rapid deployment, costs containment efforts, increasing patient accuracy, and chaotic practice environment. -Continuing education initiatives are needed that will meet the needs of new nurses during their first year of practice.

Appendix B

Consultation Report

According to the Public Health Agency of Canada (PHAC), an acute stroke occurs when the brain is injured leading to cell death (PHAC, 2016). A stroke can either be ischemic, obstructed blood flow due to narrowed arteries in the brain, or hemorrhagic, where a blood vessel in the brain ruptures (PHAC, 2016). Patients admitted to an acute neurological stroke unit will receive optimum rehabilitative care with the interprofessional team of physicians, nurses, physiotherapists, occupational therapists, dietitians, social workers, and speech language pathologists (Hebert et al., 2016). Novice and experienced nurses require orientation to their new roles to optimize stroke care for patients. A stroke unit requires nurses to develop goals, collaborate with interprofessional team members, and complete rehabilitation with stroke patients to improve their physical, functional, and cognitive ability (PHAC, 2016).

Purpose of Practicum Project

To optimize the orientation for novice and experienced nurses beginning to work on the stroke unit at the Health Sciences Centre in St. John's, NL, I proposed creating a learning module which would highlight information pertinent to the stroke care for patients on the unit. This learning resource will educate nurses on strokes: the types, severity, symptoms and disabilities, rehabilitation requirements, and role of the interprofessional team. Since a stroke unit focuses on rehabilitation of stroke patients and requires a high level of collaboration, having a learning resource which can provide nursing staff with expectations, and responsibilities will help novice and experienced nurses prepare for working on a new unit.

The stroke unit learning resource will be an interactive internet-based learning module containing passive learning of stroke background knowledge, as well as active

learning through case studies, simulation, and game-based learning (Scheckel, 2016; U.S. Department of Education, 2009; & Ruiz, Mintzer & Leipzig, 2006). With the increase in online learning, it has become common for students to show a higher level of engagement and satisfaction with e-learning resources, allowing a more flexible, accessible program which can be utilised at home or work (Ilott et al., 2014; McCuthcheon, Lohan, Traynor, & Martin, 2014; Menon et al., 2010; & Ruiz et al., 2006). Nurses can therefore prepare for orientation prior to entering the workplace, allowing for active engagement and self-directed learning (Ruiz et al., 2006).

There are many different learning strategies which can be utilized to further nursing knowledge on the roles and responsibilities within a stroke unit such as cast studies, simulation, and game-based learning. Case studies represent an in-depth analysis of a real-life situation which encourage active critical thinking, building on prior knowledge, and connecting everything to clinical practice (Phillips, 2016). Participating in a case study allows learners to collaborate on studies and encourages interprofessional learning (Phillips, 2016; Souza & Souza, 2014). Games, simulation and role play will also be highlighted in the learning resource. Simulation and role play engage students in actively becoming the patient or nurse, so they can interpret how they will feel in different situations, thereby developing empathy and building a stronger connection with their patients (Sharma, 2017; Marshall et al., 2016). Game-based learning can encourage active participation and improve overall satisfaction with the education session over lecture style teaching (Telner et al., 2010). These different types of learning strategies will be utilised in the learning resource to encourage participation and actively engage

students in learning more about stroke care, roles and responsibilities, and how to collaborate with interprofessional team members.

Consultations

Consultation requires the act of consulting with an expert or professional to seek advice on a topic of interest. Consultations were required to determine current stroke policies and procedures, interprofessional roles and responsibilities, and current behaviours on the stroke unit. Interviews and questionnaires have been completed to highlight the opinions of different professionals. These consultations were also aimed at identifying current guidelines for stroke orientation, as well as, opinions on effective teaching and learning strategies, and expectations for nurses' roles and responsibilities on the stroke unit.

Participants

Interviews were requested and completed with the current clinical educator and stroke coordinator for the stroke unit, 4SB at the Health Science Centre in St. John's, Newfoundland. An interview was also requested with the manager for the unit, however, she was on holidays and unavailable at the time. The clinical educator interview focused on current orientation procedures and input into effective teaching and learning strategies for the learning resource. Appendix A contains the clinical educator interview questions. The stroke coordinator questions focused on current policies and procedures, and current education requirements or plans for education in the foreseeable future. Appendix B contains the stroke coordinator interview questions.

Questionnaires were administered to the nursing and interprofessional staff on the unit. These questionnaires focused on current stroke knowledge, orientation practices,

nursing roles and responsibilities, interprofessional expectations, and consideration of effective teaching and learning strategies. Ten questionnaires were completed by nursing staff, no other interprofessional team members chose to complete the questionnaires even with encouragement. Face-to-face interviews were conducted with two staff nurses with over ten years nursing experienced. The interviews focused on current orientation practice, possible improvements, and current nursing practice and interprofessional team collaboration. Appendix C includes the nursing staff questionnaire/interview questions.

Data Management & Analysis

Following completion of interviews and collection of questionnaires, the data was read thoroughly and then organised and coded into major concepts while searching for the underlying professional opinion of nursing staff to identify important information for the developing learning resource. These concepts were determined based on professional nursing opinions to identify pertinent information which could be including in the learning resource.

Interviews with the clinical educator and stroke coordinator were typed verbatim as transcripts. These transcripts were read thoroughly to familiarize with the information and data collected. The important concepts for the learning resource were identified and coded into two separate tables for ease of assess of pertinent information.

Clinical Educator Responses

The interview conducted with the clinical educator highlighted that current orientation practices are generalizable to any medical or surgical floor. The clinical educator spends one week with new hires and two or three hours with transfers orientating them on computer training, oaths, policies, and medical equipment. During

orientation there is nothing specific for stroke care or stroke care policies, it is assumed that nursing staff will learn what is necessary during their orientation on the floor. Current orientation strategies include classroom-based learning, rare use of the code blue simulator and online modules through the LEAP program for compressed gas and WHIMIS. While the clinical educator identified that distance learning is a very common form of e-learning and it is highly flexible for learners she primarily uses lecture-based learning. She stated that "nurses must be responsible for their own education". She also believes that there may be a "gap between orientation and practice for unit specific care". The clinical educator stated that "a learning resource on stroke practices and interprofessional collaboration would be useful for self-study". It would allow for nursing staff to gain general knowledge prior to starting on the unit. The generalizability of the orientation period and lack of specific stroke orientation further encouraged a need for a learning resource which could be used for self-study or nursing mentors to guide orientation on the floor.

Stroke Coordinator Responses

The stroke coordinator interview identified that the coordinator role is primarily to collect data via audits to collate it and show that human resource hours are justified. The audits are used to determine the compliance of stroke best practice guidelines. The interview identified that current education practices include a yearly stroke education day and a stroke course offered to nursing staff every three to four years with the last session occurring in 2014. The coordinator indicated that a stroke course would be available in the upcoming fall season for any full-time nursing staff interested in completing it. She

indicated that a learning resource could make staff aware of the benefits of providing care and believes that nursing staff are "more invested in changing their behaviours or how things are done if they understand the reason why they are changing these behaviours". She encourages hands on practice and group work to improve team communication and to highlight strong team leaders. It was also indicated in the interview that webinars and e-learning are especially useful for including those in rural areas or outside the province.

Nursing Questionnaire Responses

Nursing staff interviews and questionnaires were read through twice and coded into a table highlighting the major concepts discussed including: stroke, nursing roles, stroke unit changes, interprofessional collaboration, Canadian Stroke Best practice, learning resource and strategies, and orientation suggestions. More than half of the participants defined stroke as a traumatic brain injury, with one third specifically dividing stroke into two categories ischemic, loss of blood flow, or hemorrhagic, blood clot in the brain. This highlighted that most of nursing staff had the basic knowledge and definition of strokes. Nursing roles, however, were more diverse with most participants identifying the physical care, personal care, emotional support for patients and families, and administration of medications as nursing responsibilities. Half of the participants also identified physical assessment, rehabilitation, and assistance with activities of daily living, such as toileting or dressing, as other nursing responsibilities. Admitting and discharging or transferring patients, swallowing assessments, collecting blood, checking orders and labs, relaying pertinent information to physicians and other team members, and answering phones or faxes were identified by a couple of participants as other nursing

responsibilities. It was clear from the questionnaires that there are many different nursing roles which constantly changed based on the needs of the patient and optimum goal of recovery.

Another important concept discussed were specific stroke unit changes with the questionnaires identifying staff ratios, increased mobilization and communication, and changes in medical rounds as the important changes by most of the participants. It was also highlighted that there was an increase in interprofessional team members and a specific stroke order sheet. Questions surrounding interprofessional collaboration showed that most participants noted a significant interaction between nursing staff and other professionals, with a high level of communication, increased collaboration and the awareness that other health professionals provide specific and useful knowledge to nursing staff. This information provided by the questionnaires provides me with a foundation for developing my learning resource. It gives a basis of what roles and responsibilities nursing staff are aware of which will be included in the resource, and highlights which areas need improvement. While nursing roles were very diverse, the staff highlighted the importance of communication and collaboration with interprofessional teams, however, they did not highlight the specific roles and how they may influence nursing staff which will be provided in the learning resource.

The participants stated that e-learning would be beneficial, however, they failed to identify why. Case studies and role play were indicated as most beneficial for learning since they involve real-life scenarios, and hands-on learning, while another participant indicated that they learn via visual aids. Other suggestions for improving orientation

included more time on the stroke unit, and education sessions on stroke knowledge and physiology, and interprofessional team roles.

Nursing Interview Responses

Interviews were conducted with two senior nursing staff, with over ten years experience in neurology. The questions were the same as the questionnaires but in an interview setting. These experienced nursing staff defined stroke care as an injury to the cells in the brain resulting in cell death, stating it could be either ischemic or hemorrhage, with CT imaging identifying the type and severity of stroke. The nursing roles were diverse with both individuals identifying the personal or physical care, including toileting, washing, and rehabilitation; physical and mental assessments, and administration of medications as the primary nursing duties. One nurse also highlighted the non-nursing duties such as answering phones, transferring patients, cleaning spills, and changing garbage stating that it "took time away from more essential nursing duties". The other nurse also indicated the nurse's role in emotional support for patient and families, especially in relation to stroke care and rehabilitation.

The interviews both identified the importance of collaboration with interprofessional team members to ensure the patient is receiving optimum rehabilitation. It was noted that each member of the interprofessional team had an important role in stroke rehabilitation. One nurse stated that communication and collaboration were essential for the stroke unit, with members needing to constantly communicate to plan patients' days so it ran cohesively rather than "stepping on other professionals' toes". She explained that working together required strong communication and a constant "balance" to ensure that patients were able to receive collaborative care. An example provided by

the nurse was ensuring a patient had received prompt personal care, vital sign checks, and pain medication prior to a physiotherapy assessment to ensure the patient was at their best to actively engage in the therapy. Another example provided by second interviewee was a failure in communication that the occupational therapists intended on doing an assessment of personal care, however, the nursing staff had already assisted with activities of daily living because they were unaware that an assessment was to be completed. Both interviewees highlighted the need for good communication and stated it was the most important concept to share with novice nurses coming onto the stroke unit.

The interviewees understood that the practice they engaged in such as oral care protocols, toileting schedules, and staff ratios were part of the stroke best practice guidelines. However, they indicated that while they respected the high level of care expected they themselves had not looked up the overall practice guidelines. This indicated that a general summary of the different guidelines would be beneficial for individuals to gain a better understanding of best practice expectations. The interviewees both agreed that a learning resource with important information summarized would be useful for guiding new staff and could be used as a "self-study" tool for preparing new staff. One interviewee stated that she was a visual learner and found diagrams, pictures and charts helpful, though she also stated that anything based on the internet wouldn't be helpful for her since she did not always find computer programs accessible. The other interviewee thought that internet-based programs would be helpful for the newer generation and stated that role-play and scenarios with group discussion was always the best method of learning in her opinion.

Overall both interviewees identified different roles for nursing staff and the changes which came about with the creation of the stroke unit. They both felt that communication and collaboration played a big role in stroke care nursing and thought it would be beneficial to gain more understanding of the best stroke practices if they were summarized in point form. While they did not both identify each different nursing or interprofessional role, the major responsibilities were identified. Based on the interviews and questionnaires it is apparent that the nursing role is diverse and with interprofessional collaboration and communication such an important concept within the stroke unit it would be beneficial to have a resource which highlighted everything in a clear concise manner.

Ethical Considerations

Informed consent will be implied based on the individuals choosing to participate in the interviews or questionnaires. Individuals who are interviewed will be asked to remain anonymous. Those who complete the questionnaires will be identified by their profession to ensure confidentiality and no names will be necessary on the questionnaires. Completed questionnaires will be kept in a folder in the locked charge nurse's office. They will be transferred from the hospital to my office via briefcase and kept secure in a filing cabinet. The human research ethics authority screening template was completed identifying the project as quality/evaluation which does not require ethical approval from the Human Research Ethics Board of Newfoundland and Labrador. The completed template is available in appendix F.

Conclusion

The primary purpose for conducting interviews and questionnaires were to determine what the current stroke care knowledge, nursing roles, and interprofessional roles and responsibilities were for the stroke unit. Interviews with the clinical educator and stroke coordinator were used to determine current orientation practice, and educational requirements to determine whether a learning resource could fill a perceived knowledge gap. Gaining the professional opinion of learning strategies and recommendations were also beneficial in providing guidance for developing the learning resource. These consultations can provide guidance in designing a learning resource which could benefit self-study during nursing orientation. Nursing roles were highly diverse and the importance of interprofessional communication and collaboration was identified during the interviews and questionnaires. Having a resource which highlighted the different roles and responsibilities and stroke best practice policies would benefit a novice nurse in preparing to enter the stroke unit.

