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THE DEVELOPMENT OF A RISK ASSESSMENT TOOL FOR
SECONDARY STROKE PREVENTION:
IMPLICATIONS FOR THE ADVANCED PRACTICE NURSE
IN PRIMARY CARE

Scholarly Project for the Degree of M. S. N.
MICHIGAN STATE UNIVERSITY
DEBRA A. HANSEN
1999

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By

Debra A. Hansen

A SCHOLARLY PROJECT

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE IN NURSING

College of Nursing

1999

ABSTRACT

THE DEVELOPMENT OF A RISK ASSESSMENT TOOL FOR SECONDARY STROKE PREVENTION: IMPLICATIONS FOR THE ADVANCED PRACTICE NURSE IN PRIMARY CARE

By

Debra A. Hansen

Stroke continues to be the third leading cause of death in the United States and it has a major negative impact on the survivor, the family, and society as a whole.

Disabilities from a stroke force physical limitations to be a part of daily life which in turn increases the person's family's economic burden. The major concern of this project is with stroke survivors' recurrent stroke prevention. There is a significant amount of research regarding primary prevention of stroke, but there is a paucity of information concerning secondary prevention. Yet, secondary prevention is essential in decreasing the incidence, morbidity and mortality of stroke.

The focus of this scholarly project was to develop a tool for advanced practice nurses (APN) to assess for the risk factors of a client who has had a stroke. The tool includes collecting assessment data which would place the stroke client at risk for a recurrent stroke and includes secondary prevention measures and strategies for intervention. With the initial assessment by the APN, risks would be identified for the stroke survivor. Mutual goals will then be developed. The stroke intervention strategies will help increase adherence to preventive health behavior to reduce the risk of future strokes.

The Health Belief Model provided the theoretical basis for this scholarly project.

The model identified the perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action for taking preventive health action. The focus of this project will be the use of the risk assessment tool as a cue to action. The tool will identify secondary risk prevention measures that should be a part of the routine care of a stroke survivor in primary care. The roles of the APN as well as implications for further research will be discussed.

ACKNOWLEDGMENTS

I would like to thank God for giving me the faith, will, and determination to pursue my desire in obtaining an Advanced Practice Nursing Degree.

I want to express my sincere gratitude to the members of my committee who helped guide me through this process. Thanks to Laura Struble PhD, RN, CS who was an exemplary chairperson. She is truly a visionary scholar and always available to offer encouragement. Thanks to Brigid Warren MSN, RN who provided insight and a critical eye from family practice. I appreciate the neuroscience and medical expertise as well as the patience of Daniel Murman MD. My committee's interest and commitment to stroke survivors was greatly appreciated.

My sincere appreciation goes to Sharon King PhD, RN, CS, my Program Advisor, who has been a mentor throughout my graduate education. Her positive and caring attitude, together with her patience, cheerleading and humor has helped to make graduate school an enjoyable learning experience.

I would like to acknowledge my friends, family, and the people who have been apart of my life throughout this very long worthwhile process. I also wish to thank two close friends, Diane Rabe and Janette Buhl, for their masterfully skilled proofreading and suggestions. I can not thank you enough for your countless hours of devotion. I especially want to thank my mother, Ila Hansen, for her unwavering support and encouragement. Thank you to my grandmother, Anna Hansen, who made this experience possible.

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INTRODUCTION

Stroke, also known as apoplexy, cerebral vascular accident, and brain attack, is on the increase for the first time in 35 years. Since 1993, age-adjusted stroke rates have risen (Joint National Committee VI [JNC VI], 1997). Stroke is the number one cause of adult disability and the third leading cause of death after heart disease and cancer (American Heart Association [AHA], 1997; Stroke Prevention Council, 1998).

Approximately 160 thousand people in the United States (U.S.) die of a stroke each year. The American Heart Association (AHA) (1997) estimates every 53 seconds someone in the U.S. suffers a stroke and every 3.3 minutes someone dies of a stroke. Stroke costs the U.S. 30 billion dollars annually due to health care expenses and lost productivity. The average cost per patient for the first 90 days is 15 thousand dollars (National Stroke Association [NSA], 1998b). In addition, patients with recurrent strokes have documented higher costs 4 to 24 months after their stroke. On the average, recurrent stroke totals approximately 375 dollars per month more than first stroke (Samsa, Bian, Lipscomb, & Matchar, 1999). The above statistics are unfortunate when considering that 80 percent of all strokes are preventable (Stroke Prevention Council, 1998).

Costs include not only financial expenditures, but also personal losses of the person surviving a stroke and the care-giver burden. Physical and mental disabilities are a major problem after surviving a stroke. Approximately 4 million stroke survivors are alive today in the U.S. (AHA, 1997). Three million of these stroke survivors are permanently disabled because of stroke. In terms of disabilities, approximately one-third

of stroke survivors have mild impairments, one-third have moderate impairments, and one-third have severe impairments (NSA, 1998b). The impact of premature morbidity from stroke on the ability of stroke survivors to function independently or to participate fully in activities of daily living is devastating in terms of personal loss, pain and suffering, the effects on families and loved ones, and economic burden.

The likelihood of a stroke recurrence is a significant problem. Each year more than 700 thousand Americans experience a new or recurrent stroke (Stroke Prevention Council, 1998). Patients with recurrent strokes often have a greater degree of impairment and they have poorer survival rates compared to first stroke survivors. At 24 months, 57 percent of first stroke survivors were alive as compared to 48 percent of recurrent stroke survivors (Samsa et al., 1999). When no prevention efforts have been attempted, stroke recurrence is calculated to be 8 to 13 percent annually. When attention to secondary prevention efforts is made by health care providers, stroke recurrence is estimated to be 14 percent the first year of stroke, and 5 to 8 percent thereafter annually (Viitanen, Eriksson, & Asplund, 1988). Secondary prevention efforts documented in the literature includes anticoagulation in patients with a presumed embolic brain infarction, antiplatelet therapy in patients with small nonembolic brain infarctions and careful control of hypertension, cardiac failure, and diabetes mellitus. The high frequency of a recurrent stroke and the poor outcomes related to that recurrence underscores the importance of secondary prevention.

As the elderly population living in the U.S. increases, the importance of stroke prevention will increase. The incidence of stroke is ten times greater in the 75 to 84 age

group than in the 55 to 64-age group (Kane, Ouslander, & Abass, 1994). Americans 65 years old and above are projected to make up 20 percent of the population by the year 2030 as compared with 12 percent in 1997 (U.S. Department of Commerce, 1997). Most of the growth projected will occur between 2010 and 2030 at a rate of 2.8 percent annually, when the baby boom generation enters their older adult years (U.S. Census Bureau, 1995). Since stroke incidence increases with age, the prevalence of stroke is expected to increase as the baby boom generation ages (Goldberg, 1991). The need for health providers to assess and develop strategies to prevent stroke and its recurrence is imperative because of the aging population, the high incidence of stroke and the damaging neurological consequences of a stroke.

Management of stroke survivors is impacted by the changes in health care, primarily in managed care. Managed care is a system that attempts to achieve the best product at the lowest price. With managed care, a shift occurs from costly specialists to primary care providers. Often a stroke survivor is referred from the neurologist and physiatrist to a primary care provider, once the survivor has been stabilized and initial rehabilitation completed (Ozer, Materson, & Caplan, 1994). The primary care provider facilitates access to health care and rehabilitation, develops holistic management plans, and provides ongoing follow-up utilizing specialists for consultation.

Stroke is a problem with potentially grave consequences. Many assumptions have been made regarding stroke due to lack of knowledge, such as “a stroke is a stroke,” yet location and type of stroke are important data to know for proper management. Because of the increasing number of people affected by stroke and changes in the health care

system, it is becoming increasingly important for primary care providers to play a role in stroke management. Often, after initial contact with specialists and rehabilitation, stroke survivors return to their primary care provider. Therefore, primary care providers need a strong knowledge base in stroke management and coordination of care. Not enough thought is given to stroke recurrence prevention in primary care journals. No articles were found in primary care journals within the last five years that discuss post stroke care. With the potential increase in number of stroke survivors and high stroke morbidity and mortality statistics, the primary care advanced practice nurse (APN) needs to be able to assess secondary stroke risk factors and develop a prevention management plan.

Purpose of the Project

The purpose of this project was to develop a risk assessment tool to assess and identify secondary prevention interventions for patients that have experienced stroke. This tool will be utilized by the APN in the primary care setting. Although primary prevention of stroke is clearly a preferred goal for care of at risk populations, secondary prevention of stroke is equally important in the care of stroke survivors (Golberg, 1991). Secondary prevention consists of screening for risk factors, patient education, and appropriate interventions to halt the disease process (Pender, 1996). Most strokes can now be prevented using research based interventions, but the challenge remains to apply the treatments effectively in a clinical practice. The proposed tool will determine those interventions that will decrease the likelihood of stroke recurrence for a particular individual. The purpose of this tool is to assist the APN in assessment and management

of stroke survivors in primary care enhancing the overall care of the stroke survivor and is not intended to be a comprehensive management instrument. The premise will be stroke recurrence prevention through risk factor reduction (Wolf, D'Agostino, Belanger, & Kannel, 1991).

The goal of this risk assessment tool is to obtain optimal patient health by reduction of stroke risk factors which are based on current research and standardized practice interventions. The APN's role in managing stroke in primary care is invaluable toward achieving positive outcomes. Positive outcomes would include decreased morbidity, mortality, and decreased number of stroke recurrences. Discussion of an individual's risk for stroke recurrence with an APN and implementation of strategies to diminish the risk are key elements of secondary stroke prevention. In a survey of Americans, more than one half of people at risk for stroke were unaware of their risk. People who were aware of their increased risk were more apt to participate in stroke prevention practices (Samsa et al., 1997).

This research-based tool provides decision points for the APN to effectively screen and manage the stroke survivor in the primary care setting, after the individual has received acute care and rehabilitation. The targeted population for this tool is stroke survivors with no dysfunction or mild dysfunction, which combined make up approximately 50 percent of stroke survivors (Robbins, 1978). The targeted population could most likely be followed in a primary care office situation. To facilitate the development of this tool, the Health Belief Model (HBM) will be used as a conceptual framework (Becker, 1974; Janz & Becker, 1984; Pender, 1996).

