COMMUNITY EDUCATION ON STROKE:

EARLY RECOGNITION AND TIMELY ACCESS TO HEALTHCARE

by

Paula Anna Stobie

A professional paper submitted in partial fulfillment of the requirements for the degree

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Dr. Susan Luparell, PhD, CNS - BC

Approved for the Department of Nursing

Dr. Helen Melland, PhD, RN

Approved for the Division of Graduate Education

Dr. Carl A. Fox
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November 2009
DEDICATION

I would like to dedicate this document and all the work it represents to my husband Jim for his constant encouragement and unwavering faith in me, and to my family for their support and understanding. Thank you Conner, Randi, Chris, and Hanna for being flexible and patient while Mom was busy with school. You each have contributed in your own way, and I couldn’t have done this without all of you.
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ABSTRACT

In 2006, data collected from a hospital emergency room centrally located in Sanders County, Montana revealed that 33% of patients presenting with possible stroke symptoms were eligible to be evaluated for treatment with a potentially life-saving intervention. As a member of the community, I felt this rate of treatment could be improved. Review of data from state and national sources showed similar treatment statistics nationwide. One consistent suggestion in the literature for improving stroke detection and treatment was for increased public education.

As a result of these findings I developed, presented, and evaluated a community-based education presentation on stroke symptoms and treatment. Knowledge about stroke symptoms and treatment was measured prior to the presentation and again afterwards with a pre- and post-test tool. Results of this testing showed overall improvement in the audience’s knowledge. On-going evaluation of emergency room data to assess for an improved percentage of persons being treated was beyond the scope of this project.

Information discovered in a review of the literature consistently points out that late arrival to the Emergency Department is one of the major reasons people are not being treated for stroke, and most sources call specifically for increased public awareness regarding stroke and treatment available. This project served to educate a small population of people in a county with multiple risk factors for stroke. Although ongoing refinement and data collection are needed, continued use of this educational tool may serve to improve treatment of stroke, potentially decreasing the death and disability attributed to stroke in this county.
CHAPTER ONE

INTRODUCTION

In the United States stroke ranks third among all causes of death of Americans (American Heart Association, 2008). The human and financial cost is great, for a stroke can lead to permanent disability or death, and in the process create an enormous financial burden for families and the healthcare system. Despite the emergence of effective treatment in the mid-1990’s in the form of tPA (a “clot busting” drug) most patients suffering from stroke are not treated. Late arrival (greater than 2 hours) to the Emergency Department after symptom onset continues to be one of the most common reasons for non-treatment with tPA (Alexandrov, 2007; National Stroke Association).

Alexandrov (2008) lists many factors that contribute to delay, including a lack of urgent response by the victim, inability to activate EMS, and fear of embarrassment. Lack of patient recognition of symptoms may also contribute to this list (Mitka, 2008). From data gathered at Clark Fork Valley Hospital in Sanders County, it would appear the statistics are similar to what we find nation-wide: only about 33% of patients experiencing stroke symptoms present to the ED within the 2 hour treatment window needed for tPA administration. (Cockrell, 2007)

Reasons for patient delay in seeking treatment aren’t entirely clear. Zerwic found that while lack of knowledge of stroke symptoms was certainly present in patients delaying access, it wasn’t related to delay time. It was noted that perhaps older age and a sense of urgency may be associated with more use of 911. The presence of bystanders
that identified a serious health problem decreased delay in seeking treatment as well by encouraging notification of 911 (Zerwic, Hwang, & Tucco, 2007). The National Stroke Association, however, contends that the majority of patients don’t arrive at the emergency room in a timely manner because they are unaware they are having a stroke (National Stroke Association). (Cockrell, 2007)

**Statement of the Problem**

In a compilation of data from 2006, of the 9 persons presenting the Clark Fork Valley Hospital Emergency Department with stroke symptoms, 3 presented within 2 hours of symptom onset (33%). As a member of the community served by Clark Fork Valley Hospital and a health care professional, I was concerned with these numbers. The American Heart Association (2008) reports that only 23% actually access the ED within two hours of symptom onset; other authors report this number at 31.6% (Zerwic, 2007) and 19% (Mitka, 2008). All of the authors covering this topic call for action to increase the percentage of patients accessing emergency treatment within 2 hours to ultimately decrease the mortality and morbidity related to stroke.

As described by the authors Alexandrov (2008), Mitka (2008), and Zerwic (2007) in a previous paragraph, it is unclear as to whether patient delay is significantly affected by a lack of knowledge of stroke symptoms or by lack of awareness of the treatment available. My experience as a registered nurse suggests that both factor in to the delay. In reflecting with Isabelle Cremer, RN (Cremer, 2009) and Chris Cockrell, RN (Cockrell, 2007), I found that they were both in agreement with my assessment. Patients reaching the ER are there because they are aware that ‘something’ significant has developed so
this lends weight to suspecting the delay may be more strongly associated with being unaware of the treatment option and limited time frame. Denial may also play a role in the delay of seeking care but has not been formally addressed in this project. Relevant organizations (American Stroke Association, National Stroke Association, Montana DPHHS) encourage education of the public regarding stroke to increase the percentage of persons accessing emergency care within 2 hours (and thereby improving the outcome of those being treated).

The lack of a county-wide stroke education program is a significant barrier to reducing stroke risk factors and raising awareness or knowledge about specific stroke symptoms. If people do not have the knowledge they are ill-prepared to react appropriately when they or those they witness have possible stroke symptoms.

To gain a better understanding of the issue at hand, a problem analysis can be utilized to identify the basic epidemiology of a problem, as well as targeting the key causal pathways that lead to a particular condition or outcome. Analysis of the information regarding stroke care specific to Sanders County reveals the key causal pathway:

![Figure 1. Key Causal Pathway of Stroke Care Outcomes in Sanders County](image-url)
The most effective intervention point is education at the community level with an easily understood presentation that identifies potential stroke symptoms and emphasizes the urgency needed when accessing the emergency services.