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Appendix A: Clinical Educator Interview Questions

1. What does Canadian Stroke Best Practice Guidelines mean to you?
2. How do you orientate new staff to the unit?
    a. Is there specific orientation for the stroke unit?
3. What is the current length of time for the orientation period?
4. What are some learning strategies which are currently used during orientation?
5. My research shows that e-learning, case studies, role-play and simulation are the most effective learning strategies.
    a. What are your experiences with e-learning?
    b. What are your experiences with case studies?
    c. What are your experiences with role-play?
    d. What are your experiences with simulation?
6. The above learning strategies may be included in the learning resource, do you think they will be effective in enhancing knowledge of stroke care?
7. Are there any other learning strategies which you think would be beneficial during nursing orientation?
8. Do you believe a learning resource designed to improve knowledge of stroke, interprofessional role and responsibilities and best practice would be useful for orientating new nurses to the unit? Is there any content which you think I should include?
9. Is incorporating these strategies into the orientation phase feasible? Would you change any of your current orientation practices based off this learning resource?

10. Any recommendation for the content of the learning resource or how it can be delivered during the orientation phase?

Appendix B: Stroke Coordinator Interview Questions

1. What are your responsibilities for the stroke unit?
2. What does Canadian Stroke Best Practice Guidelines mean to you?
    a. Are there audits being completed for the stroke unit to identify whether current best practice is used?
3. Are there any new policies and procedures being implemented on the unit related to stroke care in the past few months?
4. What are the current educational requirements for the nurses on the stroke unit?
    a. Are all staff up to date on current practices according to stroke best practices?
    b. Are there any future educational sessions for improving stroke knowledge?
5. Do you believe a learning resource designed to improve knowledge of stroke, interprofessional roles and responsibilities and best practice would be useful for orienting new nurses to the unit?
6. My research shows that e-learning, case studies, role-play and simulation are the most effective learning strategies.
    a. Do you think an e-learning resource (a resource available online with the necessary stroke knowledge, interprofessional roles and nursing responsibilities) will benefit nurses entering the unit? Is it something could enhance nurses' knowledge on stroke care?
    b. What are your opinions on using case studies as a teaching strategy? For example, the research shows that case studies represent an in-depth

analysis of a real-life situation, thereby making participants actively engage in critical thinking by building on their previous knowledge and connecting it to clinical practice.

c. What are your opinions on using role play as a teaching strategy? For example, the research shows that role play requires the learners to act out a patient situation, where on learner becomes the patient and the other learner, the nurse, attempts to assist their patient.

d. What are your opinion on using simulation as a teaching strategy? For example, simulation is the replication of a real-world event to improve clinical skills and knowledge, such as using mannequins with palpable pulses, blood pressure, breath and bowel sounds, catherization, and naso-gastric tube insertions to practice.

e. Are there other learning strategies which you think would benefit learning and should be included in the stroke resource?

7. Do you have recommendations for how this content can be delivered during the orientation phase?

8. Would you support a new orientation plan for nursing staff that incorporates various teaching strategies to enhance knowledge and abilities of nurses to provide care for stroke patients?

Appendix C: Nursing Staff Questionnaire/Interview Questions

1. What does stroke mean to you?
2. What is the nurse's role and responsibility on the stroke unit?
3. Did you work on the floor prior to the opening of the unit in 2016?
    a. If so, what changes have occurred in your professional responsibilities within the stroke unit?
4. How would you define collaboration?
    a. How do the different professionals "work together"?
    b. How well do the nurses work with the other professional groups on the unit?
5. What do Canadian Best Stroke Practice Guidelines mean to you?
    a. How do you use these stroke guidelines in your practice?
6. Do you believe a learning resource containing information on stroke, rehabilitation requirements, collaboration, best practice, and the interprofessional roles and responsibilities would better prepare for nurses entering the stroke unit?
7. My research shows that e-learning, case studies, role-play, and simulation are the most effective learning strategies.
    a. If the stroke learning resource was available as an e-learning resource that is accessible at home, would you use it?
    b. What are your opinions on using case studies as a teaching strategy? For example, the research shows that case studies represent an in-depth analysis of a real-life situation, thereby making participants actively

engage in critical thinking by building on their previous knowledge and connecting it to clinical practice.

   a. What are your opinions on using role play as a teaching strategy? For example, the research shows that role play requires the learners to act out a patient situation, where on learner becomes the patient and the other learner, the nurse, attempts to assist their patient.
   c. What are your opinion on using simulation as a teaching strategy? For example, simulation is the replication of a real-world event to improve clinical skills and knowledge, such as using mannequins with palpable pulses, blood pressure, breath and bowel sounds, catherization, and naso-gastric tube insertions to practice.
   d. Are there other learning strategies that you find more effective?

8. How do you think orientation to the unit could be improve?
9. Do you have any other suggestions or comments on participating in a new learning resource for caring for stroke patients?

Appendix D: Clinical Educator Interview Responses

Table 2: Clinical Educator Interview Responses

Canadian Best Practice Guidelines: - National Benchmarks for health care institutions implemented to meet the minimum standards for patients with strokes
New Staff Orientation: - Medical-surgical orientation is one week of computer training, oaths, policies and equipment training - Very non-specific and generalizable to any medical or surgical unit, nothing stroke specific - Policies include geriatric study, stroke orders, TEDs/SCDs application. - Equipment includes medicine and feeding pumps, and mechanical lifts.
Transfer Orientation: - Two-three hours with clinical educator than orientation moves to floor nurse - Nothing stroke-specific
Current Orientation Learning Strategies: - Classroom-based lectures, some simulation (code-blue simulator), and LEAP (online modules such as compressed gas, WHIMIS
E-Learning Experiences: - Distance education is the most common e-learning - It is flexible, accommodating, and fits into peoples lives better
Case Study Experiences: - Use them during orientation especially surrounding medication administration, side effects and dosages
Role-Play Experiences: - Completed some role play during education days but not much experience since
Simulation Experiences: - Mainly code blue simulator, but haven't used it in years
Other Useful Learning Strategies: - Lecture-based learning is the main form used by the general population - Conferences are useful for networking and motivating new learning opportunities - Nurses must be responsible for their own education - Educators can only provide and encourage learning - Stroke Course is offered every 3-4 years
Learning Resource Usefulness: - Could be useful for self-study or to assist with nursing mentors - May not be beneficial for orientation with clinical educator since it is more general - Having a module on LEAP would allow accessibility - There seems to be a "gap" between orientation and practice for unit specific care and the resource could help aid with self-study

Appendix E: Stroke Coordinator Interview Responses

Table 3: Stroke Coordinator Interview Responses

Stroke Coordinator Responsibilities: - Regional role, responsible for provincial stroke units including Health Science Centre, St. Clare's, Carbonear, and Burin - Collect data via audits and collate it to show that the human resource hours are justified
Auditing Stroke Best Practice: - Stroke best practice are guidelines for practice and audits are used to ensure compliance - Audits include: Alpha-FIM, oral care audit, length of stay (LOS), stroke admission audits, TPA administration audits, 7-day and 30-day mortality and rehabilitation admission audits - In 2015, palliative stroke care, incontinence care, oral care, and post-stroke rehab audits were completed.
New Policies/Procedures: - Upcoming oral care product/policy - Rehabilitation group through Miller Centre, a stroke action policy
Current Educational Requirements: - Yearly stroke education days - Stroke course available every 3-4 years - Staff are currently up to date on TORBSST (swallowing assessment training) and Alpha-FIM but many will need the stroke course since it has not been offered since 2014
Learning Resource Benefit: - If more nurses and staff are aware of the benefits of providing care, then they are more likely to be involved in the provision of care. You need to understand the why before you will commit to completing a task. Staff are more invested in changing their behaviours or how things are done if they understand the reason why
Learning Strategy Recommendations: - Nothing specific to say regarding the various learning strategies I have suggested in my learning resource, however, she states that hands-on care is essential, and it is important to work and communicate as a team - Hands on practice or group would work improve understanding of individual roles and develop strong team work - It would also allow for the determination of strong team leaders and role models for the unit - Webinars and e-learning would also allow for more people to attend that wish to attend outside the rural area and even in another province

Appendix F: Health Research Ethics Authority Screening Tool

	Question	**Yes**	**No**
1.	Is the project funded by, or being submitted to, a research funding agency for a research grant or award that requires research ethics review		X
2.	Are there any local policies which require this project to undergo review by a Research Ethics Board?		X
	IF YES to either of the above, the project should be submitted to a Research Ethics Board. **IF NO** to both questions, continue to complete the checklist.		
3.	Is the primary purpose of the project to contribute to the growing body of knowledge regarding health and/or health systems that are generally accessible through academic literature?	X	
4.	Is the project designed to answer a specific research question or to test an explicit hypothesis?	X	
5.	Does the project involve a comparison of multiple sites, control sites, and/or control groups?		X

6.	Is the project design and methodology adequate to support generalizations that go beyond the particular population the sample is being drawn from?		X
7.	Does the project impose any additional burdens on participants beyond what would be expected through a typically expected course of care or role expectations?		X
LINE A: SUBTOTAL Questions 3 through 7 = (Count the # of Yes responses)		2	
8.	Are many of the participants in the project also likely to be among those who might potentially benefit from the result of the project as it proceeds?	X	
9.	Is the project intended to define a best practice within your organization or practice?	X	
10.	Would the project still be done at your site, even if there were no opportunity to publish the results or if the results might not be applicable anywhere else?	X	

11.	Does the statement of purpose of the project refer explicitly to the features of a program, Organization, or region, rather than using more general terminology such as rural vs. urban populations?	X	
12.	Is the current project part of a continuous process of gathering or monitoring data within an organization?		X
LINE B: SUBTOTAL Questions 8 through 12 = (Count the # of Yes responses)		4	
	SUMMARY **See Interpretation Below**	2/4	

Interpretation:

- If the sum of Line A is greater than Line B, the most probable purpose is **research**. The project should be submitted to an REB.
- If the sum of Line B is greater than Line A, the most probable purpose is **quality/evaluation**. Proceed with locally relevant process for ethics review (may not necessarily involve an REB).

- If the sums are equal, seek a second opinion to further explore whether the project should be classified as Research or as Quality and Evaluation.

These guidelines are used at Memorial University of Newfoundland and were adapted from ALBERTA RESEARCH ETHICS COMMUNITY CONSENSUS INITIATIVE (ARECCI). Further information can be found at: http://www.hrea.ca/Ethics-Review-Required.aspx.

Appendix C

Environmental Scan Report

According to the Public Health Agency of Canada (PHAC) a stroke is one of the leading causes of death and disability, with approximately 10,000 Canadians dying each year from stroke and over 300,000 Canadians living with stroke related disability or dysfunction (2016). A designated stroke unit has an interprofessional team who work with stroke patients to create individualized therapeutic plans (Hebert et al., 2016). The creation of a stroke learning resource would assist nurses by educating them on stroke best practices and their role within the interprofessional team prior to clinical practice on the stroke unit. To develop a strong learning resource, review of the websites from health care organizations in the Atlantic provinces specified what resources were currently available. A review was conducted of the resources and stroke unit practices for the hospitals in Newfoundland and Labrador (NL), Nova Scotia (NS), New Brunswick (NB), and Prince Edward Island (P.E.I) was completed and is summarized in this paper.

Research Parameters

The health care authority websites were reviewed for each Atlantic province since they are like NL regarding size and location. NL is divided into four health authorities: Eastern Health, Central Health, Western Health, and Labrador-Grenfell Health. Nova Scotia contains one authority called the Nova Scotia Health Authority. New Brunswick is divided into two authorities: Horizon Health Network, and Vitalite Health Network. Finally, P.E.I has a single authority called Health P.E.I. If there are multiple hospitals within each authority, the focus will be on hospitals with a designated stroke unit. The search parameters included stroke care practices, and teaching resources which were available to the public. Resources and practices were summarized for each province to

determine the similarities and differences between different health care authorities. Any organization evaluation of these resources will also be highlighted. When a website provides links to other websites related to stroke care such as, the Health and Stroke Foundation, they were also reviewed for resources and summarized.

Newfoundland & Labrador

Newfoundland and Labrador are divided into four regional health care authorities, Eastern Health, Central Health, Western Health, and Labrador-Grenfell Health. Each health care authority is divided into hospitals, clinics, community services, and long-term care facilities based on population and location. The health care authorities were reviewed for stroke resources which could be utilized in the stroke learning resource.

Eastern Health

Eastern Health is the largest health care organization in NL. They provide the full continuum of health services to a regional population of more than 300,000 people. Though Eastern Health includes 14 hospitals along the Avalon Peninsula, the Health Science Centre and Dr. Leonard A. Miller Centre are the main hospitals which deal with stroke care and rehabilitation.

Health Sciences Centre – General Hospital

The Eastern Health website did not contain any direct links to policies, procedures or resources for stroke care. Stroke or head injury does not appear in the A-Z listing of topics provided on the website. There is a link for the Canadian Heart and Stroke Foundation within the resource links category which directs clients to a separate website.