Conceptual Framework: Health Belief Model

The HBM is used as a framework for developing a tool aimed at assessment of stroke survivors and stroke recurrence prevention in a primary care environment. The HBM was formulated by Hochbaum and associates during the 1950's (Champion, 1984). The HBM provides a method for understanding and predicting health behavior (Davidhizar, 1983). An understanding of health behavior is necessary to develop methods to influence and facilitate behavior change. Control of risk factors for recurrent strokes such as obesity, hypertension, and diabetes will need to take place by motivating the stroke client to behaviorally change their health habits.

It is possible that the health promotion model (Pender, 1996) could be used as a framework for developing a tool used in stroke recurrence prevention, rather than the HBM. The health promotion model does not rely on personal threat as a primary source of health motivation. Immediate threats to health have been shown to motivate action for positive health behaviors. Threats in the distant future, however, may lack the same motivational strength. The health promotion model, then is more applicable to the young and people who perceive themselves invulnerable to illness. In this project, the illness or stroke is present. Because the HBM utilizes threat, the threat is present, and the threat has been shown to motivate behavior, the HBM will be utilized.

The HBM originated from social-psychologic theory as a framework of exploring why some people took preventive health action through screening tests to avoid illness while others did not. The theory underlying the HBM has been attributed to the Lewinian theory of goal setting. Lewin, Dembo, Festinger, and Sears (1944) hypothesized behavior

depends mainly upon two variables. One variable was the value placed by an individual on an outcome and the second was the individual's estimate of the likelihood that a given action will result in the desired outcome. The HBM makes the assumption that health is highly valued (Janz & Becker, 1984).

The HBM has been derived from theories of decision making. In making the decision whether or not to take on a preventive health action, an individual goes through a progression of steps. Rosenstock (1966) stated studies performed by Koos (1954), Stoekle (1963), Zola (1964), Friedson (1961), and Suctman (1965) explained relationships between demographic factors and utilization of services. They individually proposed that an individual, when confronted with symptoms, goes through a decision making process in which the individual moves through stages. The individual interacts with persons and events at each of the stages which influences the individual's decisions and subsequent behavior.

The definitions of health behavior, illness behavior and sick role behavior are important within the HBM. Kasl and Cobb (1966) defined health behavior as any activity done by a healthy person for the purpose of preventing or detecting disease. Illness behavior was defined as an activity done by a person who believes himself to be ill. The purpose of illness behavior was to seek to define the disease state and find appropriate treatment. Sick role behavior was the activity taken on by an individual that considers himself ill, for the purpose of getting well. Sick role behavior included the activities of receiving treatment, dependent behaviors and omission of one's usual activities. The three behaviors are on a continuum on which the borders are blurred.

The HBM is organized into three vertical columns. Those column headings are Individual Perceptions (the individual's perceptions of susceptibility to a disease the perceived seriousness of the disease), Modifying Factors (demographics, sociopsychologic and structural variables, perceived threat, and cues to action), and Likelihood of Action (the benefits and barriers associated with the choice of action that may prevent the disease process). The constructs of the model will be discussed in the order in which they appear within the HBM (see Figure 1).

Individual Perceptions

The two constructs within the individual perceptions column are perceived susceptibility and perceived seriousness. Perceived susceptibility refers to the risks the individual believes he has of contracting a condition. People are believed to vary in their perceived susceptibility of disease whether or not there is a statistical chance that they could contract a disease. Perceived seriousness is created by the degree of emotion related to the thought of a certain disease as well as the number of problems that the individual believes that the illness could create for him and his family. Perceived susceptibility and perceived seriousness influence perceived threat and are influenced by demographic, sociopsychologic, and structural variables as depicted by the arrows. The acceptance of an individual's susceptibility to a serious disease was thought to lead an individual to action, but does not define the course of action (Rosenstock, 1966).

Modifying Factors

Modifying factors include demographic, sociopsychologic, and structural variables, perceived threat, and cues to action. Demographic variables are personal

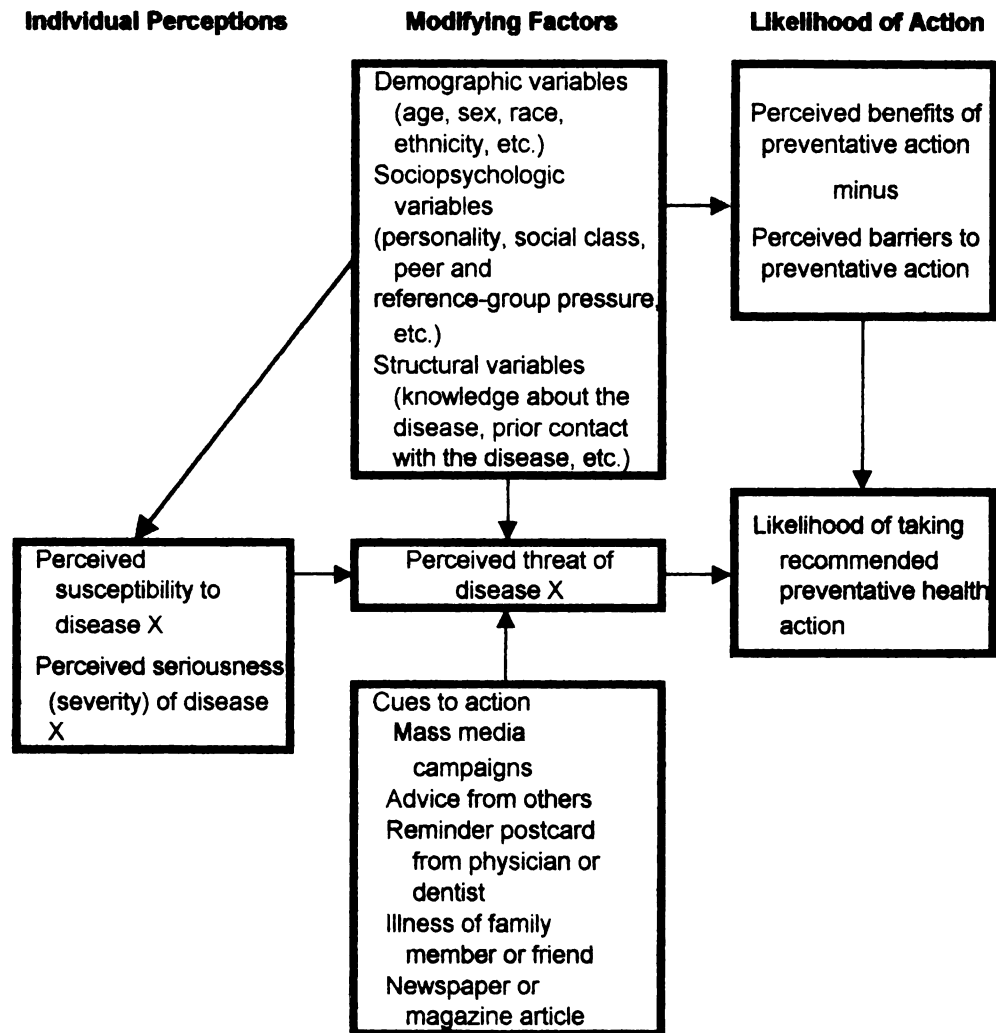


Figure 1. The Health Belief Model. (From Pender, N.J. (1996). Health Promotion in Nursing Practice (3rd ed.) Stamford, Connecticut: Appleton & Lange, pg. 36).

characteristics such as age, sex, race, and ethnicity. Kasl and Cobb (1966) understand health and illness behaviors as a function of personal characteristics which are variables in the perception of symptoms. Sociopsychologic variables include personality and social class and are influenced by the norms and peer pressure. Structural variables, such as the individual's knowledge of health and disease, impact both perceived susceptibility and perceived seriousness (Rosenstock, 1966). The demographic, sociopsychologic, and structural variables influence perceived susceptibility and seriousness, perceived threat, and perceived benefits and barriers.

Perceived susceptibility and seriousness, demographic, sociopsychologic, and structural variables, and cues to action all influence perceived threat as depicted by the arrows on the model. The perceived threat is an important construct of the HBM because the individual must perceive his or her health as threatened in order to consider preventive action. Perceived threat influences the likelihood of taking action.

The HBM contends that cues to action or internal and/or external stimuli must occur to trigger the health behavior. Cues to action make the individual aware of the health threat and thereby increase the likelihood of taking action (Davidhizar, 1983; Pender, 1996). Cues to action can be strategies to activate an individual's readiness to follow a prescribed regimen (Davidhizar, 1983). Cues to action can be in the form of warning labels, comments, internal feelings, symptom recognition, pamphlets, health care education or recommendations encountered by the person in his or her environment. Rosenstock (1966) identified clear symptoms of disease as a frequent source of health behavior initiation or cue to action.

Likelihood of Action

“**Perceived benefits** are beliefs about the effectiveness of recommended actions in preventing the health threat” (Pender, 1996, p.35). The action or inaction on a health behavior will depend on the individual’s belief’s regarding the efficacy of the advised health action. “**Perceived barriers** are perceptions concerning the potential negative aspects of taking action such as expense, danger, unpleasantness, inconvenience, and time required” (Pender, 1996, p.35). A barrier is an obstacle preventing the individual from following the suggested health behavior. Perceived benefits and barriers influence the likelihood of taking action. Perceived barriers are believed to be the most powerful of the HBM constructs in predicting various health behaviors (Janz & Becker, 1984; Pender, 1996).

If the level of readiness to act, which is a high perceived susceptibility and severity level, and the barriers are low, the health action is more likely to take place. The amount of cue necessary for the action to occur is directly related to the level of readiness (Davidhizar, 1983). Thus the lower the level of readiness, the greater the cues needed.

The definitions of health, illness and sick role behaviors and the definitions of the major constructs of the HBM support the use of the model in secondary stroke prevention. A substantial amount of research has been based on the HBM constructs. Janz and Becker (1984) critically reviewed 29 HBM related investigations from 1974-1984, tabulated the findings from 17 studies prior to 1974, and provided a summary of the 46 HBM studies. They found perceived barriers to be the most powerful of the HBM

concepts across the various study designs and diversity of populations. Perceived susceptibility was identified as a stronger contributor to understanding preventive health behaviors than sick role behaviors. Perceived benefits were stronger contributors to understanding sick role behaviors than preventive health behaviors. Perceived severity was strongly related to sick role behaviors. Overall the research provides substantial evidence supporting the HBM as an important contribution to the explanation and prediction of individuals' health-related behaviors.