**Significance**

Clark Fork Valley Hospital is centrally located in Sanders County, in Northwest Montana. In 2007, the population was 10,972 and 47% of this population is 50 years of age or greater. (Economic Development Intelligence System Sanders County Montana, 2007). One hundred percent of the county population is considered rural. High school graduates number 81.2%, and 15.5% have at least a Bachelor’s degree. Economically speaking, 17.2% of the population is listed below the poverty level as compared to a statewide average of 14.6%. This information identifies significant risk factors within the population of Sanders County including persons over the age of 50 and those that are below the poverty level (American Heart Association, 2008).

Late arrival to the ED is one of the most common reasons for non-treatment of ischemic stroke, and ED statistics from Clark Fork Valley Hospital contain results similar to nationwide studies. Education of the public regarding stroke would be a valuable tool in an effort to improve the statistics in this facility and surrounding county for stroke treatment. A search of county resources does not reveal an established program to provide education to the general public regarding recognition of stroke symptoms nor the importance of accessing the healthcare system in a timely manner. Noting that the American Stroke Association, the Montana Stroke Initiative, and the Montana Department of Public Health and Human Services have made materials available to
healthcare facilities with the purpose of increasing public education and awareness of stroke, it is appropriate to develop a community education presentation that will increase the public’s knowledge of stroke symptoms and the need for rapid entry into the healthcare system for effective evaluation and treatment.

**Purpose**

The purpose of this project is the development, implementation, and initial evaluation of a community education presentation outlining the symptoms of stroke as well as highlighting the necessity of accessing EMS within 2 hours for potentially life-saving treatment.

**Conceptual Model Framework**

Dorothea Orem developed and formalized Orem’s Self-Care Deficit Theory in 1971 as a way to present a clear conceptualization of nursing – what it is and what it does for people. Central to the theory is the concept that people experience “self-care limitations” in which they lack the ability (physically or otherwise) to achieve or maintain good health (Hartweg, 1991). It is in this instance that a nurse is in the position to provide what is needed to compensate for or rectify the self-care deficit. This general theory of nursing is one of the most widely used today.

In Sanders County a self-care deficit identified with regards to stroke treatment is the lack of public awareness of the need to access healthcare in a timely manner when experiencing stroke symptoms. It is in this setting that Orem’s theory identifies a deficit, and recognizes that nursing care (in this case education) is an appropriate intervention to
improve patient health and well-being. A public education presentation will provide information needed to help make decisions regarding accessing healthcare when symptoms of stroke are suspected. This in turn allows for improved opportunity for effective treatment with decreased death or long-term disability.

To examine the information derived from the Clark Fork Valley Hospital ED regarding treatment of stroke patients for the year 2006, it was necessary to analyze the topic with a Systems Theory approach. A system “is composed of interacting parts that operate together to achieve some objective or purpose. A system is intended to ‘absorb’ inputs, process them in some way and produce outputs.” (University of Missouri - St Louis College of Business Administration, 2008) The concept of Root Cause Analysis (RCA) was also utilized in this process. Rooney and Vanden Huevel (2004) summed up RCA as a “tool designed to help identify not only what and how an event occurred, but also why it happened. With this approach, a person can identify causes that can be controlled. Plan-Do-Study-Act improvement cycle is another commonly utilized tool within the Systems Theory approach. The Plan phase consists of “who” “what” “where” “why” and “how”, essentially identifying the person(s) involved, the issue(s) to be addressed, and the method that will be used. In the Do phase potential solutions are developed and implemented. The Study phase studies the trial results. If the desired results are achieved, then the process continues. If not, the process returns to the Plan phase and identifies elements that need to be adjusted, as well as re-evaluates the Do phase. Once the Study phase reveals that the desired results have been achieved the process moves to the final phase “Act”, in which the new measures are fully integrated and monitored as needed. (Performance Improvement Network, 2005).
The following is an illustration of how the system of Clark Fork Valley Hospital ER data has been analyzed:

My recommendation is to add education to the ‘process’ component. Theoretically, this will increase public knowledge of stroke symptoms and the critical actions needed thereby changing (improving) response to stroke symptoms and ultimately increasing the percentage of persons that arrive at the ER within 2 hours of symptom onset. Education is included as one of the 17 components of the “Intervention Wheel” which depicts how Public Health improves population health through interventions (Stanhope & Lancaster, 2008). With health teaching, facts and skills can be communicated that will change knowledge and thereby behavior of individuals. This change can have an impact at the individual, community, and systems level. I defined the system of Sanders County utilizing data from Clark Fork Valley Hospital based on the following precepts:

- Clark Fork Valley Hospital is centrally located in Sanders County
• It is the nearest facility for people in a 30 mile radius
• Data from their ED would be representative of patient response throughout the county
  ▶ *I do not have a means to validate this statement other than perception of community use of the facility.*

The Plan-Do-Study-Act cycle will be used to plan, develop, deliver and evaluate the educational intervention. In the *Plan* phase, I will focus on who my target audience will be and what information to present. I will also determine the appropriate format for presenting the information. “*Do*” will involve the actual presentation. The *Study* phase will contain the elements of evaluating the project, including studying and summarizing the results of the pre- and post-tests and the answers to open-ended questions given at the end of the presentation. In a long-term project, this would also include evaluating the statistics of the Clark Fork Valley Hospital ER after implementation, comparing this information to data prior to the presentation. “*Act*” will be determining what steps to take next, such as implementing the presentation as an on-going service throughout the county, or perhaps making adjustments and then returning to the study phase again.