A-Z quick links of services provided gives an overview of the various centres, clinics, and programs available. While there are links for physiotherapy, occupational therapy, dietitians, social work, speech language pathology and rehabilitation, these different services give a general overview of their responsibilities but are not specific for stroke care. The rehabilitation link indicates that continuing care occurs at the adult inpatient and outpatient rehabilitation services offered at the Dr. Leonard A. Miller Centre in St. John's, NL (Eastern Health, 2018).

Dr. Leonard A. Miller Centre

The program at the Miller Centre assists adults disabled by injury or disease to reach and maintain their best possible level of physical, intellectual, psychological and social functioning. They work with clients through therapeutic intervention to provide them with the skills and tools they need to maintain independence (Eastern Health, 2018). While it does not specifically mention stroke, further rehabilitation following discharge from the stroke unit occurs at the Miller Centre. The Miller Centre is the main public rehabilitation hospital for NL, it provides inpatient and outpatient care with referral from a physician. Searching for a website for the Miller Centre brought up the NL Brain Injury Association website. This association website contains resources which may be useful for patients and their families. It contains information surrounding the various types of brain injury, including how an injury to specific areas of the brain will cause different deficits (Brain Injury Association, 2018). It also lists the different communicative difficulties such as: (a) aphonic, being unable to make sounds; (b) dysarthria, poor articulation and slurred speech; and (c) aphasia, language impairment (Brain Injury Association, 2018).

The website also indicates the various team members who would be involved in rehabilitative care including: (a) the patient and family, who are central members of the team; (b) physiotherapists, who assess and treat the patient mobility; (c) occupational therapists, who assess and treat cognitive and perceptual problems; (d) speech language pathologists, who provide speech and swallowing assessments; (e) social workers, who assist family and patients with emotional and practical problems following discharge; (f) nurses, who assist with day-to-day health needs and medical treatments; and (g) physicians, who manage the medical issues (Brain Injury Associations, 2018).

Central Health

Central health is the second largest health region in NL, serving a population of approximately 95,000 individuals and provide a multitude of health care services including: acute in-patient care, community health, public health, long-term care, and mental health services dispersed throughout the region. It contains two regional referral centres, nine health centres, 11 long-term care facilities, 23 community health centres, two resident treatment centres and one regional office (Central Health, 2008). A review of the central health websites indicate that they provide acute care and rehabilitative services which would include stroke care, however, there is no specific mention of stroke services, resources, or units within the websites.

Western Health

Western Health encompasses the western area of NL from Port aux Basques southeast to Francois, northwest to Bartlett's Harbour, and the eastern boundary north to Jackson's Arm (2016). This region is home to approximately 77,980 individuals and

Western Health provides a broad range of programs and services. They provide community-based services, 26 medical clinic sites, and eight health facilities, which include two main hospitals, Sir Thomas Roddick Hospital and Western Memorial Regional Hospital (Western Health, 2016). Programs and services include mental health, ambulatory care, emergency, maternal, medical, pediatric, surgical and rehabilitative services (Western Health, 2016).

The Western Health website contains a health topic section with links to stroke and the adult rehabilitation program. They define stroke as a sudden loss of brain function caused by an interruption of blood flow to the brain, known as ischemic stroke; or the rupture of blood vessels in the brain, known as hemorrhagic stroke (Western Health, 2016). The symptoms of stroke depend on the location and severity of damage to the brain. They also suggest the Canadian Heart and Stroke Foundation, PHAC, and Up-to-date Patient Information websites to inquiry further about strokes (Western Health, 2016).

The Adult Rehabilitation Program is a unit on the fifth floor of the Western Memorial Regional Hospital in Corner Brook. It contains 5 rooms with a total of 8 beds and two therapy areas, physiotherapy and occupational therapy. Rehabilitation services are provided for those with neurological conditions, such as stroke, multiple sclerosis (MS), and Guillain-Barre Syndrome (Western Health, 2016). The interprofessional team consists of nursing, social work, physiotherapy, occupational therapy, dietitian and speech language pathology staff who provide a goal-oriented process aimed at reaching a patients optimal physical, mental and social functional level (Western Health, 2016).

Labrador-Grenfell Health

Labrador-Grenfell Health provides health and community services to approximately 37,000 individuals and covers the communities north of Bartlett's Harbour on the Northern Peninsula and the entirety of Labrador (2007). The website contains Telestroke services found under the programs and services link. Individuals suffering from a stroke have a higher chance of recovery if they receive immediate medical attention and having access to a specialized stroke unit (Labrador-Grenfell Health, 2007). Labrador-Grenfell Health is working with several partners both provincially and nationally to standardize and enhance the stroke care services for Northern NL (2007).

The Telestroke strategy defines stroke, as an interruption of blow flow to the brain; and lists the signs of stroke, numbness or weakness on one side of the body, difficulty speaking, blurred vision, sudden onset of a headache, and dizziness or weakness (Labrador-Grenfell Health, 2007). They highlight the importance of calling an ambulance immediately if there are any symptoms of stroke to ensure that access to stroke care is provided in a timely manner. Early treatment improves recovery and individuals who are admitted to a hospital that can successfully diagnose stroke can receive tissue plasminogen activator (tPA), a clot busting treatment which can improve patient outcomes (Labrador-Grenfell Health, 2007). Telestroke uses advanced videoconferencing technology and cameras to extend the reach of stroke experts to the more remote locations, giving guidance to physicians in rural areas (Labrador-Grenfell Health, 2007). The program links remote sites such as St. Anthony, Happy Valley-Goose Bay and

Gander to St. John's, improving access to timely tPA treatment since neurologists in St. John's can converse with physicians in these remote areas.

Nova Scotia

The Nova Scotia Health Authority provides health services via hospitals, health centres and community-based programs across the province. The service section of their website contains links to various programs including, acute stroke program, neurology and spinal cord injury program, rapid access transient ischemic attack (TIA), and stroke secondary prevention clinic (Nova Scotia Health Authority, 2017). Searching for stroke within the search bar provided by the website also links some news articles on responding to stroke using the FAST slogan and an introduction to the interprofessional stroke team in Yarmouth Regional Hospital (Nova Scotia Healthy Authority, 2017).

Stroke Programs/Clinics

The acute stroke program links to Dalhousie University's Neurology Division, which discusses the Capital Health District Stroke Program that provides evidence-based treatment and rehabilitation for stroke patients. The program activities are targeted towards medical students and practicing physicians. Research conducted by the program is focused on best stroke practice, clinical trials and rapid-access clinics which prevent severe disability by ensuring individuals are aware of the warning signs of stroke (Dalhousie University, 2018). The neurology and spinal cord program is made up of a team who provides rehabilitation and support to maximize quality of life in patients with neurology conditions and it located at the Nova Scotia Rehabilitation and Arthritis Centre in Halifax (Nova Scotia Health Authority, 2017). The rapid access TIA and stroke secondary prevention clinics are located at South Shore Regional Hospital and

Bridgewater & Area Family Health Clinic. These clinics provides rapid assessment by a Nurse Practitioner (NP) for patients who have experienced stroke-like symptoms and present to the emergency depart. The clinic aims to quickly identify patients who have experienced a TIA, order diagnostic tests, identify the underlying cause of their clinical findings and treat any risk factors before they have a stroke (Nova Scotia Health Authority, 2017). Proper treatment after a TIA is important for preventing a second, potentially disabling stroke, timely stroke prevention either via medical treatment or carotid surgery can reduce the risk of a major stroke (Nova Scotia Health Authority, 2017).

Hearing & Speech Centre

A search for stroke care programs in Nova Scotia also listed Nova Scotia Hearing & Speech Centres (NSHSC). Searching for stroke in their search board resulted in links for the provincial stroke program, stroke brochures, swallowing resources, and speech resources (NSHSC, 2018). The NSHSC provides a 75-minute communication workshop titled Improved Communication after a Stroke which was designed to improve health care workers communication. The workshop encourages participates to interact via questions, role-play, video review and discussions (NSHSC, 2018). The purpose of the workshop is to discuss common types of communication impairments following a stroke, the referral process for speech-language consultation, and communication strategies such as; alphabet board, pain scale, drawings, and yes/no cards (NSHSC, 2018).

Brochures

The NSHSC Communication Strategies brochure explains how an individual may have different communicative difficulties following a stroke, dependent upon the location and severity of the injury. It also gives tips for improving communication citing the importance of having a face-to-face interaction in a quiet, relaxed environment. It also highlights the importance of gaining their partners attention, using short sentences, common words, and giving the other person time to understand and respond to the conversation. It is important to be respectful, calm, and positive and take the necessary time to ensure conversation is understood and the patient does not get frustrated. The brochure is available for viewing in Appendix A.

The NSHSC Swallowing Strategies brochure states that 50% of stroke survivors have swallowing problems, known as dysphagia, following their stroke. Dysphagia puts stroke patients at risk for aspiration, where food or liquid enters the lungs rather than the stomach. This can lead to aspiration pneumonia, chronic lung disease, malnutrition, and dehydration. Signs of dysphagia occur while eating or drinking including: coughing, discomfort, pocketing food, shortness of breath, a wet voice, and difficulty chewing. It is important for individuals with swallowing difficulties to sit in an upright position while eating, be alert and non-drowsy, take small bites, swallow more than once if necessary, take their time eating, and remain upright for approximately 20-30 minutes following a meal. The NSHSC website also contained a dysphagia brochure aimed towards physician's containing the same material. The brochures are available for viewing in Appendix A.

The NSHSC website also contains a link to a dysphagia and oral care presentation. The dysphagia information is similar to previously discussed information including: definitions, signs, symptoms, and aspiration risk. The oral care section highlights the importance of maintaining proper oral hygiene health, brushing teeth before and after each meal and before bedtime. If the patient cannot spit and has dysphagia, they recommend a suction toothbrush to decrease risk of aspirating during oral care. It also important to monitor for pocketing food after each meal to ensure they are swallowing appropriately, and it is not being aspirated later. The presentation is available for viewing in Appendix A.

New Brunswick

Horizon Health Network

The Horizon Health Network is focused on patient and family centred care, operating 12 hospitals, and over 100 medical clinics, facilities and offices (2018). They provide a range of services from acute care to community-based health care services to the residents of New Brunswick, as well as northern Nova Scotia and P.E.I. (Horizon Health Network, 2018). Searching through the website for stroke resulted in the Saint John Stroke Program, Stroke Recovery Chapter, Telestroke Network, and Heart and Stroke Foundation (Horizon Health Network, 2018).

The Saint John Stroke Program is comprised of the Acute Stroke Program, the Stroke Prevention/Urgent Neurovascular Clinic, and an active research program. The Acute Stroke Program provides thrombolysis, endovascular therapy and Telestroke care

for patients diagnosed with acute ischemic stroke (Horizon Health Network, 2018). The Stroke Prevention/Urgent Neurovascular Clinic is a referral-based clinic for patients diagnosed with minor strokes or TIAs. They assess, complete diagnostic imaging such as; computed tomography (CT) and CT angiography (CTA), and treat patients within 24-48 hours of their event (Horizon Health Network, 2018). There is also an active research program which conducts stroke related research.

Vitalite Health Network

A search through the Vitalite Health Network website for stroke resources and information resulted in multiple links related to stroke care including: Telestroke, the medical unit, occupational therapy, and physiotherapy (2018). The Telestroke technology was active in 2014 for any hospital facilities with CT scanners, allowing remote or rural hospitals without specialists to gain access to neurologists at other hospitals through online communication (Vitalite Health Network, 2018). The medical unit treats patients with acute stroke by providing telemetry and monitoring up to 12 patients at a time. The Vitalite Health Network also has occupational therapists and physiotherapist who assist with rehabilitation for stroke patients (2018). These services are similar to services provided in the other Atlantic Provinces health authorities.

Prince Edward Island

Health PEI

Health PEI delivers health care services in Prince Edward Island through hospitals, health centres, public long-term care nursing facilities, and community-based

programs (Health PEI, 2018). The website has a link to a Stroke Care Program which defines stroke, discusses the warning signs of stroke and describes services provided by the program such as: stroke prevention, emergency care, in-patient care, rehabilitation, and stroke navigator (Health PEI, 2018). The Stroke Prevention Clinic located at the Prince County Hospital (PCH) is an outpatient clinic for people who have had a recent stroke or TIA and are at higher risk for stroke. They list the risk factors including: high blood pressure, high blood cholesterol, diabetes, smoking, poor eating habits, and physical inactivity (Health PEI, 2018). They also discuss that those individuals with vascular disease, past TIAs or stroke are also at a higher risk for further strokes. The program highlights the importance of immediate emergency care following a stroke, importance of in-patient care at the Provincial Acute Stroke Unit, located at the Queen Elizabeth Hospital (QEH) and referral to the Provincial Acute Stroke Rehabilitation Unit, where a stroke care team will focus on patients regaining functional independence (Health PEI, 2018). There is also a link to a rehabilitative services brochure which guides laypersons through the referral process, the signs of stroke, post-stroke rehabilitation team, team goals and what to expect during treatment. The brochure is included in Appendix A and would be a useful resource in patient teaching. Telestroke is also briefly discussed in the website, which once again provides stroke care services to hospitals without neurologists.