Health Belief Model and Secondary Stroke Prevention

The HBM constructs are used to define the components required in a tool for secondary stroke prevention in order to facilitate preventive health action. The following section will explain the various facets of the HBM as it relates to secondary stroke prevention risk assessment (see Figure 2). The constructs will be discussed as they appear within the model. Although the entire model is required in behavior change for stroke prevention, the cues to action construct will be the focus of this project.

Individual Perceptions

Under individual perceptions, Becker (1974) identified three dimensions of perceived susceptibility in the case of diagnosed disease. The three dimensions are the individual's belief in the accuracy of the diagnosis, the individual's estimate of resusceptibility or recurrence of illness, and the individual's perception of vulnerability to disease and illness in general. The dimensions add more specific information about susceptibility in patients that have experienced stroke. An individual who has

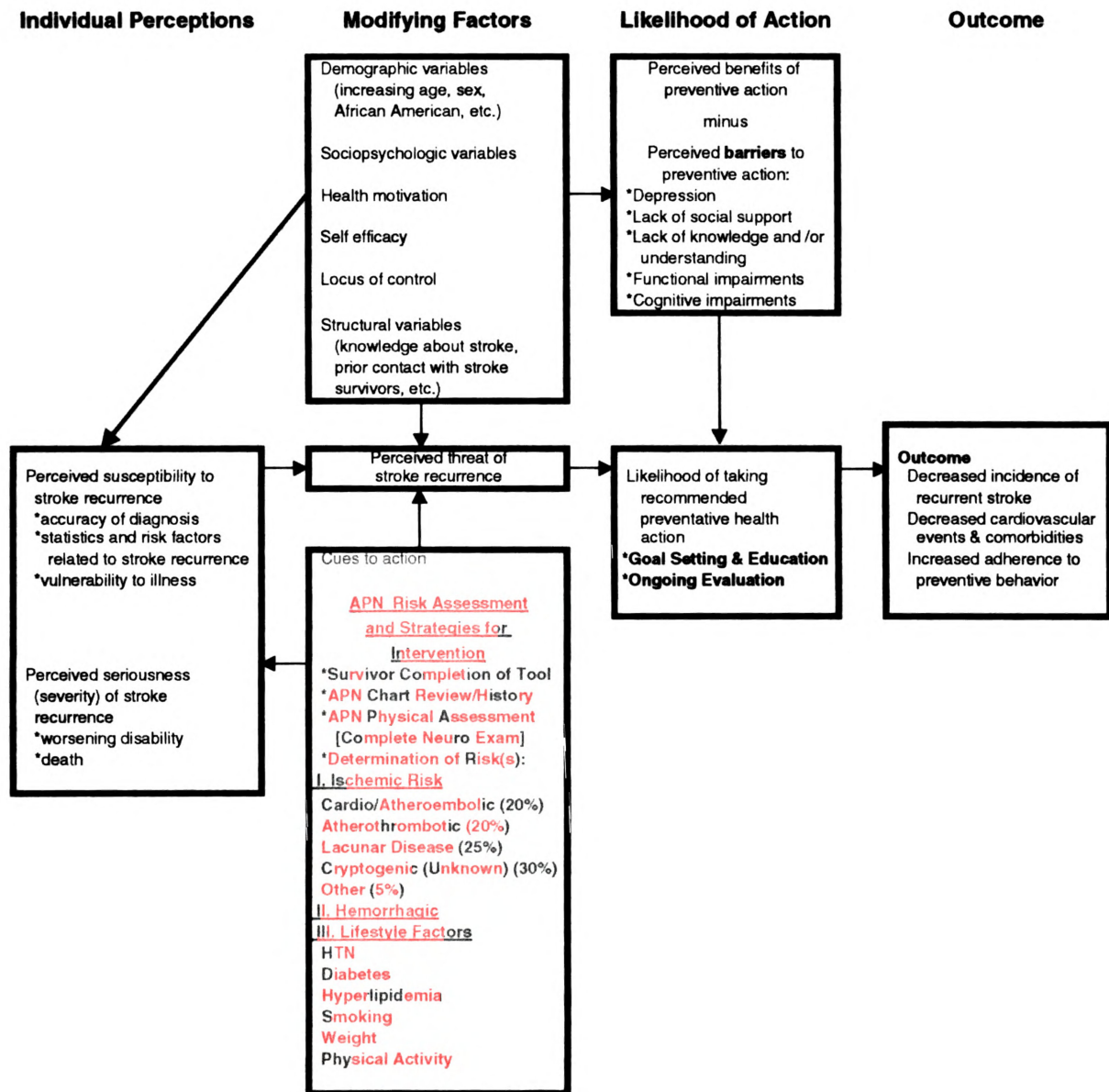


Figure 2. Modification of the Health Belief Model for application of a secondary stroke prevention risk assessment.

experienced poor health, such as a previous stroke, is more likely to perceive himself vulnerable to health threats from an illness and comply with health promotion behaviors than someone who has experienced good health (Becker, 1974).

Perceived seriousness relates to the perceived impact of a second stroke on the individual and family. An individual's estimates of the seriousness of stroke and stroke recurrence are predictive of compliance with the prescribed medical regimen. The presence of physical symptoms probably increases perceived severity which in turn motivates the individual to follow medical recommendations as long as the symptoms persist (Becker, 1974). Data regarding recurrences and potential consequences (worsening disability or likelihood of death) can impact an individual's perception of seriousness. Both the perceived susceptibility and seriousness related to stroke will impact the perceived threat of stroke recurrence as shown by the arrow in the model.

Modifying Factors

Many of the modifying factors discussed in the original HBM also apply to the modified HBM. Only those factors peculiar to stroke will be discussed at this time. There are specific demographics that impact or are modifying factors for stroke survivors. African Americans, older adults, and stroke survivors are at higher risk for stroke and should be targeted for stroke prevention. Structural variables, such as personal experiences of individuals and significant others, may affect an individual's health beliefs toward stroke.

In addition to the original constructs, health motivation, self efficacy and locus of control have also been used as a part of the HBM in predicting health related behavior

and have been added to the modified HBM. Health motivation refers to a general state of concern about health that results in behaviors to maintain or improve health and diminish disease (Becker, 1974). Self efficacy was added later into the interventions based on the model by Rosenstock, Strecher, and Becker (1988). Perceived self-efficacy is a judgment of one's ability to perform a behavior to the level needed to influence the outcome.

Locus of control relates to outcome expectations or an individual's belief that a given behavior will lead to certain outcomes (Rosenstock et al., 1988; Pender, 1996). Locus of control is either internal, such as personally controlled outcomes, or external, referring to outcomes determined outside of the person's control. The author believes these concepts are very important to consider in developing a plan for secondary stroke prevention.

The modifying factors mentioned above and the cues to action impact the perceived threat of the chronic disease process. Perceived threats that may accompany stroke include: increased mortality and morbidity, increased costs, decreased functional status, and decreased quality of life. An assessment of perceived threat and additional cues to action is critical to determine the triggers necessary to stimulate the appropriate healthy behavior.

The cue to action in the modified HBM is the implementation of the risk assessment tool by the APN in primary care, which is the focus of this paper. The original HBM indicates that external information received is one of the primary items that affect the perceived threat of a disease. Rather than relying on information from one of several sources such as mass media or advice from friends, the assessment tool can serve as an effective cue to action for the stroke survivor. In the case of recurring stroke,

it is important that information conveyed to the stroke survivor be tailored to that individual. The likelihood of action will increase if the stroke survivor perceives the information being received is relevant to their situation. The assessment tool can serve as a systematic method to gather information regarding stroke risks, evaluate the risks, and create the plan utilizing the appropriate suggested strategies within the tool.

With the modified HBM as a guide and prior to the use of the tool, the APN would identify the survivor's perceptions of susceptibility/severity of the disease and acceptance of the diagnosis along with the survivor's understanding of recurrence. The influence of factors such as demographics, sociopsychologic and structural variables, locus of control, self efficacy, knowledge, perceived threat, and benefits and barriers would be addressed on an individual basis. Through the use of the risk assessment tool, chart review, and physical assessment, the APN would go through a process of risk appraisal and determination of risk(s). The risks are divided into ischemic risk, hemorrhagic risk, and lifestyle factors. Each of these three areas will be discussed later in the project.

Likelihood of Action

Benefits are perceived advantages of health or illness prevention behaviors. To increase perceived benefits, health actions must demonstrate effectiveness in preventing stroke recurrence. Listing benefits of the new preventive health behaviors may be helpful. Encouraging behavior changes in a step by step fashion, allowing time to integrate the new behavior before suggesting the next step may be beneficial. Current prevention strategies will be integrated into the plan.

Barriers, the perceived negatives relating to a desired outcome, must be addressed in the assessment tool as barriers are the strongest predictors of whether or not an individual will take on the health behavior (Janz & Becker, 1984). Identifying barriers reflects individual acknowledgment of potential obstacles to change, appraises readiness to initiate and sustain lifestyle change, and provides an important way of choosing between alternative means of goal achievement. The stronger the perceived barrier, the less likely the individual will make the behavior change. Therefore, stroke prevention behaviors need to be as simple, convenient, and as tailored to the individual as possible. Examples of barriers that affect stroke survivors are depression, lack of social support, lack of knowledge and/or understanding, functional impairments, and cognitive impairments. Each of these barriers will be discussed further in the review of literature section.

Once the benefits and barriers have been assessed, it is time for action. Goal setting and education of the stroke client and family increases the likelihood of taking recommended preventative health action. Goal setting with the survivor is important to increase knowledge related to the disease process, increase awareness of potential barriers, and address ways to overcome barriers, increase awareness of benefits to adherence, and to assist him or her in identifying and using social support (Given & Given, 1983). Maintenance of realistic goal setting allows for a sense of enhanced efficacy and control over potentially uncontrollable outcomes. In accepting ownership of change, survivors accept responsibility or accountability for their behaviors and for desired changes.