**Clinical Nurse Leader Role**

The Clinical Nurse Leader is uniquely qualified to develop and deliver a community education presentation. The American Association of Colleges of Nursing sees the CNL as a clinician, outcomes manager, client advocate, educator, information manager, systems analyst/risk anticipator, team manager, member of a profession, and
lifelong learner. (American Association of Colleges of Nursing, 2007) This project draws on nearly every competency associated with the CNL practice. As a clinician, the CNL readily identifies the pathophysiology of stroke and treatment as well as the gap in care created by lack of public awareness of treatment options. Analyzing data after implementation draws on the outcomes manager aspect. At the community level, the CNL is acting as a client advocate by identifying a need for education and delivering a presentation that will promote improved health outcomes in the event of a stroke. As an educator, the CNL will develop an appropriate educational presentation, incorporating recent evidence supporting current stroke diagnosis and treatment (stroke and stroke treatment) as well as adult learning principles and systems theory. It is not enough to be knowledgeable of the topic, but also to develop and present the material in a meaningful, understandable way. CNL competencies as an information manager come into play in the review and critique of evidence used to develop educational materials, and present information to both the targeted audience, and again when evaluating and sharing the results of the education with other members of the profession.

Strong leadership is inherent to the CNL role. Leadership in nursing is critical for providing guidance for solving the complex problems related to nursing care delivery (Smith, Manfredi, Hagos, Drummond-Huth, & Moore, 2006). The AACN defines the CNL as a “leader in the healthcare delivery system” (American Association of Colleges of Nursing, 2007). The CNL has the competencies to identify a problem (lack of community awareness of stroke treatment options) and consequently develop, implement, and evaluate an intervention in the form of a community education presentation.
Assumptions

In planning and implementing this project, the following assumptions were made:

- Individuals will act appropriately according to the level of knowledge they have about a subject.
- Attendees at presentation can understand English at the grade level presented.
- Attendees are present because they have a desire to know more about stroke.
- A significant majority of people that live in Sanders County and suffer symptoms of possible stroke will utilize the Clark Fork Valley Hospital ED
- Community Education is an effective intervention point to improve public response
CHAPTER TWO

REVIEW OF LITERATURE

In 2006, the Clark Fork Valley Hospital ED admitted 9 persons complaining of stroke symptoms. Only 3 of the 9 (33%) presented within 2 hours of symptom onset. Since Clark Fork Valley Hospital is centrally located in Sanders County, this data was taken to be representative of the county. At the outset of this project, Sanders County did not have any community-based education available to the public that would raise awareness of the need to access healthcare in a timely manner when experiencing stroke symptoms.

Pathophysiology of Stroke

A stroke or cerebrovascular accident occurs either from infarction or hemorrhage involving the vasculature of the brain (McCance & Huether, 2006). Cells in the brain, as all cells in the body, require oxygen and nutrients to survive. Hypoxia (lack of sufficient oxygen) is the most common cause of cellular injury, and ischemia (reduced blood supply) is the most common cause of hypoxia. As the cells lose the supply of nutrients and oxygen brought by the blood, they can no longer produce sufficient ATP which causes the sodium-potassium pump to fail. The cells swell with water as electrolyte imbalance worsens. At this point if oxygen is restored the damage is reversible. If the oxygen is not restored the cell continues the process of enzyme release, inflammation, and eventual cell death.
Symptoms of CVA vary depending upon the size and location of the injury. Blindness, coma, death, one-sided weakness or paralysis, speech or swallowing difficulty, confusion, visual disturbance, dizziness and severe headache may be manifestations of a stroke, especially if associated with sudden onset (Seidel, Ball, Dains, & Benedict, 2006). If a person survives the stroke, symptoms can persist throughout the rest of their lives, causing financial, emotional, and physical burdens for the patient and family. With such far-reaching sequelae for untreated stroke, an increase in the percentage of patients effectively treated would decrease human and financial costs associated with stroke. The American Stroke Association ranks stroke as the 3rd leading cause of death in the United States, with 780,000 people experiencing a new or recurrent stroke yearly (American Heart Association, 2008). The estimated direct and indirect cost of stroke for 2008 is $65.5 billion. Furthermore, risk of stroke doubles for each decade of life after age 55, and some evidence suggests stroke is more common among low-income populations. With nearly 50% of the county population at or above the age of 50, and just over 17% under the poverty level, it would appear Sanders County has significant inherent risks for stroke demographically.

Strokes are described as hemorrhagic or ischemic. In hemorrhagic stroke, either microaneurisms of smaller vessels or arteriolar necrosis causes bleeding into the brain. The primary cause is hypertension. As bleeding continues a mass of blood is formed, compressing adjacent brain tissues. The pressure on the tissues effectively occludes the blood supply leading eventually to tissue death. Hemorrhagic stroke accounts for approximately 20% of all cerebrovascular accidents. Treatment thus far is focused on
controlling the bleeding and associated increased intracranial pressure. No other definitive treatment exists.

*Ischemic* stroke is caused by an interruption in the brain’s blood flow. There are 2 subtypes: Thrombotic and Embolic.

In thrombotic ischemic stroke, there is occlusion in one of the blood vessels that supply the brain. With embolic ischemic stroke, a clot forms somewhere in the body, then travels through the system until it reaches a vessel in the brain that is too small to pass through, and blockage occurs. Combined, thrombotic and embolic ischemic strokes account for 80% of all strokes. Since the mid-1990’s we have had effective treatment available for ischemic stroke in the form of tPA, but it must be administered within 3 hours of symptom onset. (DiPiro, Talbert, Yee, Matzke, Wells, & Posey, 2008)

**Treatment of Stroke**

At present the Stroke Council of the American Stroke Association recommends only two pharmacological agents that have been shown to decrease the disability associated with ischemic stroke: tissue plasminogen activator (tPA) within 3 hours of symptom onset, and aspirin within 48 hours (DiPiro, Talbert, Yee, Matzke, Wells, & Posey, 2008).

tPA (also known commercially as Alteplase or Activase) is a “clot busting” drug that binds to the fibrin in a clot thereby beginning the process to break it down. Once the clot causing the occlusion is dissolved blood flow is then re-established to the affected area. The sooner circulation is restored, the greater the chances of minimizing lasting
damage in the brain. tPA was approved in 1996 by the US Food and Drug Administration for the treatment of ischemic stroke. It must be administered within 3 hours of symptom onset for significant reduction of stroke effects (American Heart Association, 2008). Guidelines from the National Institute of Neurological Disorders and Stroke recommend computer tomography (CT) scan within 25 of hospital arrival (American Heart Association, 2008). If the patient arrives at the hospital no longer than two hours after stroke symptom onset, one hour is subsequently available for initial intake, evaluation, CT, and radiologist interpretation, thus allowing for the administration of the tPA prior to the 3 hour limit.