Caregiver Handbook

A resource provided by Health PEI is a stroke caregiver handbook which assists caregivers in understanding stroke care. It informs caregivers of the diverse emotional

changes that stroke survivors may goes through including: confusion, fear, anxiety, anger, denial, sadness, isolation, loss of control, and depression. These feelings can be quite common, and caregivers may not understand how to relate to their family member. The handbook recommends the "Let's Talk about Stroke" information guide provided by the Heart & Stroke Foundation. The handbook also discusses the importance of caregivers being active members in their family's care, as well as being knowledgeable of the health care team members responsible for stroke care. It also provides a list of stroke support programs and health care centres. This may be a useful resource for families of stroke patients which could be included in the learning resource if permission can be obtained.

Canadian Programs

Heart & Stroke Foundation

The foundation is a Canadian based program available for every province which contains stroke care information. The website defines stroke, lists the signs of stroke, treatment options, risk and prevention options, as well as recovery and support. While the majority of the information provided through this website has already been discussed throughout this paper, the website provides videos and visual pictures to assist with understanding stroke. The treatment section discusses the importance of early rehabilitation, the different types of rehabilitation needed such as: physical, swallowing, and speaking and how it may take significant time to recovery (Heart & Stroke Foundation, 2018). It also discusses the use of tPA to break up blood clots, and medication such as blood thinners, anti-platelet drugs and anticoagulants to lower the risk of further clots (Heart & Stroke Foundation, 2018). The recovery section of the

foundation is also much more in-depth, reiterating the importance of living with physical changes of stroke, the changes in everyday activities such as requiring more assistance with dressing and being unable to drive. Relationships with loved ones may also change, especially family roles since those who survive a stroke may never return to the same functional role they once held in the family (Heart & Stroke Foundation, 2018). The heart and stroke foundation also created an information guide for survivors and their families which outlines everything a family should expect during stroke recovery.

Let's talk about stroke

The Let's Talk about Stroke information guide contains information on every aspect of stroke a patient and family may need to know during their recovery. It defines stroke, types of stroke and the warning signs of stroke with pictures and descriptions that a layperson could understand. It discusses the effects stroke has on different signs of your brain where left sided stroke causes: weakness to the right side of your body, trouble reading, talking, trouble learning, remembering new information, and right sided neglect (Heart & Stroke Foundation, 2005). A right sided stroke causes: weakness to the left side of your body, vision problems, problems with distance or depth, short term memory issues, and left sided neglect (Heart & Stroke Foundation, 2005). Brain stem strokes are an uncommon stroke which can cause issues with: breathing, heart function, body temperature control, balance, coordination, chewing, swallowing, and speaking (Heart & Stroke Foundation, 2005). The information guide also lists the common effects of stroke including: paralysis, vision problems, aphasia, perceptual challenges, fatigue, incontinence, depression, emotional changes, memory and problem-solving challenges,

and personality changes (Heart & Stroke Foundation, 2005). Each effect is further defined, discussed in relation to stroke care and recovery in their own individual sections.

The guidebook discusses stroke treatment while hospitalized, where the patient is assessed, has diagnostic tests including: electroencephalogram (EEG), to track electric activity in the brain; an evoked response test, to process brains response to light, pictures, sound or touch; CT scan, to get a detailed visual of the brain; and magnetic resonance imaging (MRI), to get a three-dimensional picture of the brain (Heart & Stroke Foundation, 2005). These tests confirm the diagnostic of stroke and depending on type and severity a patient may have an ultrasound completed to view the carotid arteries or a cerebral angiography to identify blockages (Heart & Stroke Foundation, 2005). Treatment options include: tPA, to break up blood clot if within three-hour timeframe; surgery, to remove blood pooled in brain after hemorrhagic stroke, remove plaque in carotid artery, or to repair broken blood vessels; and non-surgical procedures such as angioplasty (Heart & Stroke Foundation, 2005).

The guidebook discusses the importance of rehabilitation to stroke recovery. The aim of rehabilitation is to gain as much functional independence as possible post-stroke. It also highlights the different medications which a patient may receive during stroke care recovery including: blood pressure medication, blood thinners, and cholesterol-lowering medications. The book contains a section on aphasia, swallowing, eating, and dysphagia. It goes into great detail about the different types of aphasia, other language related problems such as apraxia, dysarthria and tools to use to assist with communicative difficulties such as: picture cards, language boards, tablets, and gestures or sign language.

The helpful devices and home modification chapter discusses the changes that may be required at home following discharge. The occupational therapists will assist in identifying issues at home and assist families in planning necessary changes and finding resources. A link to the Let's Talk about Stroke information guide can be found in appendix A.

Learning Resource

A review of the health care authority websites provides general information regarding stroke care and interprofessional roles and responsibilities which can be utilized in the development of the learning resource. The Let's Talk about Stroke information guide highlights stroke definitions, background information, interprofessional roles, recovery goals, and patient expectations which can guide the creation of the resource. The Nova Scotia Hearing and Speech Centre website contains information on aphasia, dysphagia and communicative disabilities based on brain injury location and severity which can be used in developing the role play and case studies within the learning resource. The Dr. Leonard Miller Centre contains information on rehabilitation and interprofessional team member responsibilities which can be used to guide those sections in the learning resource. The brain injury association website contained detailed information on brain injury locations and the expected deficits and disabilities associated with type and severity of stroke or brain injury. Each of these resources can be useful in developing the resource. The other websites and reviewed authorities all contain similar information which can also be reviewed and utilized in the resource.

Conclusion

Most of the health care authority websites contain some reference to a stroke care program, stroke rehabilitation unit, and Telestroke program. Telestroke seemed to be the more common program discussed with government funding being directed towards increasing services to remote and rural hospitals without neurologists to diagnose stroke. The brochures and programs available in the websites commonly defined stroke, the types of stroke, symptoms of stroke, risk factors to prevent strokes and the members of the rehabilitation team. The Heart and Stroke Foundation is a common link which each website linked and referred readers to review. The Let's Talk about Stroke guidebook is a resource that contains the most information surrounding the effects of stroke, care requirements and changes expected during recovery. The information reviewed from these websites, brochures, and resources will be extremely useful in creating a learning resource surrounding stroke care for my practicum project.

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Appendix A: Documents

Rehabilitation Inpatient Referral Form:

Communication Strategy Brochure:

Dysphagia Brochures:

Rehabilitation Services Brochure:

PEI Caregiver Handbook:

Let’s Talk about Stroke Information Guide:

Let's Talk About Stroke.pdf

Appendix D

Stroke Learning Resource

Table of Contents

List of Figures

List of Tables

Introduction

This stroke learning resource was created to assist with preparing nurses entering the acute stroke unit by highlighting the Canadian Stroke Best Practice recommendations, the roles of the interprofessional team members, and how nursing roles and responsibilities interconnect with other professionals and optimize stroke care.

Learning Objectives

1. To define the different type of strokes.
2. To identify the risk factors of strokes.
3. To identify the symptoms/deficits of strokes.
4. To describe the symptoms/deficits of stroke according to brain region.
5. To identify the five warning signs of stroke (FAST response).
6. To discuss early stroke management on an acute stroke unit.
7. To discuss Canadian Stroke Best Practice Recommendations being utilized on the stroke unit.
8. To identify the roles and responsibilities of the interprofessional team members.
9. To identify the nursing roles in caring for stroke patients.

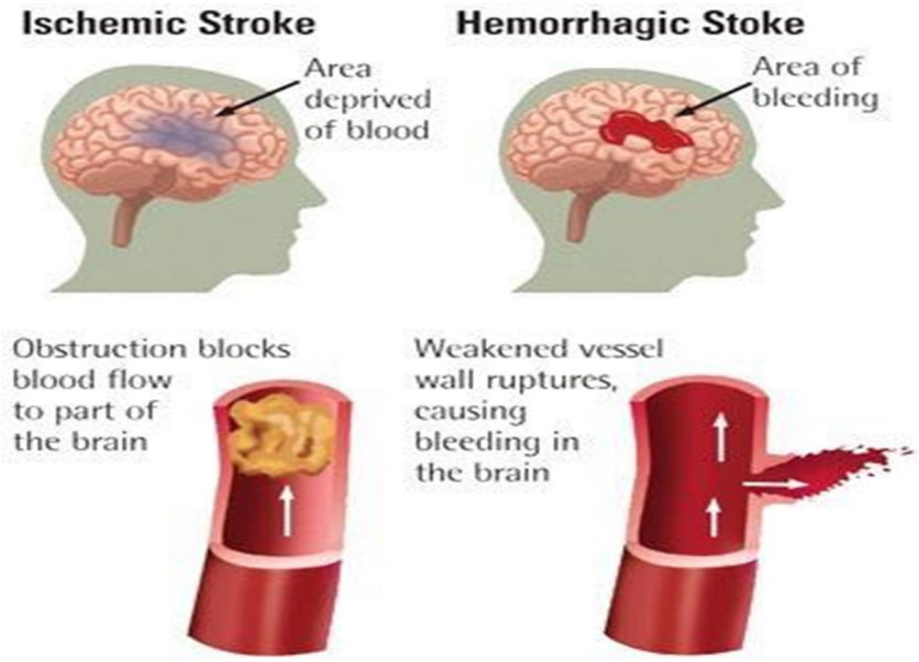
Section 1: Stroke Background

What is a stroke?

An acute stroke arises when a neurological injury accords in the brain (Public Health Agency of Canada (PHAC), 2017). The injury blocks blood flow to the brain

which denies the brain oxygen and nutrients, these injuries may be ischemic, hemorrhagic, or a transient ischemic attack (TIA).

Figure 1: Ischemic Vs. Hemorrhagic Stroke



Types of Stroke

Ischemic stroke occurs when a blood clot blocks an artery, cutting off blood flow to the brain therefore causing a stroke. For example, clot buildup can be caused by smoking, diabetes, high blood pressure and high cholesterol (Heart and Stroke Foundation (H&S), 2005).

Hemorrhagic stroke occurs when blood vessel in the brain bursts causing blood to rush into the surrounding tissue therefore damaging the brain. An example is the bursting of an aneurysm, where a weaken vessel wall balloons out and bursts causing a hemorrhagic stroke (H&S, 2005).

A TIA is a short-term drop, from 30 seconds to 10 minutes, in blood-flow to a part of the brain, often called a mini-stroke. The occasional TIA can last for up to 24 hours before diagnosed. Most TIAs leave no permanent brain damage (H&S, 2005).

Five Warning Signs of Stroke

1. Weakness – sudden weakness, numbness, or tingling in the face, arm or leg, usually localized to one side of the body.
2. Trouble speaking – a temporary loss of speech, confusion or trouble understanding speech.
3. Vision problems – sudden loss of vision, particularly in one eye, blurred or double vision.
4. Headache – sudden, severe, and unusual headache.
5. Dizziness – sudden loss of balance, especially with any of the above signs (H&S, 2017).

Figure 2: FAST Response Acronym

Stroke Risk Factors

Nine in ten Canadians have at least one risk factor for heart disease and stroke. Almost 80% of heart disease and stroke can be prevented by changing current lifestyle behaviours by making healthier choices (H&S, 2017). Stroke risk factors include:

1. Hypertension – the most significant risk factor for stroke is hypertension, or high blood pressure. Blood pressure refers to the pressure inside the arteries. Hypertension means that the blood is exerting more pressure than is healthy which over time weakens and damages blood vessel walls (H&S, 2005; PHAC, 2017).
2. Cigarette Smoking - doubles or even quadruples your risk of stroke. Cigarette chemicals such as; nicotine and carbon monoxide accelerate the process of atherosclerosis, narrowing of arteries (H&S, 2005; PHAC, 2017).
3. Diabetes – a chronic condition where the body is unable to utilise blood sugar. High blood sugar levels contribute to the development of atherosclerosis (H&S, 2005; PHAC, 2017).
4. High Blood Cholesterol – a fat-like substance which in high levels causes the formation of atheroma which sticks to artery walls leading to atherosclerosis (H&S, 2005; PHAC, 2017).
5. Heavy Drinking – people who drink heavily are 3X more likely to have a haemorrhagic stroke, regardless of their age (H&S, 2005; PHAC, 2017).
6. Diet – an important risk factor in the development of stroke, it is necessary to limit or moderate salt intake, choose fresh rather than processed foods, reduce sugary

and fatty foods, and increase the consumption of vegetables, fruits and whole grains (H&S, 2005; PHAC, 2017).

7. Obesity – being overweight or obese increases the risk of stroke. High body fat contributes to high blood pressure and high cholesterol leading to heart disease and type 2 diabetes (H&S, 2005; PHAC, 2017).
8. Exercise – a sedentary lifestyle increases your risk for obesity, high blood pressure, and high blood cholesterol which are all risk factors for stroke (H&S, 2005; PHAC, 2017).

Through choosing healthier lifestyle choices these stroke risk factors can be lowered to improve your chances of preventing heart disease and strokes. Having a stroke increases the chances of having another stroke, therefore lowering your risk and preventing strokes can improve your health.

The Human Brain

The human brain is divided into four distinct lobes, the frontal, parietal, occipital, and temporal lobe, as well as the cerebellum. These areas of the brain affect the functioning of the individual in different ways and can cause different deficits if injured as described in the table below.