Self regulation is “the process through which individuals transform goal intentions into personalized action” (Fleury, Thomas, & Ratledge, 1997, p. 31). The concept of self regulation offers health care providers a basis for facilitating risk reduction and individualized participation, thereby enhancing self management in behavior change. Self-monitoring reflects the individual assessment of adherence to self-determined performance criteria and progress toward desired goals. An example of self-monitoring could include a checklist that provides information about the frequency and timing of behavior as well as feelings associated with the behavior. Self-monitoring serves an important role in the maintenance of internal standards for behavior. Through monitoring efforts, survivors are aware of the positive physical and mental changes that came with risk factor modification efforts and perceived the ability to continue with life changes and achieve valued goals (Fleury et al., 1997).

Because stroke is complex, survivors and support people need to be educated about the disease process and prescribed therapeutic regimen. Survivors should be educated about the symptoms of stroke and importance of seeking treatment emergently should symptoms of stroke occur. Patient education should be an ongoing process and patient’s understanding should be evaluated. Education at the time of discharge from the acute care setting may not always be the best time for education. Education should be reviewed during rehabilitation and in office settings. It is important to be sensitive to the survivor’s educational and cognitive level, language, culture. All of these impact understanding and adherence.

Once information (individual perceptions, modifying factors, and likelihood of

action) regarding the stroke survivor has been gathered and assessed, a plan of action can be formulated with the use of the tool. This plan will encompass recommended preventive health action, goal setting, education, and ongoing evaluation. As part of the recommended preventive health action, stroke survivors need to acquire certain beliefs, knowledge, and behaviors in order to manage their chronic disease, according to the HBM. Therefore, the survivor must be aware of his or her beliefs, recognize barriers to and benefits of following the recommended regimen, know how to obtain support for the adopted behaviors, and how to self-monitor the new behaviors (Given & Given, 1983).

Following rehabilitation or acute care (if no rehabilitation required), the APN would see the survivor in an outpatient office visit, within one month of discharge, and initiate the tool. The survivor should also be evaluated at regular intervals during at least the first year post discharge, consistent with the survivor's condition and goals set. The overall goals of monitoring regularly are to support and document the maintenance of functional gains achieved during rehabilitation, making further progress toward functional independence, and reintegrating successfully with the family and community (Gresham et al., 1995).

Outcome

The last segment of the modified HBM addresses outcome. Successful application of the risk assessment tool with the modified HBM will result in reduced recurrent stroke, reduced cerebrovascular risk, and reduced comorbidities. Adherence to preventive behavior plays a key role in each of these improvements. For the best chance of behavior change to occur, the individual will need an internal locus of control and

positive self efficacy expectations regarding the proposed health behavior (Given & Given, 1983).

Stroke survivors can be a major challenge to the health care provider due to their complex health problems, the recovery and rehabilitation process, and the psychological adjustment to the chronic disease. Successful management of a stroke survivor requires major lifestyle changes within the individual, which may affect the support network as well. The modified HBM can provide a solid framework for determining the predictive variables that influence health choices of stroke survivors. The application of the modified HBM for secondary stroke prevention risk assessment when used by the APN can help motivate and sustain behavior change.

Review of Literature

The concepts of the HBM are used to define the components that need to be addressed in a risk assessment tool designed to aide in secondary stroke prevention. The literature review delineates these components. The definition and types of stroke, pathophysiology, signs and symptoms of stroke, consequences, and stroke recurrence will be briefly reviewed. Risk appraisal and risk reduction will be highlighted. Risk factors will be discussed at length. Treatments, barriers to adherence to secondary prevention, and secondary stroke prevention will also be discussed. Furthermore, the review of the literature addresses the multiple variables and prevention issues of the condition and limitations of the review. The literature review supports the need for primary care provider and consumer education if prevention and behavior change are to occur.

Stroke: Definition and Types

“Stroke is a heterogeneous, neurological event characterized by the gradual or rapid nonconvulsive onset of neurological deficits that fit a known vascular territory and that lasts for 24 hours or more” (Hickey, 1997, p. 543). Over the years, the stroke disease process has been identified in different ways. Stroke was originally designated as apoplexy. The meaning of apoplexy can be traced from the Greek words “apo” which means from and “plesso” which means to strike (Camarata, Heros, & Latchaw, 1994). Apoplexy was meant to convey the belief that the potentially devastating disease was caused by a stroke of God’s hand in response to unsuitable living. The term cerebral vascular accident (CVA) evolved in the 1900's. Currently, CVA has not been used as often as stroke because of the true nonaccidental nature of the disease process (Bronstein, Popovich, & Stewart-Amedei, 1991). The term “brain attack” is currently used to denote the emergent nature of the disease similar to heart attack or myocardial infarction (Camarata et al., 1994). It is important to convey the need to seek emergent medical attention with the advent of therapeutic interventions that are beneficial only within the first few hours after the onset of stroke symptoms. Cardiac resuscitation training programs in basic cardiac life support (BCLS) and advanced cardiac life support (ACLS) have been redesigned to include material on stroke with a focus on saving brain tissue. The previous dismal views of stroke outcomes are being replaced with optimism for better outcomes for stroke survivors.

Two major types of stroke are ischemic stroke (or cerebral infarction) and hemorrhagic stroke (or intercerebral or subdural hemorrhage). Ischemic stroke is caused

by the interruption of the blood supply to an area of the brain supplied by an arteriole. Ischemic stroke is further divided into cryptogenic stroke or of unknown origin (30%), small penetrating artery thrombosis or lacunar stroke (25%), large artery thrombosis or atherosclerotic disease (20%), cardiogenic embolic stroke (20%), and other type (5%). Hemorrhagic stroke is a rupture of one of the arterioles that feed an area of the brain. Atherosclerosis of small and large cerebral arteries which result in blockage or thrombosis makes up 45 percent of the strokes in the U.S. (Hickey, 1997; Albers, Easton, Sacco, & Teal, 1998).

Ischemic vascular disease is divided into two broad categories of thrombotic and embolic. Between 10 and 20 percent of people with thrombotic strokes have had at least one prior transient ischemic attack. Thrombotic strokes often present with changing or fluctuating symptoms that worsen over minutes to hours. In comparison, embolic strokes usually present with a neurologic deficit that is maximum at the onset of symptoms (Easton, Hauser, & Martin, 1998).

Stroke is differentiated from Transient Ischemic Attack (TIA) and Reversible Ischemic Neurologic Deficits (RINDs) by the length of time of neurologic deficit. The majority of TIAs are short, between two to fifteen minutes, with complete clearing of neurologic deficits within one hour. Neurologic symptoms of TIA usually fit a known vascular territory may last up to twenty-four hours (Uphold & Graham, 1998). TIAs are thrombotic ischemic events (Schretzman, 1999). RINDs are defined as a focal cerebral ischemia that lasts greater than twenty-four hours and resolves completely within three weeks (Uphold & Graham, 1998).

Stroke: Pathophysiology

Atherosclerosis is the gradual underlying process resulting in ischemic cerebrovascular disease. There are two theories of atherogenesis, which is the process of developing atherosclerosis. One is the vessel reaction to injury and the other is the lipid hypothesis. No matter which theory, the artery undergoes a series of changes that result in structural alteration of the vessel. Atherosclerotic plaque slowly accumulates in the cerebral arteries and facilitates the formation of thrombi (Hickey, 1997). Thrombus formation, which is secondary to atherosclerosis, begins with plaque formation which intrudes into the lumen of the artery. The plaque formation may enlarge to cause stenosis of the artery. The surface of the plaque is rough and irregular creating a site for platelet aggregation. Fibrin networks develop when platelets clump together. Blood cells stick to the platelet and fibrin network forming blood clots, further narrowing the artery (Bratina et al., 1997). The narrowed artery may eventually occlude, usually during hypotension, and typically in early morning. The lack of blood flow to the area fed by the artery leads to the signs and symptoms of ischemia.

Embolic ischemic strokes are caused by occlusive material, such as blood clots or atheromatous debris from outside the brain. Emboli commonly originate from the left chambers of the heart, the internal carotid arteries, or the vertebral arteries. This material detaches from the vessel wall and eventually occludes a cerebral vessel (Bratina et al., 1997). Individuals with atrial fibrillation, valvular heart disease, coronary heart disease are at significant risk for embolus formation.

Brain cells do not tolerate the absence of blood flow regardless of mechanism. In

acute ischemic stroke, the area in the brain lacking the blood flow is considered the core of the ischemic area. The area between the ischemic core and the surrounding perfused brain tissue is known as penumbra (Bratina et al., 1997). Within the penumbra, the blood flow is reduced, but for a limited period of time, the neurons are able to survive. Emergency treatment is directed at the penumbral region to prevent it from being added at the infarcted zone. Decreased blood flow to an area in the brain initiates an ischemic cascade resulting in eventual death of the under perfused cells if the ischemic condition is not reversed.

Stroke: Signs and Symptoms

A 1996 National Stroke Association/Gallup survey on stroke awareness in the U.S. revealed among adults over the age 50, 38 percent did not know where in the body a stroke occurs. Only 40 percent of the respondents would call 911 immediately if they were having a stroke. Two-thirds of the respondents were unaware of the short time frame in which an individual must seek treatment (NSA, 1998a). These statistics are staggering in light of the National Stroke Association (NSA) and American Heart Association (AHA) attempts to educate the public.

Common stroke symptoms include weakness, numbness, or paralysis of one side of face, arm and/or leg. Sudden blurred or decreased vision in one or both eyes and difficulty speaking or understanding words may occur. Dizziness, loss of balance, or loss of coordination can indicate stroke especially if combined with one of the other symptoms. Sudden severe headache may occur with stroke. A headache described as “the worst headache of your life” is an indication of a hemorrhagic event (NSA, 1998a).

Specific signs or manifestations of stroke can be divided into anterior circulation and posterior circulation strokes. The anterior circulation can further be divided into anterior cerebral artery and middle cerebral artery. Signs of anterior cerebral artery disruption include any or all of the following: abulia (lack of initiative) flat affect and apathy, aphasia (dominant hemisphere), gaze deviation toward the affected side, contralateral (opposite side of the body) hemiparesis or hemiplegia (leg involvement greater than arm), apraxia (inability to perform purposeful movements) on the affected side. Signs of middle cerebral artery disruption include any or all of the following: aphasia (dominant hemisphere), dysarthria (difficulty or inability to speak due to impairment of muscles essential to speech), gaze deviation toward the affected side, homonymous hemianopia (blindness of nasal half of the visual field of one eye and temporal half of the other), contralateral hemiparesis or hemiplegia, contralateral sensory deficits, and visual and sensory neglect (nondominant hemisphere) (Bratina et al., 1997).