Tissue plasminogen activator is actually a naturally occurring substance in the body. The commercial form is produced from recombinant DNA technology. The action is to bind to fibrin that is present in a clot. Once it is bound, the tPA begins the process of converting plasminogen (causes blood to clot) to plasmin (which begins breaking down the clot). Interestingly, this conversion of plasminogen to plasmin does not occur to such a large extent without the presence of fibrin. This reduces the systemic action of tPA thereby decreases chances of widespread bleeding (Genetech, 2009).

**Barriers to Treatment**

Failure to recognize their symptoms as that of stroke, coupled with delay within the medical delivery system results in treatment of less than 5% of eligible patients with tPA (Mitka, 2008). In this article, Mitka writes “to be eligible to receive thrombolytic therapy for a stroke, patients must learn to recognize symptoms and seek help at an
emergency department within 3 hours of symptom onset” (p1653). A community education presentation can inform the public not only of stroke symptoms, but instill a sense of urgency to access emergency services within 2 hours of onset.

Ms. Chris Cockrell, RN, currently serves as the Performance Improvement Coordinator for Clark Fork Valley Hospital and has acted as Nurse Educator in the past. Ms. Cockrell was not aware of any community education programs addressing stroke symptoms and treatment currently available in Sanders County (Chris Cockrell, personal communication, 2007). The county is designated 100% rural which may in part contribute to this lack because of fewer resources (people, equipment, funds) than more urban areas. Unless a community member actively seeks information, it is not readily available.

Having worked with this rural community in both the hospital and clinic setting for over 20 years, I also have developed a sense for what additional barriers may be that involve attitude. It is not uncommon to encounter someone that delayed seeking treatment because they “had to finish cutting the hayfield” (or the logging project, etc…). The agricultural, rural population seems especially prone to this attitude about completing their work before seeking treatment. Long and Weinert (1989) recognize that ‘health’ is often defined by rural people by the ability to do their work, and that pain is acceptable as long as it doesn’t interfere with their ability to complete their work. Furthermore, this population tends to delay seeking treatment until symptoms are severe, and considers themselves to be very self-sufficient. (Long & Weinert, 1989). I also have picked up a
sense of the person perceiving themselves as “tough enough” to not require care. It would be an interesting topic to pursue at another time.

**Stroke and Public Health**

The Montana Department of Public Health and Human Services released the Montana Heart Disease and Stroke Plan for 2006-2010. In a letter accompanying the plan, the governor asked for help from all readers to participate in the plan to help achieve the stated purposes, which are to decrease morbidity and mortality associated with heart disease and stroke, reduce disease risk factors among all Montanans, and eliminate health disparities in the treatment of heart disease and stroke (Department of Public Health and Human Services, 2006). Specifically they look to public health and healthcare workers, in addition to business leaders, insurers, policy makers and healthcare organizations. Public health can have opportunities to interact with people at the community level, where they can assess lifestyle risks and knowledge deficits regarding healthcare. From this perspective the provider is in a position to evaluate the need for public education (among other needs) and either contact the public health agency or even develop a teaching plan themselves. It is this type of involvement that the state of Montana is looking for to gain success for the 2006-2010 plan.

Statistics utilized in development of the state plan were from 2003, and listed stroke as the number 4 cause of death statewide. Statistics from 2006 list stroke as the number 3 cause of death in the state (after heart disease and cancer) and the number 4 cause of death in Sanders County (after heart disease, cancer, and accidents). (Department of Public Health and Human Services, 2006)
Certain populations have been identified as having a high prevalence of heart disease and stroke risk, and therefore are listed as ‘priority’ populations for the efforts of the Heart Disease and Stroke State Plan. Those identified are:

- Adults over 45 who are at risk for heart attack/stroke due to cardiovascular risk factors
- Adults over age 55
- American Indians (dying from cardiovascular disease at an ‘alarming rate’)

One of the communities served by Clark Fork Valley Hospital is the town of Hot Springs. According to US Bureau of the Census 44% of the population is 55 years old or older, and 15.6% of the town is American Indian as compared to a State level of 5.98% (Sanders County Demographics, 2007). As noted previously, the town of Hot Springs has a significant percentage of two of the ‘priority’ populations targeted for intervention.

**Adult Learning Theory**

Adult learning as a distinct field was significantly advanced and defined by Malcolm Knowles in the 1950s. He is recognized as ‘the’ central figure in US adult education in this time period (Smith M., 2002). Knowles began working in the field of adult education in 1940. From that beginning, he went on to develop programs in adult learning as well as write several books on leadership, group dynamics, and adult education. His key texts are considered to be The Modern Practice of Adult Education (1970) and The Adult Learner (1973). These books not only ensured his role as the
major voice in adult education in the US, but also popularized the notion of andragogy (Smith M., 2002).