Figure 3: Parts of the Human Brain

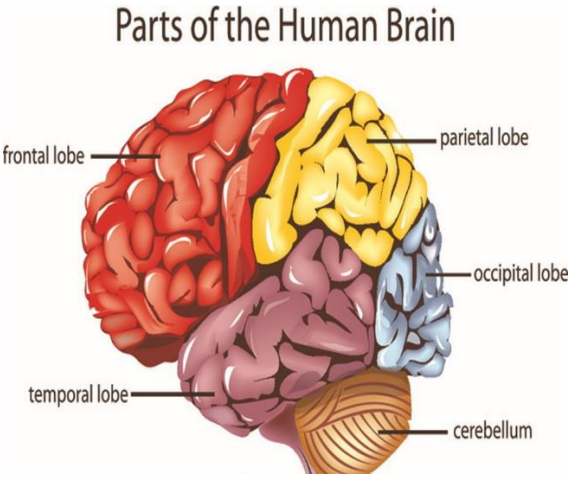


Table 1: Healthy Brain versus Injured Brain based on Brain Region

	Healthy Brain	**Injured Brain**
Frontal Lobe	Personality/emotions Intelligence Attention/concentration Judgement Body movement Problem solving Speech (speak & write)	Loss of movement (paralysis) Single thought repetition Unable to focus on a task Mood swings, irritability, impulsiveness Changes in social behaviour & personality Difficulty problem solving & language
Parietal Lobe	Sense of touch, pain and temperature Distinguishing size, shape, and color Spatial perception Visual perception	Difficulty distinguishing left from right Lack of awareness or neglect Difficulties with eye-hand coordination Problems with reading, writing, & naming Difficulty with math
Occipital Lobe	Vision	Defects in vision or blind spots Blurred vision Visual illusions/hallucinations Difficulty reading & writing

Temporal Lobe	Speech (understanding language) Memory Hearing Sequencing Organization	Difficulty understanding language & speaking (aphasia) Difficulty recognizing faces Difficulty identifying/ naming objects Memory problems Increased aggressive behavior
Cerebellum	Balance Coordination	Difficulty coordinating fine movements Difficulty walking Tremors Dizziness (vertigo) Slurred speech

Brain Hemisphere Controls

The brain is divided into two hemispheres which control different aspects of an individual's personality. Damage to these areas can lead to different deficits or disabilities in the human body. The following section will highlight what each hemisphere controls and what deficits occur when that brain area is damaged.

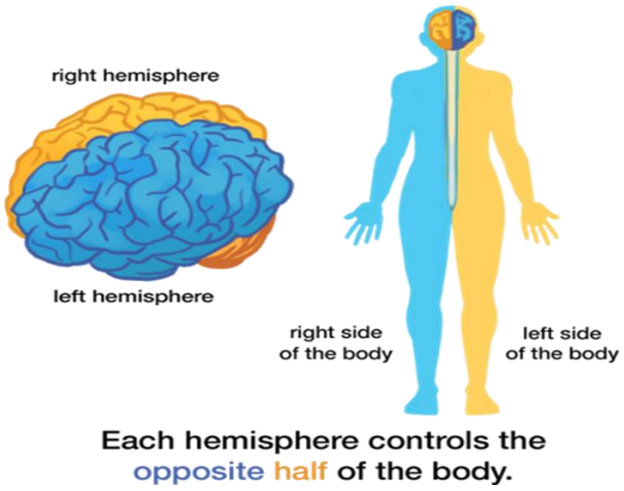
Right Hemisphere

- Creativity
- Music Awareness
- Spatial Orientation
- Artistic Awareness
- Imagination
- Intuition
- Insight
- Holistic Thought
- Left-Hand Control

Left Hemisphere

- Spoken Language
- Reasoning
- Number Skills
- Written Language
- Logic
- Science
- Analytic Thought
- Right-Hand Control

Figure 4: The Right & Left-Brain Hemispheres



Right Brain Deficits	Left Brain Deficits
- Hemiplegia (left-sided paralysis)	- Hemiplegia (right-sided paralysis)
- Left-sided neglect	- Aphasia (impaired speech or language)
- Spatial-perceptual deficits	- Impaired right/left discrimination
- Tends to deny or minimize problems	- Slow performance, increased caution
- Rapid performance, short attention span	- Impaired comprehension related to language and math
- Impulsive, safety problems	- Difficulty learning new concepts
- Impaired judgement	- Anxiety
- Impaired time concepts	- Depression

Another uncommon form of stroke is based at the brain stem, these strokes have issues stemming from breathing and heart function, body temperature control (hypothalamus), balance and coordination, paralysis or weakness of limbs on both sides of the body, chewing, swallowing, speaking, and vision (PHAC, 2017).

Strokes may affect different people in different ways, however, the most common effects of stroke are paralysis or weakness to one side of the body, fatigue, depression, incontinence, emotional and personality changes, vision, speech, memory, and swallowing problems (PHAC, 2017).

Learning Checkpoint

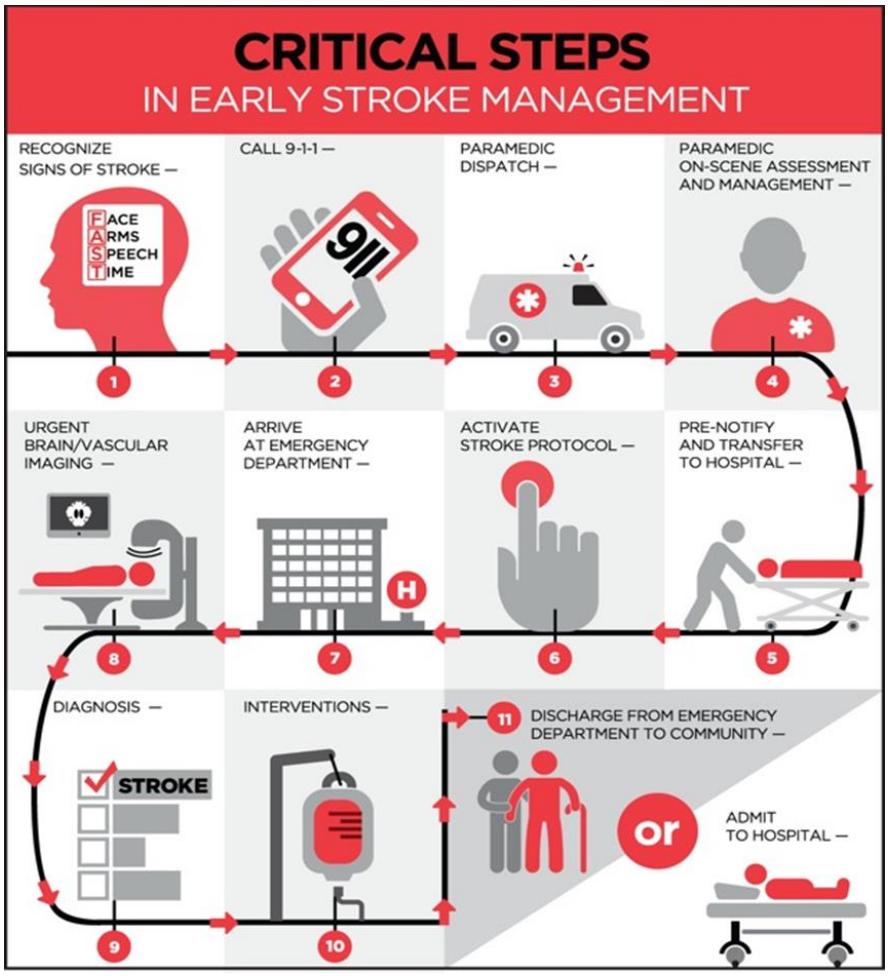
1. What is a stroke?
    a. Blocked blood vessel to the brain
    b. Bleeding in the brain
    c. Loss of oxygen to part of the brain
    d. All the above
2. Which of the following best describe the signs and symptoms of a stroke?
    a. Diaphoresis and jaw pain
    b. Indigestion and shortness of breath
    c. Weakness and edema
    d. Facial droop and slurred speech
3. The nurse is conducting a community education class on stroke prevention. The teaching plan for this class will include which of these instructions?
    a. “Foods high in saturated fats can be consumed in moderate amounts”
    b. “There is no correlation between diabetes and risk of stroke”
    c. “There is no known link between risk of stroke and regular exercise”
    d. “It is important to maintain a healthy weight and to control your blood pressure”
4. The nurse is assessing a patient who is recovering from a stroke. Which of these problems receive priority for this patient?
    a. Impaired communication
    b. Impaired mobility
    c. Risk for aspiration
    d. Risk for altered coping

Section 2: Stroke Best Practice Recommendations

Early Stroke Management

Early stroke care delivery has shown a significant positive impact on stroke outcomes. Coordinated and organized rehabilitation care in a stroke unit has been shown to reduce mortality and hospital length of stay and to increase functional independence and quality of life (Hebert & Teasell, 2015).

Figure 5: Critical Steps in Early Stroke Management



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Acute Stroke Unit Recommendations

All patients admitted to hospital with acute stroke should have a CT scan and initial assessment, conducted by rehabilitation professionals within 24-48 hours of admission. This scan highlights the location and severity of stroke allowing rehabilitative specialists to create a specific plan of care (Hebert & Teasell, 2015).

The Acute Stroke Unit is employed by stroke rehabilitation professionals including physicians, nurses, physiotherapists, occupational therapists, speech-language pathologists, social workers, and dieticians. All team members should have specialized training in stroke care and recovery, and in supported conversation with patients with communicative limitations such as aphasia (Hebert & Teasell, 2015). Patients are initially assessed by the interprofessional team for physical, functional and social impairments which would impede activities of daily living. The interprofessional rehabilitation team follows stroke evidence-based best practices including early mobilization and active physical, mental and functional rehabilitation to create a plan of care, transition and discharge planning during admission to the stroke unit (Hebert & Teasell, 2015).
The stroke unit teams also conduct at least one formal interprofessional meeting per week to discuss progress, problems, rehabilitation goals, and discharge planning (Hebert & Teasell, 2015).

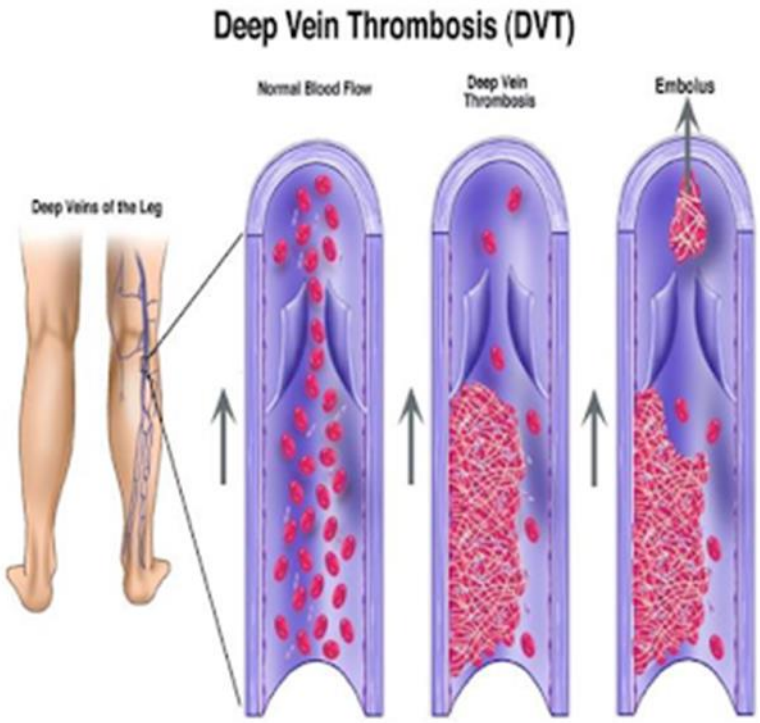
Stroke Best Practice

Venous Thromboembolism Prophylaxis (VTE)

All stroke patients should be assessed for the risk of developing venous thromboembolism, a condition in which blood clot forms most often in the deep veins of the leg, groin, or arm (deep vein thrombosis) and travels in the circulation, lodging in the

lungs (pulmonary embolism). High risk individuals include those who have limited mobility to one or both lower limbs, unable to walk independently, previous history of VTE, dehydration, and those with other health comorbidities (Hebert & Teasell, 2015).

Figure 6: Deep Vein Thrombosis



High risk patients should immediately be started on thigh-high sequential compression device (SCD) or pharmacological VTE prophylaxis (i.e. aspirin, enoxaparin) if there is no contraindication (e.g. intracranial hemorrhage, or other bleeding). Acute ischemic stroke patients with high risk of VTE should be assessed regarding the use of low molecular weight heparin (i.e. enoxaparin) or unfractionated heparin for those with renal failure. Nursing staff are responsible for ensuring VTE is ordered by the physician

for their stroke patients. They measure patients for SCDs, apply SCDs, and monitor skin integrity to avoid skin breakdown (Hebert & Teasell, 2015).

Figure 7: Thigh-High Sequential Compression Device

Temperature Management

Nursing staff will monitor temperature as part of vital sign assessment; every four hours for the first 48 hours, then routine for the floor or based on clinical judgement. For temperatures greater than 37.5º'C nursing staff will increase frequency of monitoring, begin measures to reduce temperature, investigate possible source of infection such as pneumonia or urinary tract infection, and initiate antipyretic and antimicrobial therapy based on cultural and sensitivity (Hebert & Teasell, 2015).