The posterior circulation can be divided into the posterior cerebral artery and verteobasilar arteries. Manifestations of posterior cerebral artery disruption include any or all of the following: memory deficits, Wernicke's aphasia, and contralateral homonymous hemianopia. Manifestations of verteobasilar arteries include any or all of the following: impaired level of consciousness, cranial nerve palsies, nystagmus, dysarthria, dysphagia, ipsilateral Homer's syndrome, vertigo, nausea and vomiting, contralateral hemiparesis or hemiplegia (arm and leg), ataxia (impaired muscular coordination), ipsilateral (same side of body) face with contralateral body sensory deficits, and locked-in syndrome (Bratina et al., 1997).

Consequences

Complications of stroke or consequences can impact an individual's perception of severity and susceptibility to a recurrent stroke. Each year, 160 thousand Americans die after stroke (AHA, 1997). Mortality from stroke ranges from 17 percent to 34 percent during the first 30 days and from 25 percent to 40 percent during the first year (Gresham et al., 1995). More women die each year from a stroke than from breast cancer (Stroke Prevention Council, 1998). Stroke is the leading cause of serious, long-term disability in the U.S. (AHA, 1997). Approximately 10 and 40 percent of stroke survivors have no to mild dysfunction, respectively. Forty percent have significant dysfunction and 10 percent require institutional care (Robbins, 1978). Stroke survivors can be left with significant neurological deficits based on stroke location. Cognitive impairment, functional disability, and risk of falling may affect an individual's ability to live independently.

Stroke recurrence

Stroke recurrence is a major threat and potential consequence facing the stroke client. Stroke recurrence was documented as more frequently associated with a history of TIA, atrial fibrillation, male gender, and hypertension, and not associated with age, daily alcohol consumption, smoking, diabetes, ischemic heart disease, serum cholesterol, or hematocrit (Jorgensen, Nakayama, Reith, Raaschou, & Olsen, 1997). However, previously the top two prognostic variables associated with stroke recurrence in survivors of cerebral infarction had previously been documented as smoking and diabetes (Burn et al., 1994). Jorgensen (1997) and co-researchers found a history of TIA, atrial fibrillation, male gender, and hypertension significantly increased the risk of stroke recurrence. They

also found clients with recurrent strokes have larger lesions, more severe strokes, and a higher mortality (almost doubled) than patients with a first ever stroke. However, those clients with a recurrent stroke recover as well and as fast as clients with a first stroke (Jorgensen et al., 1997).

Nine studies have addressed predictors of stroke recurrence, but the results have been contradictory. Differing methods of analysis and relatively few patients with recurrent strokes included in the research may account for varying results. Within the nine research studies, recurrent stroke was associated with hypertension in five studies, with male gender, diabetes, and heart disease in three studies, with a previous TIA and atrial fibrillation in two studies, and smoking and age in one study (Sacco, Wolf, Kannel, & McNamara, 1982; Hart, Coull, & Hart, 1983; Alter et al., 1987; Meissner, Whisnant, & Garraway, 1988; Viitanen et al., 1988; Sacco et al., 1989; Heir et al., 1991; Burn et al., 1994; Jorgensen et al., 1997).

Risk appraisal

Risk appraisal or risk assessment is the process of obtaining specific health information to estimate the risk of developing the disease (Kelly-Hayes, 1991). To obtain modifiable risk factors, a risk assessment or appraisal needs to be completed.

Concentration on risk factors that can be modified leads to the best preventive approach.

Secondary stroke prevention involves the identification of stroke type, risk factors for stroke, and the development of strategies directed toward reducing risk as well as determining need for further treatment and rehabilitation.

Risk reduction

Risk reduction is the process of reducing one's risk of disease by modifying or treating the risk factor(s). Mosby (1996) defines risk factor as an element that causes a person or group of people to be vulnerable to an unwanted, unpleasant, or unhealthful event. Some risk factors are modifiable, such as smoking, and some are not, such as age. Nursing is concerned with the reduction or elimination of the modifiable factors that place a person at risk for a specific disease process. APN's are able to assist individuals understand and adopt lifestyle changes to reduce risk and disability (Fleury, 1992). Cerebrovascular risk reduction includes management of hypertension, diabetes, and hyperlipidemia, regular exercise, dietary modification, smoking cessation, and compliance with medication regimen.

Risk Factors

Risk factors for stroke as identified in the literature can impact an individual's perception of susceptibility. Modifiable or potentially modifiable risk factors for stroke include hypertension, diabetes mellitus, hyperlipidemia, cigarette smoking, obesity, excessive alcohol consumption, atrial fibrillation, left ventricular hypertrophy, transient ischemic attacks, coronary artery disease, congestive heart failure, stress, sedentary lifestyle, and cocaine use. Nonmodifiable risk factors for stroke are age, race, gender, prior stroke, mitral valve disease, and family history (Wolf, D'Agostino et al., 1991; Gresham et al., 1995; Hickey, 1997).

Hypertension. Hypertension is the major risk factor for stroke (Powers, 1993; Bronner, Kanter, & Manson, 1995). It is the single most controllable risk factor.

Approximately 50 million Americans age six and older have high blood pressure (AHA, 1997). However, 29 percent of those being treated have blood pressure lower than 140/90 mm Hg (JNC VI, 1997). These statistics support the need to translate the results of research into improved health. Hypertension accelerates the formation of atheromatous plaques which damage the integrity of the vessel walls. Vessel wall damage predisposes the vessel to thrombotic occlusion or cerebral infarction. Hypertension also promotes the growth of aneurysms in parts of the small intracranial arteries. Aneurysm can be the site of intracranial bleeds and lacunar infarctions (Kane et al., 1994).

History of hypertension ($>150/90$) after initial stroke has been documented as being associated with an increased risk of second stroke. Alter and co-researchers found that controlling diastolic pressure substantially reduced this risk. The authors point out that in previous studies, the association between hypertension and stroke risk is unclear (Alter, Friday, Lai, O'Connell, & Sobel, 1994).

It has been documented that hypertension prior to the stroke has an adverse effect on survival. Hypertension with the comorbidity of heart failure or coronary artery disease worsens the survival rate (Sacco et al., 1982). Early diagnosis and treatment of hypertension, coronary artery disease, and heart failure may offer an opportunity to prevent recurrence and improve longevity among stroke survivors.

Both diastolic hypertension and isolated systolic hypertension are pathogenetically related to the occurrence of stroke (Doyle, 1993). Systolic hypertension occurs in approximately 15 percent of people 60 years or older. The Systolic Hypertension in the Elderly (SHEP) trial documented treatment of systolic hypertension

in which diuretics prevented stroke, myocardial infarction, and congestive heart failure. Specifically, stroke risk was reduced by 36 percent (SHEP Cooperative Research Group, 1991). The Systolic Hypertension in Europe (Syst-Eur) Trial confirmed the findings of the SHEP study. Treatment of one thousand patients for five years with a long-acting calcium channel blocker reduced stroke risk by 42 percent (Staessen et al., 1997). Another more recent study documented antihypertensive therapy with nitrendipine as being beneficial in older patients with systolic hypertension and diabetes. Tight control of blood pressure (<150/85) was found to reduce fatal and nonfatal strokes by 73 percent (Tuomilehto et al., 1999).

Diabetes Mellitus. Individuals with diabetes may have a higher stroke risk primarily due to the circulation problems diabetes can cause. Diabetes is the most prevalent endocrinologic problem in primary care and a prominent risk factor for stroke (Wolf, D'Agostino et al., 1991; Gorelick et al., 1999). The probability of stroke in diabetic males is 2.5 times greater than the rate in nondiabetic males of the same age (Goldberg, 1991). The stroke risk due to diabetes is between two and 5 percent for stroke of all types (Bronner et al., 1995).

Diabetes mellitus may increase the risk of thromboembolic stroke through differing and possibly synergistic mechanisms. The mechanisms include advancement of large artery atherosclerosis via glycosylation-induced injury, negative effects on both low-density lipoprotein and high-density lipoprotein cholesterol levels, and promotion of plaque formation through hyperinsulinemia (Gorelick et al., 1999).

Stroke recurrence in diabetics was examined by Alter et al. (1997). Alter and co-

researchers found no association between HbA1c level over time and risk of stroke in diabetic patients with an initial stroke. However, the authors determined that the majority of diabetics in this study were well controlled and the adverse effects of poor control could not be adequately tested. The data did support the conclusion that when blood glucose is well controlled, the risk of recurrent stroke up to four years after an initial stroke is no greater than in clients without diabetes.

Another factor for individuals at risk for diabetes is syndrome X. Syndrome X comprises obesity, glucose intolerance, dyslipidemia, and hypertension, though not all individuals with the syndrome are hypertensive. Other conditions that may be found within individuals with syndrome X include coagulation abnormalities, elevated serum uric acid concentrations, and atherosclerosis. The underlying abnormality in syndrome X is insulin resistance. In individuals with insulin resistance, glucose utilization by the tissues is impaired and excess glucose accumulates in the bloodstream. To compensate, the beta cells of the pancreas produce more and more insulin, leading to secondary hyperinsulinemia. If a patient has both hyperinsulinemia and hyperglycemia, then the patient may also have diabetes. Individuals with syndrome X have a tendency to form blood clots. Thus, thrombus formation explains the increased prevalence of stroke in individuals with syndrome X (Gavin, Peters, & Lewis, 1999).

Hyperlipidemia. Lipid abnormalities are associated with an increased risk of stroke (Kane et al., 1994). An increase in serum cholesterol can lead to atherosclerosis of the internal carotid artery and larger cerebral arteries, which could lead to ischemic stroke. Another more speculative mechanism pertains to the weakening of the

endothelium of smaller intracerebral arteries due to low serum cholesterol levels (Bronner et al., 1995).