The basis for Knowles’ idea that adult education is a distinctive field was his belief that adults learn differently than children. The term andragogy means “man-leading” as opposed to pedagogy “child-leading”. He identified four principles unique to adult learning in his book “Modern Practices of Adult Education, from Pedagogy to Andragogy”

1. Adults generally have a deep need for self-directed learning
2. Adults increasingly appreciate that learning takes place through experience
3. Learning readiness of adults arises primarily from the need to accomplish tasks and solve problems that real life created
4. Adults see learning as a process through which they can raise their competence in order to reach full potential in their lives. They want to apply tomorrow what they learn today

Knowles’ view of adult learning is that adults approach learning not just to gather information but to solve problems (Smith M., 2002). Other authors less well-known echo this sentiment. Thoms (2001) writes that adult learning is a unique field of study and recognizes that adult learners are not just ‘big kids’. Others point out that the most important way to increase motivation is to respond to the adult’s learning needs (Hudson River Center for Program Development, 2001) and to present information that is meaningful (Thoms, 2001) (Lieb, 1991). Still others write
“the process begins with the incentive to learn” (Roberson & Merriam, 2005)(p.275). These points regarding adult education explored by Knowles and written of by others since must be kept in mind when considering an educational presentation for adults. The presenter must ask himself if the information is meaningful to the intended audience, and will the participants be able to perceive a benefit to themselves.

When determining the length of presentation, there is little literature that addresses appropriate length of an education program (Reardon, Payan, Miller, & Alexander, 2008). These authors conducted and evaluated a study of university students and instructors comparing the amount of learning in a 1 hour, 1½ hour, and 3 hour class format, their hypothesis being that the 1 ½ hour format would be most desirable. This is based on part in their belief that students “…do not have an unlimited attention span or unlimited ability to process information” (p.12) even though some of their sources for the paper recommended extended periods of contact time. Tracey, Sedlacek, and Patterson (as cited in Reardon et al., 2008) noted that instructors were more fatigued with the 3 hour format, while Henebry (cited in Reardon, et al., 2008) writes that during the latter portion of a 3 hour class students experience “information overload and attention problems” (p 14). Results of the study did yield support for their hypothesis.
To be effective, information must be presented at a level that the audience will understand. Although it is not the focus of this project to develop a written document for public understanding, the principles of readability and comprehension must be kept in mind when developing the oral presentation, the Power Point slides and testing material. The Adult Literacy Survey outlines the effect of literacy on healthcare. DuBay (2004) wrote about the relationship between literacy levels and hospital visits, citing statistics from 1994 in which adults with low health literacy levels averaged 6% more hospital visits when compared to adults with higher literacy skills. Length of hospitalization averaged 2 days longer as well in the lower literacy group. (DuBay, 2004). These statistics should further encourage persons developing healthcare information for the public to ensure a readability level that will be comprehended. The average adult reads at the 7th grade level, but it is recommended that materials for the public be written at the 5th or 6th grade level (DuBay, 2004). DuBay also offers literacy suggestions (e.g., using short simple words, avoiding jargon) as well as describing readability formulas which generally use sentence length and word length to predict grade level.

One commonly found readability test is the Flesch-Kincaid grade level index. It is installed in Microsoft Word, and can be activated to check for grade level as the computer performs grammar check.
CHAPTER THREE

METHODOLOGY

The intent of this professional project is the development and implementation of a community-based educational presentation that focuses on identifying symptoms of stroke, as well as relaying to the audience a sense of urgency to access emergency medical services if these symptoms are suspected. Of particular importance is the need to arrive at the ED within 2 hours of symptom onset. The desired outcome ultimately is to increase the percentage of persons presenting to a healthcare facility (Clark Fork Valley Hospital) experiencing stroke symptoms within the prescribed 2 hour ‘window’ needed for effective treatment with tPA (if appropriate). Time limitations of this project prohibit actual evaluation of that data, but the presentation will include a pre-and post-test to evaluate how much of the material has been learned by the participants. If an increase in knowledge has occurred, we will infer that this will translate into an improvement in ED admission within the necessary time frame. This project will focus on the data gathered from Clark Fork Valley Hospital, a 16 bed acute care facility with an emergency department. With it’s central location in the county, plus the fact that it is the nearest facility for people within a 30 mile radius, data from this ED would be representative of patient response throughout the county. The idea for this project emerged from a conversation with the Performance Improvement Coordinator at Clark Fork Valley Hospital who mentioned that in 2006 only one person was treated for stroke at that facility. (Chris Cockrell, personal
communication, 2007). It was difficult to believe that in a hospital that serves an entire county (it is the only hospital in the county) only one person presented needing stroke care. Further examination of the data showed 9 patients total presented in that year complaining of stroke symptoms, 3 of which arrived within the 2 hour treatment window (33%). Additionally, only one of the 3 went on to receive treatment. Similar results are noted in studies by Zerwic (2007) at 31%, American Heart Association (2008) at 23%. It is my hypothesis that if only 33% actually access emergency care within the necessary time frame, then perhaps there is a knowledge deficit in the public regarding the need to present within the 2 hour treatment window to be eligible for potentially lifesaving therapy. It was at this time I decided, not only as a graduate student in search of a project but as a healthcare worker and member of the community that a community education presentation would be appropriate and very likely helpful to the residents of Sanders County.

A description of this project was provided to Dr. Mark Quinn with the MSU IRB regarding the need for evaluation. Based on the fact that this was strictly an educational project and not intended for further research, this project was exempted from review (Dr. Mark Quinn, personal communication, 2009). An email correspondence from Dr. Quinn is included in the appendix.

A presentation approach was chosen because it fit well within the parameters of a graduate project. Another example of public education approaches involved a community-wide campaign to promote pneumococcal immunizations in which TV and newspaper advertisements, brochures, posters, and mailings were used
(Johnson, et al., 2003). Results overall showed a 3.7% increase in pneumococcal immunization claims to Medicare following the advertising campaign. However, the cost of this strategy was listed at over $24,000 and as such, not a feasible approach for a graduate project.