Depression Screening

Approximately 1/3 of individuals will exhibit symptoms of depression at some point following the stroke event. Most cases of post-stroke depression (PSD) may develop within the first 3 months of stroke. PSD is associated with poorer functional recovery, increased risk of dependence, poorer cognitive function, reduction in social

participation, and increased risk of mortality. Appropriate identification, diagnosis, and treatment of PSD has been associated with improved patient care outcomes. Nursing staff are in the ideal position to notice PSD symptoms early, thereby improving chances of early diagnosis and treatment of PSD. Stroke unit depression screening is recommended for all stroke patients monthly during inpatient admission (Hebert & Teasell, 2015). Links to Eastern Health depression screening is available in Appendix A.

Early Mobilization

Mobilization requires the progression of patient movement within in the bed (turning and sitting up), standing, and walking. Acute stroke patients should be assessed by rehabilitation professionals such as, physiotherapists (PT) and occupational therapists (OT) within 24-48 hours after admission (Hebert & Teasell, 2015). All patients admitted to the hospital stroke unit should be mobilized early, ideally within 24 hours of stroke symptoms unless contraindicated. Contraindications include interventional procedures (surgeries, biopsies), lower limb fracture or injury, low oxygen saturation, and unstable medical conditions. While early mobilization is assessed and completed by PT and OT, nursing staff will work with other rehabilitation professionals to continue mobilization exercises throughout the hospital stay (Hebert & Teasell, 2015).

Continence Management

Indwelling catheters should be avoided due to the risk of urinary tract infection (UTI). If admitted patients have a Foley catheter then they should be assessed daily and removed as soon as possible. All admitted stroke patients are screened for urinary and fecal incontinence and retention, constipation and urinary retention (Hebert & Teasell, 2015).

Trained stroke personnel should assess for contributing factors of incontinence such as UTI, medications, nutrition, diet, mobility, activity, cognition, environment, and communication. Interprofessional team members will develop a individualized incontinence management plan, including a bladder-training and bowel management programs. Nursing staff are responsible for maintaining timed, prompt toileting on a consistent schedule which assists with retraining their bladder. Nursing staff are also responsible for giving regular bowel management medications and monitoring a stroke patients bowel regime. They also assist patients with stroke deficits in proper peri-care and monitoring for skin integrity/breakdown due to incontinence (Hebert & Teasell, 2015).

Seizure Management

Patients admitted with an acute stroke may have new-onset seizures which should be treated with short-acting medications such as lorazepam. Patients with an immediate post-stroke seizure should be monitored for recurrent seizure activity during routine vitals and neurological status checks. Nursing staff are the frontline staff and can readily monitor for seizure activity post-stroke (Hebert & Teasell, 2015).

Oral Care

All stroke patients should have an oral/dental assessment to screen for signs of dental disease, level of oral care, and dental appliances such as dental plates and dentures. An oral care protocol should be used for all stroke patients, ideally brushing teeth, mouthwash, and flossing after meals and before bedtime (Hebert & Teasell, 2015).

For patients with dysphagia there are special oral care products including, suction toothbrush and mouth sponges to prevent aspiration. Nursing staff are responsible for

scheduling and providing oral care for stroke patients. Nurses can also mentor and educate patients and family members in providing oral care (Hebert & Teasell, 2015).

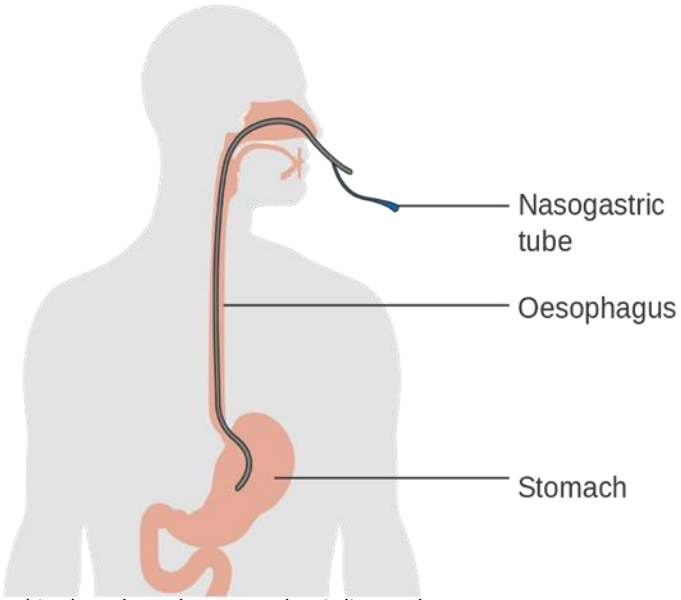
Figure 8: Oral Care Sponge for Stroke Patients

Dysphagia and Nutrition

Speech Language Pathologists and Registered Nurses are trained to complete initial swallow screening for all stroke patients. Swallowing, nutritional, and hydration status should be screened early, ideally during admission, using a validated screening tool. The Toronto Bedside Swallowing Screening Test [TOR-BSST] is utilized at the Health Science Centre in St. John's, NL. Abnormal screening results should prompt referral to a speech-language pathologist (SLP), OT, and/or dietitian for more detailed assessment and management of swallowing, nutritional and hydration status (Hebert & Teasell, 2015). A copy of the TORBSST screening guide is available in Appendix A.

Based on screening results those patients with dysphagia or swallowing difficulties are at risk for nutritional concerns, and hydration deficits which requires an individualized plan of care. To ensure that stroke patients receive necessary nutrient and fluid requirements they may be placed on specialized diets with alterations in food texture and fluid consistency (Hebert & Teasell, 2015). Stroke patients who are unable to swallow without risk of aspiration may require enteral nutrition support via nasogastric tube feeding. To prevent delay in receiving nutrition, patients must be assessed for swallowing difficulties and put on enteral nutrition early, ideally during admission to avoid delays in treatment. Nursing staff are responsible for inserting and monitoring nasogastric tubes. Nurses also give enteral nutrition and medications via nasogastric tubes while monitoring for signs of aspiration (Hebert & Teasell, 2015).

Figure 9: Insertion of a Nasogastric Tube



Section 3: Interprofessional Team Members

Physician

Stroke patients are followed by a neurologist, who specializes in the study and treatment of the central nervous system, the brain and spinal cord. The neurologist will diagnosis a stroke from CT imaging, follow and plan the stroke care recovery and rehabilitation. Physicians order diagnostic tests, medications and any medical procedures which the stroke patient may require (H&S, 2005). Physician fill out admission orders for adult stroke patients which can be found in Appendix A.

Social Worker

The social worker connects with patients and families as soon as possible after the stroke occurs to advise on family, social, or financial impacts and to advise them on how to obtain assistance if necessary. Patients and family members may also experience feelings of anger, sadness, depression, confusion, and anxiety as a result of the stroke. A social worker is skilled in counselling and can assist with these emotional problems (H&S, 2005). Social workers also work with nursing and other interprofessional team members to arrange community services, family finances, work, and discharge planning. Social workers are extremely involved with arranging for long term care placement if patients are unsuitable for rehabilitation or unable to return home (H&S, 2005).

Physiotherapist

An integral team member on the stroke unit who completes the initial physical, and functional assessment which will guide decision on rehabilitation services and therapies required during admission and potential discharge needs. Early consultation with rehabilitation professionals enhances the process of discharge planning, whether

stroke patients are going to transition to acute care, to specialized rehabilitation units (e.g. Miller Centre), or back to the community (Hebert & Teasell, 2015).

The physiotherapist will measure the stroke patient's movement, balance, and coordination. Depending on the stroke severity patients may suffer from right or left-sided neglect in either one or both limbs, balance, and/or coordination issues. The physiotherapist will develop a specific plan of care or goal for the stroke patient which will focus on teaching patients exercises and techniques to improve muscle control, balance, mobility and walking. Early emphasis may be on movement such as turning in the bed, rising into a sitting position, maintaining balance in an upright position, transferring from bed to chair. As patients improve the exercises will increase in difficulty such as standing and walking (H&S, 2005; Hebert & Teasell, 2015).

The physiotherapist will also set a therapeutic schedule for having the patient mobile, up in the chair, or resting. Nursing staff are responsible for engaging patients in therapy once the patient is assessed by physiotherapy and patient limitations are noted. Nursing staff engage patients in therapeutic self-care and encourage active participation in activities of daily living (ADLs) which will improve patient's functional ability (H&S, 2005; Hebert & Teasell, 2015).

Occupational Therapist

The occupational therapist (OT) assesses the effects of the stroke on independence and ADLs. They will assess the patient's abilities to complete tasks such as washing, and dressing. They assist stroke patients in relearning regular ADLs and they teach methods of adaptation to changed circumstances by designing specific activities concentrating on

the skills needed to return home. For example, those patient's with neglect or weakness in their arms or hands are provided exercises to improve fine motor activity (H&S, 2005).

The OT will assess the patients home life and set patient goals around returning and managing at home. They will often recommend some simple modifications to the home and advise the patient on home aids, such as a shower chair and handrails. Nursing staff work with OT by assisting in ADLs, scheduling time to work with OT assessment. Nursing staff will also assist stroke patients with utilizing OT suggestions such as adaptive aids while eating, using canes and walkers while transferring and practice fine motor activities using handballs or other adaptive aids (H&S, 2005).

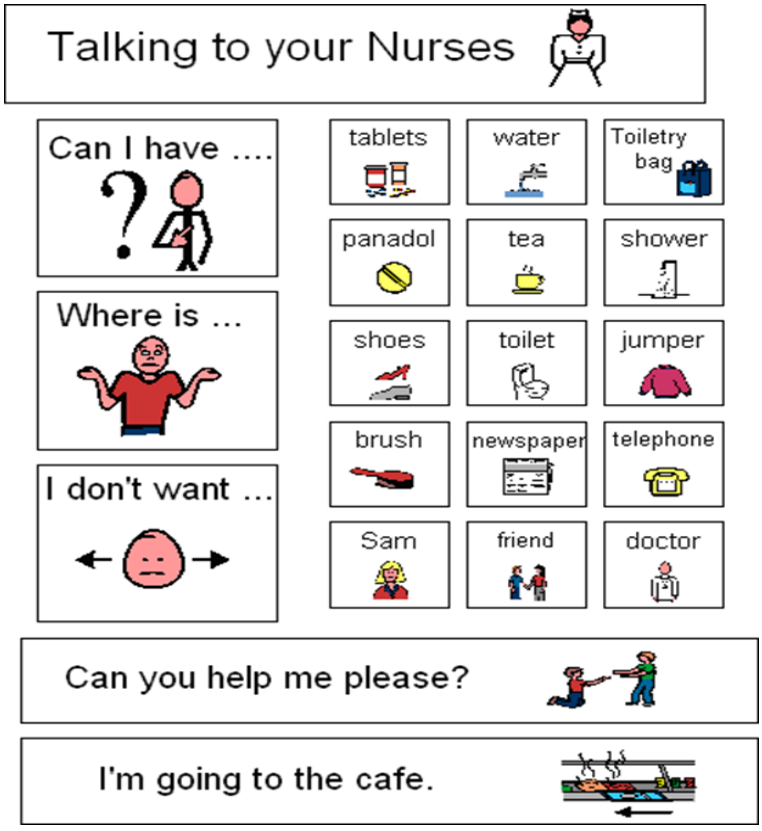
Speech Language Pathologist

Dysphagia or difficulty swallowing occurs in 65% of stroke patients, and if it is not identified and managed then it can lead to poor nutrition, pneumonia, and aspiration. Initial swallowing tests can be performed at the bedside by trained nursing staff (H&S, 2005). The Health Science Centre uses the validated screening tool TOR-BSST which can be found in Appendix A. If the stroke patient fails the bedside swallowing assessment, nursing staff will not allow the patient to eat until they are seen and screened by the SLP.

The SPL evaluates how well the muscles in the mouth move, listen to the patient's voice for an idea of how the voice box is working and they may be given food and liquid to swallow. If the patient is unable to swallow, then the interprofessional team creates a nutrition plan to ensure adequate nutrition. Nursing staff insert a nasogastric tube, the dietician decides the type of enteral nutrition and how much volume is required based on size, age, and blood work (H&S, 2005). The SLP will continue to follow a patient placed

on enteral nutrition. They will create a treatment plan with exercises to improve coordination of muscle movements in the mouth and throat. A plan may also include techniques to help compensate for lost of function, such as turning the head to one side to provide better airway protection or taking only small sips of liquid to avoid aspiration. They may also recommend changing the texture of food and liquids as the patient improves (H&S, 2005). If the patient is having speaking difficulties than the SPL will follow up with exercises to improve the muscles of the mouth and throat. For those having difficulty communicating the SLP will provide a communication board to assist in communication (H&S, 2005). Nursing staff can also utilize this communication board while providing care with aphasic patients.

Figure 10: Communication Board to assist with Aphasia in Stroke Patients



Dietitian

The dietitian will assess a persons' nutritional status and help ensure dietary needs are met by calculating their nutritional requirements, monitoring food eaten and then educating on the type of food and drink most appropriate for a patient's need. They intervene as early as possible to minimise the risks of deterioration of nutritional status and help prevent ill health (H&S, 2005).

The dietitian arranges the ordering of special meals and nutritional supplements, and for the more dependent patient, may arrange nutritional support in the form of tube feeding. They will also monitor the patient's progress and outcome on nutritional support or therapeutic diet while working within the interprofessional team. They may also educate the patient and family members by providing accurate and practical advice on nutrition (H&S, 2005). Nursing staff work with dietitians by inserting nasogastric tubes, starting enteral nutrition and monitoring patients for aspiration and other side effects (H&S, 2005).