Cigarette Smoking. Cigarette smoking contributes significantly to coronary artery disease and stroke risk. Smokers have an increased risk for atherosclerosis which can lead to stroke. People who smoke cigarettes are two to three times more likely to have a stroke than people who have never smoked (Wolf, D'Agostino et al., 1991; Terry, Berkowitz, & Kerstein, 1998). The risk of stroke in smokers who smoke more than 40 cigarettes per day was found to be nearly two times the risk for persons smoking fewer than ten cigarettes per day (Wolf, D'Agostino, Kannel, Bonita, & Belanger, 1988). Wolf (1988) and co-researchers found smoking to be a risk factor for stroke for persons with and without hypertension. In fact, cigarette smoking continued to exert a significant independent impact on stroke incidence even after cardiovascular disease risk factors were taken into account. Smoking affects steps in the clotting cascade that promote the progression of atherosclerosis and thrombus formation (McBride, 1992). Smoking two cigarettes has been found to increase platelet activation more than 100 fold. The overall effect of smoking on the blood is the creation of a thrombogenic environment that can lead to the progression of atherosclerosis and acute thrombosis (Wolf et al., 1988; Terry et al., 1998).

The total years of cigarette smoking is the most significant independent predictor of the presence of severe carotid atherosclerosis (Whisnant et al., 1990). In their study, Whisnant and co-researchers (1990) obtained cigarette smoking histories and information on other potential risk factors from consecutive patients undergoing carotid

arteriography. The extent of carotid atherosclerosis was assessed in 752 patients in whom at least one extra cranial carotid artery was visualized. Other independent predictors, in order of significance, were found to be age, hypertension, diabetes mellitus, sex (male), and current systolic blood pressure.

Obesity. Obesity increases the risk of stroke indirectly by increasing the risk of hypertension, hyperinsulinemia, glucose tolerance, and hyperlipidemia (Schretzman, 1999). A sedentary lifestyle contributes to obesity and hyperlipidemia, both of which contribute to coronary artery disease. Excess weight may put a strain on the circulatory system as well as the entire body.

Excessive Alcohol Consumption. Excessive alcohol consumption has been associated with stroke in a mechanism not yet fully determined. Excessive drinking can weaken the cerebral blood vessels which can contribute to stroke (Schretzman, 1999). Excessive or higher levels of alcohol intake can cause cardiac arrhythmias, increase in blood pressure and decrease in cerebral blood flow, and affect blood coagulation (Gorelick et al., 1999). The relative risk of ischemic stroke associated with moderate alcohol consumption, which was defined as one to two drinks a day, as compared with nondrinking, is between 0.3 and 0.5 in some populations. The relative risk increased to two for people consuming three or more drinks per day. The relative risk for hemorrhagic stroke varies from two to four (Bronner et al., 1995).

Atrial Fibrillation. Atrial fibrillation is the most important and treatable cardiac precursor of stroke (Sacco et al., 1997). Atrial fibrillation is a heart rhythm caused when the atria of the heart beat rapidly and irregularly. Blood pools in the heart, then tends to

form clots which can be carried to the brain. Prospective research has established nonrheumatic (nonvalvular) atrial fibrillation as a common cause of stroke. Nonvalvular atrial fibrillation increases the risk of stroke by about six times (Wolf, Abbott, & Kannel, 1991). The prevalence of atrial fibrillation increases with age (Barnett, Eliasziw, & Meldrum, 1995). More than 2 million adults in the U.S. have nonvalvular atrial fibrillation and about 36 percent of strokes in people between the ages of 80 and 89 years are attributed to this risk factor (Wolf, Abbott et al., 1991).

Age. The chance of having a stroke increases with age. Seventy-two percent of people who suffer a stroke in a given year are over the age of 65 (AHA, 1997). Older adults are more likely than adults less than 65 to experience serious injury both during and after stroke (Schretzman, 1999). Common age-associated physiologic changes can contribute to stroke severity in elders. Baroreceptor response and subsequent impaired response to stress may lead to decreases in cerebral perfusion and then to ischemia. Many older adults have comorbid medical conditions, such as hypertension, coronary artery disease, hyperlipidemia or diabetes, which are risk factors for stroke. Older adults commonly use multiple medications which can contribute to the incidence of stroke (Schretzman, 1999).

Race/Gender. African Americans are more at risk for stroke than individuals from another race (NSA, 1998). African Americans have a 60 percent greater incidence of death and disability from stroke than Caucasians (Mohr, Albers, & Amarenco, 1997). Compared with Caucasians, young African Americans have a two to threefold greater risk of ischemic stroke, and African American men and women are 2.5 times more likely

to die of stroke. The 1995 death rates for stroke were 97 percent higher for black males and 71.4 percent higher for black females as compared to white males and white females respectively (AHA, 1997). Another study documented that African Americans, even after accounting for established baseline risk factors, had a 38 percent greater risk of ischemic stroke as compared with Caucasian individuals (Rosamond et al., 1999). Because women in the U.S. live longer than men, more stroke survivors over age 65 are women (NSA, 1998).

Other Risk Factors. Stroke risk is higher for people with a family history of stroke or TIA (NSA, 1998b). People with coronary artery disease are more likely to have cerebrovascular disease, specifically carotid artery disease. Individuals with mitral valve disease are at risk for embolus formation and, therefore, at risk for stroke. Though there is research on stroke risk factors and stroke management, patients who have recently had a TIA or stroke have a substantially increased annual risk for a subsequent stroke, from 4.5 percent to 6.6 percent (Matchar, McCrory, Barnett, & Feussner, 1994). In patients who do not have a second stroke in the next five to ten years, the risk of stroke approximates that of the general population. Previous TIA is reported to have occurred in 50 to 75 percent of patients with stroke (Kane et al., 1994).

Treatment

The most important issues for people diagnosed with stroke are prevention of recurrent stroke, prompt diagnosis, proper treatment including rehabilitation, and reintegration into the community. Advances in research have indicated that proper treatment, rehabilitation, and risk reduction are key elements in the decline of morbidity

and mortality. “The benefit of reduction in stroke mortality is particularly striking in women 50 years and older: one half of the benefit among white women and nearly two thirds of the benefit among African American women can be attributed to the fall in blood pressure” (JNC VI, 1997, p. 2413). Because of advances in medical science, stroke prevention requires increased community awareness and changes in health seeking and disease prevention behaviors. In addition to the importance of proper medical management, active participation of the patient and family are vital.

Barriers to Adherence to Secondary Prevention

Adherence. Mosby (1996) defined adherence as “the quality of clinging or being closely attached; the process in which a person follows rules, guidelines, standards, especially as a patient follows a prescription and recommendations for a regimen of care.” Adherence and compliance have been used interchangeably. Buchmann (1997) defined compliance as a willingness to concur with the objectives of another person. He goes on to define adherence as the action of sticking to or following a person or an idea. Compliance and adherence, then, can be used synonymously based on the assumption that human behavior and adherence are connected to human thought and compliance (Buchmann, 1997). The term ‘compliance’ can have an underlying authoritarian tone on the part of health care providers. Thus, other terms such as ‘adherence’ or ‘therapeutic alliance’ have been used instead (Cameron, 1996). Nonadherence leads to poor clinical outcomes which in turn adds to health care costs. When people do not adhere to a prescribed regimen or recommendations from health care professionals, deleterious effects may happen to their health.

A literature search did produce articles that examined the issue of compliance with therapeutic regimens including hypertension (Given & Given, 1983; Jones, Jones, & Katz, 1987; Plawecki & Mallory, 1988). Nothing was found regarding secondary stroke prevention behaviors, let alone compliance or adherence to the same.

Cameron (1996) concluded the main social and psychological factors involved in patient adherence were knowledge and understanding including communication, quality of interaction including the patient-provider relationship, and patient satisfaction. In addition, social isolation, social support including the family, health belief model variables, and duration and complexity of the regimen are main factors involved in patient adherence. All of these factors can exert positive or negative influences on compliance. Understanding health related behavior and the many interrelated factors involved is essential to promoting adherence, according to the author.

Barrier. A barrier can be any factor or perception that the survivor and/or health care provider identifies as hindering the implementation of a prescribed therapy. A few of the barriers can be expense, danger, unpleasantness, inconvenience, and time required (Pender, 1996). When a barrier is identified, it must be removed in order for adherence to begin or resume. Some barriers identified within this project that will be discussed include depression, lack of social support, lack of knowledge and/or understanding, functional impairments, and cognitive impairments. This is not an all inclusive list. Each individual with stroke is unique and has their own surrounding set of circumstances and barriers. An analysis of barriers may clarify difficult points for the survivor leading to the selection of successful strategies for more effective interventions.

No literature was found on barriers to treatment and secondary prevention in stroke patients with the exception of depression. There are, however, many barriers documented to the implementation of preventive health services. The barriers have been broken down into the following four categories: patient, physician, health care setting, and community. The patient related barriers include lack of knowledge and motivation, lack of access to care, cultural and social factors. Some of the physician related barriers include time constraints, lack of specialist-generalist communication, and problem-based focus. Two of the health care setting barriers include lack of resources and systems for preventive services. The community barriers identified are a lack of policies and standards and a lack of reimbursement (Castelli, Ockene, & Roberts, 1997). Barriers in addition to depression that could relate to the stroke population include but are not limited to lack of social support, lack of knowledge and/or understanding, functional impairments, and cognitive impairments.

Depression. A barrier specific to stroke survivors and a preventive health plan is depression. Often chronic disease, such as stroke, can lead to depression. Also, the elderly often take numerous medications, some of which have depression as a side effect. Loss of motivation, fatigue and failure to achieve goals that seem to be within the survivor's capacity can be observed. Change in body image and loss of function may cause grief for the stroke survivor, leading to depression (Hafsteinsdottir & Grypdonck, 1997).

Psychological adjustments of the survivor may include the burden of living with new limitations and the acknowledgment of a shortened life expectancy. The survivor

may experience the grieving process as a result of losses brought on by the stroke. Three categories of loss have been documented in the literature: activities, abilities, and independence. Depression can occur as a result of the stroke, the survivor's struggle to adjust his or her losses, and the whole experience of stroke. The most important predictors of major depression were left anterior brain lesions, dysphasia, and living alone. Dysphasia is a frustrating condition with psychological and social consequences which may contribute to depression. Thus, it is of importance for health care providers to use and teach helpful communication methods to the stroke survivor. The stroke survivor needs to be able to communicate his own thoughts and to be able to communicate his goals (Hafsteinsdottir & Grypdonck, 1997).