Data Collection

A search for relevant information pertaining to delay of seeking treatment/delay of patient arrival time with stroke symptoms was conducted utilizing the Montana State Library Indexes and Databases. CINAHL, the Cochrane Library, Health and Wellness Resource Center, Medline, Health Reference Center, and ERIC were used. A review of the literature was performed related to pathophysiology of stroke, treatment (including barriers and the role of public health), Adult learning theory, Systems theory, Orem’s Self-Care Deficit, and Readability of literature. Additionally, US Bureau of the Census, Montana Department of Public Health and Human Services, American Heart Association, American Stroke Association, and National Stroke Association were utilized to provide local and nationwide data. A meeting with Chris Cockrell, RN, Performance Improvement Coordinator for Clark Fork Valley Hospital to evaluate ED data for 1 year regarding patient arrival time with stroke symptoms and discuss availability of community education pertaining to stroke. To ensure that a nearby facility did have capabilities to treat ischemic stroke I spoke with Clark Fork Valley’s hospitalist, Dr. Williams. She advised me that although there is no neurologist on site at the hospital, CT scans are digitally
transmitted to a neurologist that is available 24 hours per day. She is comfortable consulting in this manner to help decide if a patient qualifies for thrombolytic therapy. (Williams, personal communication, 2008). The hospital is currently (October 2008) in the process of securing inventory of tPA which is the recommended agent for treating ischemic stroke.

Development of Presentation

The teaching project consisted of a Power Point presentation that highlighted

- Stroke risk factors
- Stroke signs and symptoms
- Brief description of ischemic versus hemorrhagic stroke (emphasizing 80% are ischemic and therefore treatable with tPA)
- Treatment available – emphasizing importance of arriving at the ED within 2 hours

Information for the presentation is obtained from the National Stroke Association’s Complete Guide to Stroke (National Stroke Association).

Prior to the discussion/viewing of the PowerPoint, a pretest was distributed to the audience to stimulate questions and to gauge the level of understanding. The pretest asked for recognition of stroke symptoms, if there is any treatment available for stroke, how quickly one must get to the hospital, and what should be done if the person thinks he (or someone else) may be having a stroke (see Appendix).
Figure 3. Outline of PowerPoint Presentation

Brochures were available from the Montana Department of Public Health and Human Services outlining information presented.

The target audience will comprise the community of Hot Springs. As one of 3 main communities in Sanders County, it does reflect the demographics for the county. It also was selected because it is my home town, so the people are familiar with me and therefore likely to trust my information as well as be more inclined to attend the presentation. Demographic data identifies Hot Springs as containing populations that are considered to be at higher risk for stroke, therefore making this an appropriate choice.

Advertising for the presentation was placed in the local weekly newspaper, “The Baldy Press” one month ahead of time. Posters were placed in local businesses, medical clinic, and Senior Citizen’s Center. In addition, one week prior to the
presentation I attended the weekly luncheon at the Senior Citizen’s Center to promote attendance.

Evaluation of data from the Emergency Department of Clark Fork Valley Hospital as well as extensive review of the literature has shown that a need exists for increasing public knowledge of stroke symptoms and appropriate response to those symptoms. A community-based educational presentation in a PowerPoint format accompanied by a narrative is an effective means to provide this information. This project is well within the scope and interest of the CNL and provides an opportunity to decrease death, disability, and cost associated with under-treatment of ischemic stroke in a community in Sanders County.
CHAPTER FOUR

OUTCOME OF THE PROJECT

The outcome of this project was the development and delivery of a PowerPoint presentation on stroke. Information in the slides consisted of basic stroke pathophysiology, symptoms, risk factors, critical actions, and available treatment. The Montana Department of Public Health and Human Services provided brochures, posters, and magnets for the participants. The presentation was given at the local Senior Citizen’s Center in a rural Montana town and was open to the public. Total number of attendees was 27, with 9 men and 18 women. Age range was estimated between 70 and 88 years, with 2 people under the age of 60. An advertisement for the presentation was provided in the local newspaper (see appendix).

Presentation

This presentation is very similar to a community education program titled *Stroke: It could be you*. A study that evaluated the project details the use of a 12 minute slide/audio program describing stroke, symptoms, risk factors, and need for immediate treatment (Stern, Berman, Thomas, & Klassen, 1997). Results demonstrate that the education program was successful in increasing knowledge of stroke risk factors, warning signs, and action needed. The data also indicated that pretesting and facilitation did not significantly affect learning. The authors recommended the use of the program either alone or with facilitated discussions.
Results

A pre- and post-test was administered along with the presentation. Results of the percentages of correct responses to the questions are listed in the following table:

Table 1. Comparison of Percentage of Correct Responses between Pre- and Post-Test

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>PRE-TEST</th>
<th>POST-TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>“What are symptoms of a stroke?”</td>
<td>12%</td>
<td>42%</td>
</tr>
<tr>
<td>“Is there any treatment for stroke?”</td>
<td>83%</td>
<td>100%</td>
</tr>
<tr>
<td>“What should I do if I think I’m having a stroke?”</td>
<td>87%</td>
<td>100%</td>
</tr>
<tr>
<td>“How soon should I get to the hospital?”</td>
<td>87%</td>
<td>100%</td>
</tr>
<tr>
<td>“What is the most common type of stroke?”</td>
<td>75%</td>
<td>79%</td>
</tr>
</tbody>
</table>

Responses to the three open-ended questions that were administered with the post-test were fairly consistent with the participants. The following answers are a summary of responses that are very representative of all the participants.

Figure 4. Responses to Question 5
Figure 5. Responses to Question 6

Figure 6. Responses to Question 7
Overall, I was given the sense that the audience gained important information which included:

- Calling 911
- There is a 2 hour time limit for potentially effective treatment
- Being better equipped to recognize stroke symptoms.

Participants also indicated that they were intending to use the information for their own benefit as well as be better prepared to recognize a possible stroke and react appropriately for someone else. Several also indicated they would pass the information along to others.