Learning Checkpoint

1. Which patient below is at most risk for a hemorrhagic stroke?
    a. A 65-year old male patient with carotid stenosis
    b. A 89-year old female with atherosclerosis
    c. A 88-year old male with uncontrolled hypertension and a history of brain aneurysm repair 2 years ago
    d. A 55-year old female with atrial flutter
2. A patient who suffered a stroke one month ago is experiencing hearing problems along with issues learning and showing emotion. Which lobe in the brain do you expect to be affected?
    a. Frontal lobe
    b. Occipital lobe
    c. Parietal lobe
    d. Temporal lobe

3. A patient's MRI imaging shows damage to the cerebellum a week after the patient suffered a stroke. What assessment findings would correlate with this MRI finding?
    a. Vision problems
    b. Balance impairment
    c. Language difficulty
    d. Impaired short-term memory
4. You have a patient who has had a stroke has issues with understanding speech. What type of aphasia is this patient experiencing and what area of the brain is affected?
    a. Expressive; Wernicke's area
    b. Receptive; Broca's area
    c. Expressive; hippocampus
    d. Receptive; Wernicke's area
5. A patient has right side brain damage from a stroke. Select all the signs and symptoms that occur with this type of stroke:
    a. Right side hemiplegia
    b. Confusion on date, time, and place
    c. Aphasia
    d. Unilateral neglect
    e. Aware of limitations
    f. Impulsive
    g. Short attention span
    h. Agraphia
6. You have a patient who has expressive aphasia. Select all the ways to effectively communicate with this patient?
    a. Fill in the words for the patient they can't say
    b. Don't repeat questions
    c. Ask questions that require a simple response
    d. Use a communication board
    e. Discourage the patient from using words.
7. You are assisting a patient who has right side hemiparesis and dysphagia with eating. It is very important to:
    a. Keep the head of bed than 30 degrees
    b. Check for pouching of food in the right cheek
    c. Prevent aspiration by thinning the liquids
    d. Have the patient extend the neck upward away from the chest while eating

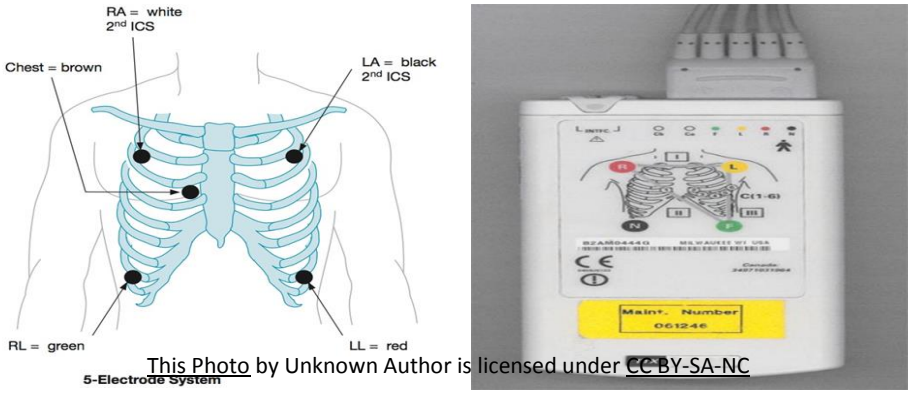
Section 4: Nursing Role in Stroke Care

Assessment

Nursing staff are responsible for monitoring and assessing stroke patients for deep vein thrombosis (DVT), pressure sores, wounds, poor skin integrity, urinary tract infections (UTIs), pneumonia, continence and fall risk. Up to 30% of stroke patients will experience some deterioration in the first 24 hours which requires intensive monitoring by nursing staff trained in acute stroke care (Summer et al., 2009).

Patients who received thrombolytic therapy require close monitoring for at least 24 hours, nursing staff should be aware of bleeding complications, proper neurological assessments, and recognizing the signs of an increase in intracranial pressure (ICP) (Summer et al., 2009). Stroke patients also receive cardiac monitoring via telemetry for the first 48 hours post-stroke. Nursing staff assess vital signs, monitor telemetry, contact cardiac care unit (CCU) each shift for readings and contact the physician if any changes are noted via the telemetry system. Many stroke patients may have an underlying cardiac disease which factored into the stroke and puts them at risk for an acute myocardial infraction (MI) during the acute phase of their stroke recovery (Summer et al., 2009).

Figure 11: Cardiac Monitoring via Telemetry



Blood Pressure

Blood pressure is an important vital sign to monitor with acute ischemic stroke patients. An elevated blood pressure can increase cerebral perfusion in the ischemic zone, and since autoregulation is lost after an ischemic stroke this can lead to sensitivity in the damaged brain causing fluctuations in pressure (Summer et al., 2009). It is recommended that antihypertensive medication be prescribed for nonthrombolytic patients if systolic blood pressure is >220 mmHg or diastolic pressure is >110 mmHg. Blood pressure should be monitored every four hours for the first 48 hours of admission. An elevated blood pressure may be caused by hypoxia, an increase in intracranial pressure, hemorrhagic transformation, a full bladder, pain, nausea, or pre-existing hypertension. A registered nurse would monitor blood pressure, treat with necessary medications and assist in finding the root cause (Summer et al., 2009).

Temperature

A high fever can aggravate the ischemic injury increasing morbidity and mortality. An increase of 1ºF can lead to a poorer patient care outcome and can be a factor in short- and long-term mortality rates. Immediate identification of the source of the fever, then treatment of the fever will reduce the duration of injury. Nursing staff will be the first to notice signs of fever and will be responsible for contacting the physician, completing tests to determine the reason for the fever, initiating antipyretic medications and continuing to monitor the patient as the fever progresses (Summer et al., 2009).

Oxygenation

The brain requires adequate oxygenation to prevent neurological deterioration related to hypoxemia. Adequate oxygen levels can be compromised due to decreased

level of consciousness, aspiration, and atelectasis, or lung collapse. Nursing staff are responsible for monitoring stroke patient's oxygen level, lung sounds, and ability to swallow. Nursing staff are the first to notice threats to adequate oxygenation and can provide supplemental oxygen at a rate of 2 to 4L/min for patients with an oxygen saturation <92% (Summer et al., 2009). It is important for nursing staff to actively monitor oxygen levels to prevent further neurological deterioration.

Blood Glucose

Hyperglycemia in critically ill patients has always been associated with medical complications. Elevated blood glucose levels are common during the acute phase of stroke and may be related to uncontrolled or undetected diabetes or due to cortisol and norepinephrine release during injury. Elevated blood glucose levels are also a factor in poor functional recovery, increased infract size, increased hospital length of stay, increased mortality and cost (Summer et al., 2009).

Nursing staff are responsible for monitoring the blood glucose level based on the patient's glucose level at admission. Glucose levels are often monitored every six hours for the first 24-48 hours because there is evidence that these patients are more prone to intracranial hemorrhage. Patients with pre-existing diabetes will be monitored and treated with their regular medication and insulin, though they may be adjusted depending on their levels. Nursing staff monitor and adjust medications based on the physician's orders for their patients (Summer et al., 2009).

Coordination and Communication

Coordination and communication are important nursing roles in acute stroke care. Nursing staff spend the most time with stroke patients and therefore have the most

information related to patient progress with areas such as mobility, transferring, positioning, ADLs including washing and dressing, as well as how the patient is responding to treatments and exercises. Nurses coordinate care and communicate with other interprofessional team members to ensure the primary caregivers have the necessary knowledge while developing care and therapy plans as well as discharge planning (Long, Kneafsey, Ryan, & Berry, 2002). Nursing staff are also responsible for referrals to other specialities, delegating care to support workers, requesting input from various team members and ensuring that clients see these members throughout the shift. Nurses maintain the flow of work, organizing their day based on the schedules of the patient, interprofessional team members and necessary testing such as swallowing screening, physiotherapy exercises, MRIs and repeat CT scans (Long et al., 2002).

Technical and Physical Care

Nursing technical care includes providing nutritional support, medication administration, wound care, swallowing tests (TORBSST), tube feeding, and screening for infections. Nursing staff also care for patients with aphasia who have difficulty communicating because the stroke has damaged the area of the brain responsible for language diction. To improve communication some strategies to help the person with aphasia to get their message across include, encouraging the patient to write down a word or draw a picture, if able to write, encouraging the patient to point to something or use a communication board, and ask yes/no questions (Long et al., 2002). A role play exercise for improving aphasia communication will be available at the end of this chapter. Physical care includes mobility, rehabilitative exercises, personal care and maintaining comfort (Long et al., 2002).

Integration of Therapy

Nursing staff on the acute stroke unit are responsible for coordinating with PT and OT to follow through with therapy exercises or interventions with patients, such as swallowing exercises, passive mobility exercises, and assisting the patient by encouraging ADLs. It is important for nursing staff to encourage independence with care activities while fostering rehabilitation. Nursing staff can engage in rehabilitative activities when PT and OT have left for the day, thereby decreasing the amount of downtime patients have during their admission (Long et al., 2002).

The acute stroke unit also utilizes the Alpha-FIM screening tool to identify physical and cognitive disability in terms of burden of care. This tool is usually completed by PT or OT with assistance from nursing staff and other interprofessional team members. The Alpha-FIM tool indicates the functional ability of the patient with a mild rating of >80 being recommended to community-based rehabilitation, a moderate rating between 40-80 being recommended to inpatient rehabilitation, and a severe rating of <40 being recommended to restorative care with regular assessment for rehabilitation potential.

Nursing staff are actively involved with each of the other interprofessional team members and integrate each discipline into their own care whether it is physical activities for PT and OT, inserting nasogastric tubes and starting enteral feeds for SLP and the dietitian, or providing emotional support and referring patients and families to see the social worker for assistance.

Emotional Support

Nursing staff on the acute stroke unit play an important role in providing emotional support to the patient and helping them cope with their hospitalization and disabilities. Nurses spend the largest amount of time with patients in relation to other disciplines and are in the ideal position to discuss care, patient fears and concerns, as well as note early signs of depression. Depression screening is usually completed by nursing staff within a few weeks of admission (Long et al., 2002). A copy of the depression screening tools is available for viewing in Appendix A.

Family Involvement

The final role for nurses on the acute stroke unit is family involvement. Active family involvement into the care plan and exercises of the patient has been known to improve patient care outcomes and increase functional recovery (Long et al., 2002). Since nursing staff spend most of the time with patients and their families it places them in the ideal position to share knowledge, provide emotional support, communicate tests and procedures, and teach them how to actively care for their loved ones (Long et al., 2002). Nursing staff are also the first avenue for families to approach with questions and concerns which can then be either assisted by the nurse or make plans for the family to sit and discuss with other interprofessional team members depending on the issue at hand, i.e. direct them to OT for assistive devices, PT for exercises at home, social worker for financial support (Long et al., 2002).

Each of these different roles has an active part to play in nursing stroke care and by integrating them together the nursing can optimize stroke care on the acute stroke unit thereby improving patient care outcomes.

Section 5: Aphasia Role Play Exercise

Aphasia role play exercises give nursing professionals the opportunity to play the patient role, so they can experience the challenges associated with being a patient and trying to communicate with those around them. The exercise also places the nurse in the position of trying to effectively communicate and work with aphasic patients and learn how to utilize communicative tools.

Directions for Facilitators

In the first role play exercise (Role Play #1), the nurse is attempting to have a conversation with an aphasic patient, Mrs. Strang, who had a stroke two years prior, has mild receptive aphasia, severe expressive aphasia, and extreme right-sided weakness with limited use of her left hand. Mrs. Strang has been having recent headaches and is concerned that she is having small strokes (TIAs). She has attempted to communicate this with her family members when they visit, but they live far away, and she does not see them often. The nurse is attempting to communicate with the patient to learn her concerns and to create a plan of care using a communication board.

In the second role play exercise (Role Play #2), the nurse is attempting to communicate with Mr. Martin, a 58-year-old man who had a stroke one year ago. He has right-sided weakness, moderate receptive and expressive aphasia, reads at a slow pace, and has difficulty communicating. Mr. Martin has been growing increasingly frustrated that people do not seem to understand him. He has been having trouble sleeping and is worried about his wife. He is attempting to communicate this to his nurse but is slow to speak, says nonsense words and does not seem to realize that what he says doesn't make sense. As the nurse you are attempting to effectively communicate and understand his concerns.

Participants should be given an overview of the scenario and the package containing what their role is in the exercise, i.e. nurse or patient. Participants will be those nursing staff orientating to the floor who will participate in the role play exercise. Participants will be divided into groups of two, or partners, so that each nurse can take turns playing the role of the patient and the role of the nurse.

Role Playing for Supported Conversation:

- Participants are divided into pairs
- Each pair is given a Package A & Package B
- Packages are supplemented with pictorial material
- Each team is given blank white paper & a black marker
- Exercise takes approximately 15-20 minutes per partner
- Separate sheets for each scenario with instructions for participants

Materials:

- Directions for participants
- Role play (Package A & Package B)
- Pictorial material
- Plain white paper & black marker

Directions for Participants

You will be participating in role play exercises as either the Partner 1 or Partner 2 so that you can be the "nurse" in one exercise, and the "patient" in the other exercise. Instructions for the approach you can take when you are assigned the role of the nurse working with stroke patients are provided below. There are two different role play exercises scenarios provided for your learning.