Treatment of depression in people with stroke has been found to improve outcome. Depression may affect a stroke survivor's perception of susceptibility and seriousness as well as their motivation to participate in lifestyle changes. Gonzalez-Torrecillas, Mendlewicz, and Lobo (1995) claim to have been the first to document the beneficial effects of early antidepressant treatment on the cognitive function of post stroke depressed patients. The authors compared patients treated for post stroke depression with patients not treated for post stroke depression and with post stroke nondepressed patients who received no depression treatment. They found the prevalence of post stroke depression to be 37 percent. Post stroke depression was found more frequently in those patients with an anterior lesion (statistically significant). Findings demonstrated in fourth week post stroke treatment with fluoxetine or nortriptyline significantly improved the depressed patients' mood, functional and cognitive ability.

Effective treatment of depression was found to enhance stroke rehabilitation in a study by Morris, Raphael, and Robinson (1992). They examined 49 patients at two months and 14 months post stroke. Clinical depression occurring soon after stroke was found to be associated with impaired recovery when patients were assessed 14 months later. Depression had a negative effect on recovery in functional status, as measured by the Karnofsky score, and cognitive performance. Health care providers need to be alert for depression in stroke patients and treat it appropriately.

Cornerstone of assessment remains with the collection of subjective and objective data regarding depression. Tools for assessing depression can assist in collecting objective data. A tool specific to the older population is the Geriatric Depression Scale (GDS) (Appendix A). It is meant for not only the physically healthy elderly, but also for those that are physically and/or cognitively impaired to some extent. The authors suggest that the GDS represents reliable and valid self-rating depression screening scale for elderly populations (Yesavage et al., 1983).

Lack of Social Support. Another barrier to nonadherence found in the literature is lack of social support. Support from family, friends, and/or a support group has been described as important to the issue of adherence. The literature documented the importance of family involvement to the success of rehabilitation (Hafsteinsdottir & Grypdonck, 1997). Fleury et al. (1996) found that support from family and friends is one of the few variables consistently associated with success in compliance to cardiovascular health behaviors. Family members, friends, coworkers, and church members are part of the social context that can affect both the individual's health and sense of well being.

Social relationships may include role models, friends, or family members whose behavior either inhibits or supports effective goal setting or the development of strategies for behavioral change (Fleury et al., 1997). Increased involvement of family and friends may provide encouragement to increase lifestyle modifications among post-stroke patients.

Lack of Knowledge and/or Understanding. Poor patient-provider relationships may foster lack of understanding leading to nonadherence. If patients do not trust or have a good relationship with their health care provider, they may not disclose important information, or be willing to follow recommendations. Cognitive impairments may also affect understanding. If patients do not understand the rationale for prescribed treatment, they may not be as likely to adhere to the treatment.

Wiles, Pain, Buckland, and McLellan (1998) documented the information needs of stroke patients post-discharge as information on recovery, treatment, prognosis, practical caring tasks, social activities, and resources available in the community. In some cases lack of information in their study resulted in the care givers limiting the activities of the stroke patient out of fear that too much activity might bring on another stroke. This research identified that without adequate information, care givers may be unsure of the level of care that is appropriate, patients may not access the services that are available, and both patients and care givers may have unrealistic expectations about the extent of recovery. Unrealistic expectations regarding recovery may cause distress due to residual disability. To help improve knowledge in relation to stroke topics, the authors recommend general information about causes and prevention of stroke be

provided in written format. Specific written information could be provided on the physical effects an individual's stroke has had, how the physical and psychological symptoms can be managed, the individualized treatment plan, and the period of time for which treatment is likely to continue.

Johnson, Pearson, and McDivitt (1997) documented long-term learning needs (greater than six months post stroke) identified by stroke survivors. Stroke survivors strongly indicated they wanted to learn about all of the topics suggested by the authors. These topics included causes of stroke, why does stroke affect people differently, the role of foods and vitamins in stroke recovery, and how can stroke pain be treated. Other topics included coping with loss, and do treatments like massage and acupuncture help survivors improve. The authors concluded that providing stroke survivors with the information they seek empowers them to find ways to adapt to their disabilities.

Functional Impairments. Functional impairments are common with stroke and vary in degree of severity. Weakness and paralysis are the most common form of motor deficit, a type of functional impairment. Incoordination, clumsiness, involuntary movements, or abnormal postures may also occur (Gresham et al., 1995). Alterations in functioning may decrease independence related to activities of daily living, thus affecting an individual's capability to follow the therapeutic regimen. Patients have described how immobility has facilitated dependency and powerlessness (Hafsteinsdottir & Grypdonck, 1997).

Cognitive Impairments. Cognitive impairments can be a barrier to the stroke patient's adherence to the therapeutic regimen. Cognitive changes of aging as well as

changes related to stroke can be present. Cognitive deficits may involve problems with attention, orientation, concentration, learning (short-term memory), or problem solving. Effects of cognitive deficits on task performance depend on the pattern of deficit. Common stroke specific patterns are unilateral neglect (hemi-inattention) and apraxia. Unilateral neglect is a disturbance of a patient's awareness of space on the opposite side of the body from the location of stroke. Apraxia is a disorder of learned movement that cannot be explained by the survivor's deficits in strength, coordination, sensation, or comprehension. Dementia is rare after a first stroke, but can occur as a result of multiple strokes (Gresham et al., 1995).

The presence of cognitive or perceptual deficits often increases the severity of functional disabilities, causes emotional distress, and interferes with the survivor's ability to participate in rehabilitation. Learning is affected and the survivor's risk of injury is increased. Treatments for cognitive deficits emphasize retraining, substitution of intact abilities, and compensatory approaches (Gresham et al., 1995).

Assessment of cognitive function can be accomplished by clinical exam and the use of tools such as the "Mini-Mental State" Exam (MMSE) (Appendix B). A general impression of memory and the ability to retain new information can be obtained from observation of the patient's interaction. Another method is through questions on orientation, current events, recent personal history, or arithmetic. It is important to distinguish cognitive deficits from difficulties in communication. A neuropsychological examination may be needed to define cognitive or behavioral deficits more fully (Gresham et al., 1995).

The MMSE is a valid test of cognitive functioning. The hallmark of the MMSE is that it makes objective what is commonly vague and subjective impression of cognitive disability during an assessment of a patient. The exam concentrates only on the cognitive aspects of mental function. It excludes questions concerning mood, abnormal mental experiences and thinking. It includes eleven questions and requires only five to ten minutes to administer making it practical to use serially and routinely (Folstein, Folstein, & McHugh, 1975).

Secondary Stroke Prevention (Prevention of Stroke Recurrence)

Pender (1996) defined prevention as those activities directed toward decreasing the probability of disease by active intervention. Primary, secondary, and tertiary prevention activities overlap. Primary prevention focuses on addressing modifiable risk factors before the disease process begins. Primary prevention is considered promoting the general health of the population. Secondary prevention focuses on modifiable risk factors to halt the disease process and prevent recurrence because the pathology is already present. Tertiary prevention is focused on minimizing disability from disease and assisting the patient to live productively within society (Kelly-Hayes, 1991; Pender, 1996). Reduction in the incidence of stroke requires all three levels of prevention. This assessment tool utilizes secondary prevention. The tool assists in the determination of risk factors for stroke and prevention intervention strategies, with consideration for factors affecting behavior change.

Therapeutic interventions directed at modifiable risk factors for stroke, including hypertension, diabetes mellitus, hyperlipidemia, cigarette smoking, and heavy alcohol

use should be a part of any stroke prevention plan (Matchar, et al., 1994; Reddy & Reddy, 1997). Primary prevention and prevention of stroke recurrence are very similar in content. Prevention of stroke recurrence is tailored to the individual and education is provided based on an assessment of the individual's knowledge. The complexity of health behaviors to treat stroke positively correlates with an individual's perception of barriers. As perceived barriers increase, an individual is less likely to follow through with a health behavior. The literature indicates that stroke can be prevented through management of risk factors.

Medical and surgical interventions should be employed as applicable. Coumadin, aspirin therapy in persons with atrial fibrillation, reversal of left ventricular hypertrophy confirmed by electrocardiogram, and treatment of heart failure and coronary artery disease may decrease stroke incidence (Wolf, Abbott et al., 1991).

Hypertension Management. Controlled trials have not conclusively established the effect of long-term antihypertensive therapy on stroke recurrence (Meissner et al., 1988). However, it is generally accepted that antihypertensive treatment is of benefit to reduce cerebrovascular disease. Treatment of isolated systolic hypertension in the elderly with dihydropyridine calcium channel blockers and angiotensin-converting enzyme inhibitors has been documented to reduce the risk of stroke (Staessen et al., 1997). Most of the information on cerebrovascular effects of antihypertensive medications comes from studies on animals that have not been subjected to cerebral ischemia or hemorrhage. Thus, the designation of a level of blood pressure as too high or level of desirable blood pressure reduction cannot be made due to lack of data (Powers, 1993).

The Sixth Report of the Joint National Committee (JNC VI) on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (1997) has provided guidance for primary care providers in hypertension management, yet does not replace provider clinical judgment. Lifestyle changes for all individuals with hypertension are strongly encouraged. Pharmacologic therapy with a diuretic or betablocker for an individual with a systolic blood pressure of 140-159 or a diastolic pressure of 90-99 is recommended. Other classes of antihypertensive agents are recommended for certain clinical situations and other comorbid conditions.

Hansson (1998) and co-authors describe the importance of the Hypertension Optimal Treatment (HOT) randomized trial. The trial shows benefits of lowering the systolic blood pressure to 140 mm hg and the diastolic blood pressure to 85 mm hg resulting in a low rate of cardiovascular events. Acetylsalicylic acid also reduced major cardiovascular events with the most benefit seen in myocardial infarction. There was no increase in the incidence of stroke or fatal cerebral bleeds. The addition of acetylsalicylic acid to antihypertensive therapy is recommended as long as the blood pressure is well controlled and the risk of gastrointestinal and nasal bleeding is monitored. Lowering of blood pressure was particularly beneficial for individuals with diabetes mellitus.

Diabetes Management. American Diabetes Association (ADA) (1999) recommends tight glycemic control balanced with the risk of developing hypoglycemia. The influence of tight glycemic control on stroke risk is uncertain (Bronner et al., 1995). Standards outlined by ADA (1999) of medical care for patients with diabetes mellitus are presented. The standards do not include specific management for stroke survivors, but do

discuss patients with hypertension and hyperlipidemia, two risk factors for stroke.