The responses to the question that asked why people don’t call 911 confirmed my suspicions held prior to the presentation. Nearly all indicated that people either were too embarrassed or didn’t want to be a problem, or they simply didn’t realize the seriousness of the situation or didn’t know a treatment ‘time limit’. Overall, the participants listed multiple reasons in varying combinations but no single reason seemed to be mentioned more frequently than others. I did also note that cost was only listed by 3 of the respondents.
CHAPTER FIVE

OVERALL EVALUATION

Strengths

This project was developed with a thorough review of the literature regarding stroke and adult education. Recommendations were very consistent from several different sources regarding the need to educate the public in an effort to improve the percentage of patients that arrive at the ER eligible for treatment. Responses from the participants confirmed much of what I discovered in the literature review regarding a lack of awareness in the public with respect to the urgency with which people need to access emergency services when experiencing stroke symptoms, as well as needing to review what those symptoms are. Alexandrov (2007) cited fear of embarrassment as a significant reason for people to delay seeking healthcare in the event of experiencing possible stroke symptoms, and this was certainly reinforced in the responses from my audience.

In Adult Learning Theory, Knowles (1970) proposes that adults learn better when they realize that the subject matter is important to them. Those who attended likely had a keen interest in the topic. This stroke presentation helped the audience recognize that with this information they could increase the likelihood of surviving a stroke with fewer disabilities for themselves or for another person.
Late arrival to the ED is generally recognized as the major reason people are not treated for stroke. This presentation emphasized the need to arrive at the ED within 2 hours of symptom onset, as well as providing a review of symptom recognition. Overall, the presentation was well received with many people demonstrating that they gained an understanding of stroke symptom recognition and important critical actions related to those symptoms.

**Limitations**

The sample size for my evaluation of the teaching component was relatively small (27). It would be difficult to draw generalized conclusions of the effectiveness of the presentation based on this sample alone. Additionally this group was self-selected for this particular presentation style, so results may show a better learning response than with a more diverse group of learners.

The audience consisted almost exclusively of Senior Citizens aged 70+ years. While this is certainly an important audience to reach because of the increased risk factors, it would be desirable to educate a broad range of age groups since many times it is a bystander, not the person suffering a stroke that initiates the call to 911. People of all ages therefore need to be aware of the possible symptoms and the need to access emergency services quickly. Even though this audience may have been larger because it was given during a regularly scheduled luncheon, I believe it would have been possible to reach a more diverse group if it had been held at a ‘neutral’ time, not an event more specific to the senior citizen audience. If time and funding allowed, more advertising to highlight the role bystanders play in calling 911 for stroke victims along with citing the
significantly high risk factors of stroke in this town and county may have increased attendance of people not considered at high risk for stroke themselves.

The pre- and post-test were quite basic, consisting of a small number of multiple choice questions limiting the usefulness in accurately assessing the effectiveness of the teaching. More choices for the multiple choice answer format may have provided a more accurate pre- and post-test knowledge level assessment. With such limited choices it is difficult to know if people chose the correct response simply by chance or by knowing the answer. A recommendation for future use would be to develop a more detailed pre- and post-test tool with ‘sample’ testing on an appropriate audience to determine the readability and appropriateness of the questions for the adult lay population.

Due to the limited scope of the project there is not a means to evaluate if increased knowledge regarding stroke symptoms and the need to access care within two hours leads to an increase in the percentage of patients accessing the local ER within two hours of symptom onset.

**Implications and Recommendations**

One of the implications for Nursing practice is to realize that many people do not fully recognize stroke symptoms or the need to access the ER within two hours of symptom onset, so we need to be alert to education opportunities in our daily jobs. Continued discussions about stroke risk recognition and reduction is important to decreasing the incidence of stroke.
I would recommend that this presentation be utilized as an on-going community education module for the county, with the Public Health Nurse or other nurses (such as a CNL) scheduling with the local Senior Centers or other public organizations. Several indicators support this recommendation, including the positive audience reaction to the presentation, pre- and post-tests demonstrating increased knowledge of stroke symptoms and treatment after the presentation, and encouragement from state and national sources to increase public awareness through education about stroke. The straightforward format with self-explanatory slides lends itself to other healthcare workers replicating this presentation.

Continued utilization of this project as well as long term evaluation of the results would be an appropriate function of the CNL. This would touch upon many of the clinical competencies of the CNL, including Outcomes Manager, Advocate, Educator, Information Manager, System Analyst, and Member of a Profession. Identifying a healthcare need by means of a thorough review of literature to provide an evidence-based approach, developing and presenting an educational tool, then going on to evaluate the effectiveness of the tool is precisely the type of project that the CNL is well qualified and indeed intended for. It would be interesting to explore a variety of points that came up throughout this project, such as researching why the particular attendees chose this presentation and how it matched their learning style. More follow-up for targeting people not at high risk for stroke but likely to be witnesses certainly would be warranted as bystanders often play a key role in making the decision to call 911. I would also recommend RCTs to compare degrees of learning from various methods of instruction such as online, pamphlets, or traditional presentation. On-going data collection from
Clark Fork Valley ER and Sanders County demographics to evaluate the effect of community education on ER statistics and county stroke statistics would be appropriate, perhaps incorporating this information into RCTs.

Conclusion

Information discovered in a review of the literature consistently points out that late arrival to the ED is one of the major reasons people are not being treated for ischemic stroke with tPA. Most sources call specifically for increased public awareness regarding stroke and the treatment available. This project serves to educate a small population of people in a county with multiple risk factors for stroke. Fully in keeping with Orem’s Self-Care Deficit theory (Hartweg, 1991), a lack of public knowledge regarding stroke identification and critical actions was identified as a self-care deficit in residents of Sanders County. Education was the intervention used to improve public knowledge, thereby improving people’s ability to care for themselves in the event that they (or someone they witness) suffer symptoms of a stroke. Although ongoing refinement and data collection are needed, continued use of this educational tool may serve to improve treatment of stroke, potentially decreasing the death and disability attributed to stroke in this county.
REFERENCES CITED


APPENDIX A

EXEMPTION FROM IRB REVIEW
To: Quinn, Mark
Cc: Luparell, Susan
Subject: Community Education re: Stroke

Hello Dr. Quinn

My name is Paula Stobie, and I am in the MSU graduate nursing program (CNL option). I chose an education project for my Master's project, which will consist of a community education power point presentation of the signs/symptoms of stroke. I will measure knowledge before and after the presentation with a pre- and post-test, as well as asking some open-ended questions as to why an individual might delay seeking treatment when experiencing potential stroke symptoms.