Supported Conversation:

Getting the message IN – "Is my message clear?" (communicating effectively)

- Sit next to each other, but maintain eye contact
- Establish a topic. Let him/her know when you are changing topics. Both can be done by writing down a KEY WORD.
- Use short, simple sentences
- Pause between statements
- Use pictures when necessary

How to get the message OUT – "Does he/she have a way to answer or ask questions?"

- Ask yes/no questions and make sure that he/she has a way to respond
- Ask one thing at a time
- Ask him/her to give you clues by pointing to objects or pictures
- Give them appropriate time to respond

Verify – "Make sure you have understood"

- Summarize slowly and clearly what the patient is saying

Role Play #1 – Partner 1 (NURSE)

- You are attempting to have a conversation with someone with aphasia.
- Mrs. Strang is 63 years old and had a stroke 3 years ago. She used to write with her right hand.
- Her right extremities are extremely weak, but she has some use of her left hand.
- Her stroke has left her with mild receptive aphasia, and severe expressive aphasia.
- She says "yes" and "no", but not consistently, and sometimes what she says does not match her facial features or gestures.
- She can read single words, and benefits from a slow pace. Her family lives quite a distance away.
- Mrs. Strang is trying to tell you something, she appears to be very worried.
- Use the pictogram resources to help establish her concerns.
- Use paper and pen to write down the key words.
- Make sure you verify that you understand what she is trying to portray.
- Use the picture resources to re-assure her that her concerns will be addressed.

Role Play #1 – Partner 2 (PATIENT)

- You are Mrs. Strang, a 63-year-old woman who had a stroke 3 years ago.
- You have mild receptive aphasia and find that people talk too quickly.
- You used to use your right hand to write, however, it is now too weak, and you can do some spelling and drawing but it is very slow and frustrating.
- All you can say is "yes" and "no", but you often say, "yes" when you really mean "no" and vice versa. You don't understand why people cannot understand you.
- You can read single words, but they must be in large print.
- You are worried. You have been having headaches lately and are concerned that you are having TIAs. This concern is what you are trying to communicate with your nurse (partner) in this scenario.
- You have tried to communicate this to your family members when they visit, but they live far away, and you don't often see them.

Role Play #2 – Partner 1 (PATIENT)

- You are Mr. Martin, a 58-year-old man who had a stroke one year ago.
- You have heard the term moderate expressive and receptive aphasia, but you communicate just fine. When you say, "Boxcar chicken little", you can't understand why your wife throws her hands up in the air.
- You used to use your right hand to write, but it is now very weak, and you write exactly what you say.
- You cry often, and that frustrates you.
- You can read single words.
- You have been growing more and more frustrated. You keep telling your wife when she comes every day that you want to see the family dog, Boxer, but she has not brought him in.
- You are also having trouble sleeping, mostly because you are being kept awake by your roommate.
- Your wife looks tired and frustrated, and you are concerned. Your speech language pathologist has been working with you so that you will act out (using hand gestures) what you want, but it is still in progress. You wish people would just take the time to wait.
- You are trying to communicate your concerns to the "nurse" (partner) in front of you. (Make sure to say nonsense words, but your pointing is accurate).

Role Play #2 – Partner 2 (NURSE)

- You are attempting to have a conversation with someone with aphasia.
- Mr. Martin is a 58-year-old man who had a stroke one year ago. He used to write with his right hand.
- He cries briefly but frequently throughout the day.
- His right extremities are extremely weak, but he has some use of his left hand. Writing is no longer functional, but he can draw quite well.
- His stroke left him with moderate receptive and expressive aphasia.
- He says words, but they don't make any sense.
- He can read single words, and benefits from a very slow pace. His wife comes to see him every day.
- Mr. Martin is trying to tell you something. He has not been participating in any activities and is withdrawing from people.
- Use the pictogram resources to help establish what is troubling him.
- Use paper and pen to write down key words.
- Make sure to verify that you understand what he is trying to tell you.

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Learning Checkpoint Answers

Checkpoint 1:

1. D
2. D
3. D
4. C

Checkpoint 2:

1. C
2. D
3. B
4. D
5. B, D, F, G
6. C, D
7. B

Appendix A

Used with permission from Eastern Health

Eastern Health

Doctor's Order Sheet

Admission Orders for Adult Stroke Patients

PO1710 0392 02 2013

Name:

HCN:

Date of Birth:

Patient's Name:_____ **NO KNOWN ALLERGIES**

Orders without a box must be entered on all patients. **Orders with a box are only entered if checked.**

1. **Admit to**: _____

2. **Diagnosis:** _____

3. **Consult Stroke Team**

4. **Diet**: NPO N/G tube (see Patient Orders for Feeding Regime) Diet:_____
   Agree with recommendation by Dietitian and Speech-Language Pathologist.

5. IV Therapy: _____ Intermittent Infusion Device (Saline Lok)

6. **Activity** as tolerated, unless there is a medical indication for limitation, if so_____

7. **Vital Signs:** Every 4 hours X 48 hours, then 4 X per day; unless otherwise ordered

8. Call Physician if temperature is greater than 37.5 degrees celsius and give 650 mg Acetaminophen PO/PR, every 4 hours PRN.

9. **Bedside Glucose Monitoring**: Specify frequency:_____, Call Physician if _____ N/A

10. **Investigations**: **CBC, Electrolytes, Urea, Creatinine, Glucose, CK, LFTs, INR and PTT; Fasting Lipid Profile; Routine Urinalysis; ECG, Chest X-Ray (PA & Lat) History:**_____
    Fasting glucose Hb A1C Cardiac Telemetry for 48 hours Echocardiogram (only if necessary)

    Carotid Doppler (carotid artery events only) CT Brain (requisition required) MRI Brain (requisition required)
    CT Angiogram (head and neck)

11. **Medications**:

Anti-platelet: Enteric Coated ASA_____mg PO Daily Clopidogrel 75mg PO Daily **OR** Aggrenox 1capsule PO bid

Patient received Alteplase (t-PA), hold antiplatelet medication for 24 hours

Acetaminophen 650mg PO/PR every 4 hours PRN Dimenhydrinate 25-50mg IM/IV/PO every 4 hours PRN

Other medications: See Physicians Medication Orders

12. Venous Thromboembolism (VTE) Prevention: Ensure Form ch1231 Adult Acute Care VTE Prophylaxis for Medical Patients is completed, as per the VTE Prevention Policy

Intermittent Pneumatic Compression Device (see reverse for contraindications).

13. Patient Education: Let's Talk About Stroke Booklet - provide and discuss.

14. For Any Other Orders or Consults Please Refer to Patient's Order Sheet

Physician's Name: Date: Time:

Physician's Signature:

Nurse's Name: Date: Time:

Nurse's Signature:

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Eastern Health
Community Support Program

Geriatric Depression Scale
Short Form

AS2420 1317 01 2015

Nam

HCN:

Choose the best answer for how you have felt over the past week:

1. Are you basically satisfied with your life? ☐ YES ☐ **NO**

2. Have you dropped many of your activities and interests? ☐ **YES** ☐ NO

3. Do you feel that your life is empty? ☐ **YES** ☐ NO

4. Do you often get bored? ☐ **YES** ☐ NO

5. Are you in good spirits most of the time? ☐ YES ☐ **NO**

6. Are you afraid that something bad is going to happen to you? ☐ **YES** ☐ NO

7. Do you feel happy most of the time? ☐ YES ☐ **NO**

8. Do you often feel helpless? ☐ **YES** ☐ NO

9. Do you prefer to stay at home, rather than going out and doing new things? ☐ **YES** ☐ NO

10. Do you feel you have more problems with memory than most? ☐ **YES** ☐ NO

11. Do you think it is wonderful to be alive now? ☐ YES ☐ **NO**

12. Do you feel pretty worthless the way you are now? ☐ **YES** ☐ NO

13. Do you feel full of energy? ☐ YES ☐ **NO**

14. Do you feel that your situation is hopeless? ☐ **YES** ☐ NO

15. Do you think that most people are better off than you are? ☐ **YES** ☐ NO

Answers in bold indicate depression. Although differing sensitivities and specificities have been obtained across studies, for clinical purposes a score greater than 5 points is suggestive of depression and should warrant a follow-up interview. Scores greater than 10 are almost always depression.

Name:_____ Date:_____DD/MONTH/YYYY

Signature:_____

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Eastern Health

Stroke Aphasic Depression Questionnaire

(SADQH-10)

AM2820 1354 05 2015

Name:

HCN:

Date of Birth:

Please indicate how many days of the last 7 the participant has shown the following behaviours:

Behaviour	Days this week			
	Every day this week	**On 4-6 days this week**	**On 1-4 days this week**	**Not at all this week**
1. Did s/he have weeping spells?	3	2	1	0
2. Did s/he have restless disturbed nights?	3	2	1	0
3. Did s/he avoid eye contact when you spoke to him / her?	3	2	1	0
4. Did s/he burst into tears?	3	2	1	0
5. Did s/he complain of aches and pains?	3	2	1	0
6. Did s/he get angry?	3	2	1	0
7. Did s/he refuse to participate in social activities?	3	2	1	0
8. Did s/he sit without doing anything?	3	2	1	0
9. Did s/he keep him/herself occupied during the day?	0	1	2	3
10. Did he/she get restless and fidgety?	3	2	1	0

If scores are consistently (2 consecutive weeks) greater than or equal to 6, please discuss with physician. Further assessment may be indicated.

Name:_____ Date: DD/MONTH/YYYY

Signature: _____

Eastern Health

Medicine Program

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TOR-BSST©
The Toronto Bedside Swallowing Screening Test ©

I V1880 0307 08 2012

Name:

HCN:

Date of Birth:

DATE: DD/MONTH/YYYY TIME: _____

Is patient alert and able to participate?

☐ No, skip to Section D and mark as Failed £Yes(Continue to Section A)

A) Before water intake: (Mark either abnormal or normal for each task.)

1. Have patient say 'ah' and judge voice quality
2. Ask patient to stick their tongue out and then move it from side to side.

Abnormal	*Normal*
£	£
Abnormal	*Normal*
£	£

B) Water intake: Have the patient **sit upright** and give water. Ask patient to **say "ah"** after each intake. Mark as abnormal if you note any of the following signs: **coughing, change in voice quality** *or* **drooling.** If abnormal, stop water intake and advance to 'D'.

1) One Tsp Swallows	***Cough during/after swallow***	***Voice change after swallow***	***Drooling during/after swallow***	***Normal***
Swallow 1	£	£	£	£
Swallow 2	£	£	£	£
Swallow 3	£	£	£	£
Swallow 4	£	£	£	£
Swallow 5	£	£	£	£
Swallow 6	£	£	£	£
Swallow 7	£	£	£	£
Swallow 8	£	£	£	£
Swallow 9	£	£	£	£
Swallow 10	£	£	£	£
2) Cup drinking	£	£	£	£

C) After water intake: (Administer at least a minute after you finish Section B.)

1. Have patient say 'ah' again and judge voice quality.

Abnormal	*Normal*
£	£

D) Results: ☐ Passed (no abnormal signs) ☐ Failed → Initiate referral to Speech Language Pathologist (1 or more abnormal signs)

TOR-BSST© Screener's Name: _____

Signature: _____

Some Guidelines and Tips for the TOR-BSST©

Before the start of screening, remember to: a) have a cup of water and a teaspoon; b) ensure patient's mouth is clean; and c) ensure patient is sitting upright at 90°.

A. Before water intake:

1. *"I want you to say "ah" for 5 seconds using your speaking voice."*

- Model a clear "ah" for the patient.
- Remind them not to sing "ah" or use a quiet voice.
- You can ask them to stretch the last syllable of the word *Ottawa*.
- Remember to take note of the patient's voice when speaking. If his/her voice sounds different when saying "ah" re-instruct the patient to use a normal voice using any of the suggestions above.
- **You are looking for any breathiness, gurgles, hoarseness, or whisper quality to the voice. If you perceive any of these, even to a mild degree, mark as abnormal.**

2. *"Open your mouth. Now stick out your tongue as far as it will go. Now move it back and forth across your mouth."*

- Stick your tongue straight out. If no deviation, model a consistent back and forth motion for the patient.
- **You are looking for any deviation of the tongue towards one side on protrusion, or any difficulty in moving the tongue to one side. Mark as abnormal if you perceive any of these features.**
- **If the patient is unable to protrude his/her tongue at all, mark as abnormal.**

B. Water Swallows:

Give the patient 10 X 1 tsp of water. Remind the patient to say "ah" after every teaspoon swallow. If normal, give cup to patient for drinking.

- The patient should always be fed the teaspoon of water.
- Ensure that full teaspoon amounts are given.
- Lightly palpate the throat to monitor for movement of the larynx on the first few swallows.
- **You are looking for any coughing, drooling or change in the patient's voice suggesting wetness, hoarseness, etc. If you perceive this, mark accordingly and stop the water swallows.**
- **If you see what looks like a stifled or suppressed cough, mark this as a cough.**
- **If there is no coughing, drooling, wet voice or hoarseness mark as normal.**

C. Voice after Water Swallows:

- Wait one minute after the end of the water swallows.(You can use this time to clear away the cup etc. and mark the form)
- Ask the patient to say "ah" as in the first part of the screen.

D. Final Scoring:

If you have marked ***any*** of the ***items*** as ***Abnormal***, score the patient as ***Failed*.**