My presentation is scheduled for Wednesday, July 15 in Hot Springs, MT. Susan Luparell is my committee chairperson and advised that I run this project by you to make sure that I did not need IRB approval.

I would appreciate your time if you would please let me know if you need any further information from me.

Thank you,

Paula Stobie

Okay. Thanks Paula. This would be considered education and not research. Thus, it does not require an IRB review. Regards, Mark
APPENDIX B

POWERPOINT SLIDE OUTLINE
Community education on stroke

Early Recognition and Timely Access to Healthcare

Paula Stobie, BSN, RN
Graduate Student – MSU College of Nursing

WHAT IS ‘STROKE’

“CVA or ‘Brain Attack’

Interruption in brain’s blood flow

- Ischemic (blockage)
- Hemorrhagic (leakage)

80% are ischemic

Caused by:

- Clot
- Buildup of fatty deposits
- Bursting blood vessel

Ranks 3rd leading cause of death in state & nation

RISK FACTORS

- High blood pressure
- Diabetes
- High cholesterol
- Heart disease
- Atrial fibrillation
- Smoking
- Age
- Previous stroke
Previous “TIA”

WHAT IS “TIA”

“Transient Ischemic Attack

- Same symptoms as a stroke
- Temporary (few seconds to 24 hours)
- No permanent damage

**BUT**

- 10% of all strokes preceded by TIA
- 1/3 of people with TIA later have a stroke
  - 5% within 1 month
  - 12% within 1 year
  - 20% within 2 years
  - 25% within 3 years

- What to do about Risk Factors

- Treat high blood pressure
- Keep diabetes under control (or prevent onset)
- Treat (or prevent) high cholesterol
- Regular check-ups to monitor existing heart disease
- Regular treatment if you have atrial fibrillation
- Stop (or don’t start) using tobacco products
- Increase activity
- Maintain a healthy weight
- Eat healthy

**SYMPTOMS**
- Sudden weakness or numbness of the face, arm, or leg (especially on one side)
- Sudden difficulty walking
- Sudden dizziness
- Sudden loss of balance/coordination
- Sudden loss of vision in one or both eyes
- Sudden confusion, trouble speaking or difficulty understanding
- Sudden severe headache (no known cause)
- WHAT SHOULD I DO?
  - CALL 911!!
  - Establish time of symptom onset
    this ‘starts the clock’ for treatment evaluation

Bystanders:
  - Ask them to smile
    (one side of face may not move)
  - Ask them to raise both arms
    (one arm may ‘drift’ or not move)
  - Ask them to repeat a simple sentence
    (words may be slurred or not right)

TREATMENT
- Treatment IS available for ISCHEMIC stroke
  (80% of strokes are ischemic)

“tPA” a ‘clot-busting’ drug
  - Must arrive within 2 hours of symptom onset for evaluation and treatment
Only 33% of people get to the ER within 2 hours
(national, state, and CFVH statistics)

IN CONCLUSION

Know and reduce your risk factors

If you or someone else may be experiencing stroke symptoms:

* Sudden...weakness/numbness, difficulty walking, dizziness, loss of balance, loss of vision, confusion, trouble speaking, or severe headache... CALL 911

2 hours to get to the hospital

Bystanders can be critical in calling 911

YOU HAVE BECOME PART OF THE SOLUTION
APPENDIX C

PRE- AND POST-TEST
1. Symptoms of a stroke include which of the following? (circle all that apply)
   a. Sudden numbness or weakness, especially on one side of body
   b. Sudden trouble seeing in one or both eyes
   c. Sudden confusion, trouble speaking or understanding
   d. Sudden trouble walking, dizziness, or loss of balance
   e. Chest pain
   f. Sudden severe headache with no known cause

2. Is there any treatment for stroke?
   a. Yes
   b. No

3. What should I do if I think I’m having a stroke?
   a. Rest, if I feel better make an appointment soon with my provider
   b. Call 911 right away
   c. Make an appointment with my provider as soon as possible

4. How soon should I get to the hospital?
   a. 2 hours
   b. 6 hours
   c. 24 hours

5. What is the most common type of stroke?
   a. Bleeding into the brain (hemorrhagic)
   b. Blockage of bloodflow in the brain (clot/ischemic)
5. What was the most important thing you learned in this presentation?

6. What do you think are some of the reasons people DON’T call 911 if they think they (or someone else) is having a stroke? (There’s no ‘right’ answer – I’d just like to know your opinion)

7. What will you do with this information?
APPENDIX D

ADVERTISEMENT IN “BALDY PRESS”
What can YOU do to save a life? (Your own or someone else’s)

Learn to recognize the symptoms of stroke and what to do.

Stroke is the 3rd leading cause of death in the nation and 4th here in Sanders County. Although there is treatment available that can lessen or avert the lasting disability from a stroke (weakness on one side of the body, speech problems, even death) very few people are treated, generally because they don’t show up at the emergency room soon enough.

Paula Stobie, RN will be giving a community education presentation on stroke symptom recognition and treatment on Wednesday, July 15 at the Senior Citizen’s Center luncheon, 12:00 noon.

Everyone is invited to attend. Even if you are not at risk for a stroke yourself, you can be instrumental in alerting emergency services if you recognize that someone may be having a stroke.