Maintaining blood pressure below 150/85 mm Hg in people with type 2 diabetes mellitus and hypertension has been documented as reducing the risk of fatal and nonfatal strokes by 44 percent (UK Prospective Diabetes Study Group, 1998). By controlling blood pressure and decreasing cholesterol, the person with diabetes mellitus benefits by decreasing risk for further development of atherosclerosis.

Hyperlipidemia Management. Ahmed, Clasen, and Donnelly (1998) reviewed the target low-density lipoprotein (LDL) cholesterol value (100 mg per dl or lower) in patients with coronary heart disease or other atherosclerotic disease. Recommendations do not specifically identify stroke other than “other atherosclerotic disease.” The National Cholesterol Education Program guidelines and a patient educational sheet were reviewed as well as diet information. It is interesting to note that the American Heart Association diet may lower total cholesterol by 5 to 7 percent, whereas similar diets that emphasize dietary fiber may reduce total cholesterol by 11 to 32 percent and may exert beneficial effects on LDL as well as high-density lipoprotein (HDL) cholesterol levels (Anderson & Gustafson, 1987).

The National Institutes of Health (1997) published a document that reviews clinical trials, provides a meta-analysis, and contains management strategies for differing cholesterol levels. Included are the roles of health care providers in attaining adherence to treatment regimens. The National Institutes of Health document provides patient educational materials and specific strategies to enhance adherence.

Two cholesterol-reducing agents have been approved by the U.S. Food and Drug

Administration for the prevention of first stroke or TIA in post heart attack coronary heart disease patients. Pravastatin (brand name Pravachol) is indicated to reduce the risk of stroke or TIA and recurrent heart attacks in patients with heart disease and an average cholesterol of less than 240. Simvastatin (brand name Zocor) is indicated to prevent heart attacks and reduce the risk for first stroke or TIA in patients with high cholesterol and coronary artery disease (NSA, 1998a). In addition to these drugs, a recent meta-analysis of clinical trials using statin drugs in patients with coronary artery disease showed a risk reduction of 25 percent in fatal and nonfatal stroke (Bucher, Griffith, & Guyatt, 1998).

Smoking Cessation. Smoking cessation demonstrates many health benefits. Elevated blood viscosity, hematocrit, plasma fibrinogen, and white blood cell counts have been shown to normalize after eight weeks of smoking cessation (Ernst & Matrai, 1987). Stroke risk decreased significantly within two years of smoking cessation and was documented at the level of nonsmokers within five years after smoking cessation (Wolf et al., 1988). In 1996, the Agency for Health Care Policy and Research published smoking cessation guidelines. These guidelines provide detailed strategies for clinicians to promote smoking cessation (Fiore et al., 1996).

Medication. In addition to antihypertensive medication and lipid lowering agents both tailored to the patient, clot prevention medication is indicated for ischemic stroke prevention. Neuroprotective medications are in various stages of clinical development (Schretzman, 1999). Anticoagulants and antiplatelet drugs are two primary classes of clot prevention medications. Anticoagulants inhibit further clot formation or enlargement in the cerebral arteries. Clinicians weigh an individual's need for anticoagulation against

the risk of hemorrhage. The goal of anticoagulant therapy is to administer the lowest possible dose of an anticoagulant to prevent clot formation or expansion, in an easy to follow regimen (Horton & Bushwick, 1999). Effective anticoagulation was documented by Horton and Bushwick (1999). They recommend utilizing a single Warfarin tablet strength and alternating fractions and multiples of that tablet within a weekly plan.

Warfarin is indicated for individuals who are candidates for anticoagulation and have nonvalvular atrial fibrillation or who have had a previous myocardial infarction (MI) (Matchar, et al., 1994; Reddy & Reddy, 1997). Intensity of anticoagulation needs to be carefully monitored by use of the International Normalized Ratio (INR). The optimum range of prothrombin time (PTT) is 1.5 time baseline normal value and an INR of 2.5 (Reddy & Reddy, 1997) or an INR of 2 to 3 (Horton & Bushwick, 1999). INR levels below 2 raises the risk of ischemic stroke and INR levels above four to five unnecessarily raises the risk of major hemorrhage (Wolf & Singer, 1997).

Warfarin is more likely to be used safely by a stroke survivor if the stroke survivor and/or caregiver are aware of the potential for drug interactions, rationale for lab test monitoring, and can easily identify the symptoms of warfarin toxicity early (Horton & Bushwick, 1999). Patient instructional books are available to individuals on warfarin therapy from the company at no cost (1-800-COUMADIN). Patient instructional books reinforce teaching by the health care provider.

Antiplatelet drugs or antithrombotics work at the beginning of the clot formation process by inhibiting an enzyme necessary for platelet adhesion and activation.

Thrombotic strokes are the result of a thrombus or clot forming on top of the

atherosclerotic deposit. Because platelet activity can initialize the formation of these clots, the antiplatelet agents are the drugs of choice to prevent a thrombotic stroke. Four antiplatelet drugs are aspirin, ticlopidine (brand name Ticlid), clopidogrel (brand name Plavix), and dipyridamole (Schretzman, 1999). Aspirin is the drug of choice for people with cerebral ischemia either transient or persistent and of a noncardiac origin (Barnett et al., 1995). Recommendations for aspirin dosage have not been standardized and range from 81 mg once a day to 325 mg four times per day.

Ticlopidine, 250 mg twice a day, is an alternative to aspirin in patients who cannot tolerate it, or for whom aspirin therapy has failed. Ticlopidine can cause neutropenia, which can occur in 1 to 2 percent of recipients between three weeks and three months after therapy is started. Therefore, careful monitoring is required.

Clopidogrel was compared to aspirin in an international trial involving more than 19 thousand participants with variations of vascular disease. Of 6,431 patients with recent ischemic stroke, the small reduction in subsequent stroke attained by the use of 75 mg. of clopidogrel compared to 325 mg. of aspirin was not statistically significant. However, clopidogrel was shown to be more effective in reducing the combined risk of ischemic strokes, myocardial infarction, or vascular death (CAPRIE Steering Committee, 1996). An advantage to clopidogrel over ticlopidine is that clopidogrel does not cause leukopenia. Clopidogrel produces irreversible platelet inhibition. In contrast to aspirin, there is no inhibition of platelet aggregation.

A large European randomized trial documented 200 mg. dipyridamole twice daily in a sustained release preparation, plus 25 mg. aspirin twice daily, to be superior to

aspirin alone. A 21 percent risk reduction occurred with this combination therapy. Other combinations of antiplatelet therapy have not been researched (Diener et al., 1996).

Surgery. Carotid endarterectomy decreases the risk of stroke and death in patients with recent TIAs or nondisabling strokes and ipsilateral high-grade (70-99 percent) carotid stenosis. Benefit has not yet been documented for patients with either moderate symptomatic stenosis or asymptomatic stenosis of any degree (Golstein et al., 1996a). Carotid artery stenting has been used experimentally in high risk patients without repeat stenting at two years (Al-Mubarak et al., 1999).

Catheter ablation techniques are being researched for long-term management of atrial fibrillation (Gallagher & Camm, 1997). Balloon angioplasty of intracranial vessels has provided a therapeutic option for secondary stroke prevention in selected patients (Callahan & Berger, 1997). More research is needed before these treatments are available to the general population.

Exercise. Exercise has many benefits such as decreased platelet aggregation, increased sensitivity to insulin, decreased weight, increased HDL levels, and decreased blood pressure (Schretzman, 1999). All of these benefits help to decrease stroke risk. Kiely, Wolf, Cupples, Beiser, and Kannel (1994) prospectively examined the influence of increased levels of physical activity on stroke risk in members of the Framingham study cohort for a period of 32 years. The results indicated medium and high levels of physical activity among men are protective against stroke. High levels of physical activity did not provide additional benefit over medium levels of activity. Analyses showed no significant protective effect for women. The researchers acknowledged the majority of

women in the cohort were classified as housewives and the level of physical activity associated with housework could be underestimated. Moderate levels of physical activity as part of a primary prevention strategy for reducing stroke risk was advised.

In more recent research, exercise vigorous enough to work up a sweat is associated with decreased stroke risk in men. As with the previous study, participants entering the study had not had a stroke. As physical activity increased, an inverse relationship was found with body weight, blood pressure, serum cholesterol, and glucose tolerance. The researchers concluded that further data are needed to clarify the relation of physical activity to stroke subtypes and the optimum amount of exercise in frequency, duration, and intensity (Lee, Hennekens, Berger, Buring, & Manson, 1999).

Burns (1996) reviewed the Centers for Disease Control and Prevention and the American College of Sports Medicine combined recommendation for physical activity. The goal behind this recommendation is to achieve health promotion and disease prevention. They defined exercise as “a subset of physical activity that is planned, structured, and involves bodily movement to improve or maintain some component of physical fitness. Physical activity is any bodily movement of the skeletal muscles that results in energy expenditure. Fitness refers to a set of attributes that relate to the ability to perform physical activity” (Burns, 1996, p. 21). The recommendation emphasizes the relationship of physical activity to health as opposed to exercise and fitness. The recommendation is that “every U.S. adult should accumulate 30 minutes or more of moderate-intensity physical activity on most, preferably all days of the week” (Burns, 1996, p. 21). Moderate physical activity is equated to a brisk walk of three to four miles

per hour. Strategies to help individuals achieve moderate levels of activity and examples of moderate occupational activities are provided.

Nutrition. Dietary recommendations for stroke survivors were not found in the literature. There are dietary recommendations specific to hyperlipidemia, diabetes, and other comorbidities. Dietary recommendations for individuals with diabetes closely match those for the general population, and can be used for stroke patients. The best approach to nutrition for the general population and the one most easily understood by patients is the Food Guide Pyramid, which was developed by the U.S. Department of Agriculture (1992) (Appendix C). The Food Guide Pyramid describes the number of servings and serving size recommended per day. Daily diet should include 20-35 grams of dietary fiber. Sodium should be restricted to 2,000 mg or less per day for individuals with hypertension or nephropathy. Assuming an adequate dietary intake, individuals generally do not need supplementation. The exception to this is vitamin E for its antioxidant properties. Serum magnesium should be evaluated at intervals as deficiency of this mineral can lead to insulin resistance, carbohydrate intolerance, and hypertension. In individuals taking diuretics, potassium levels should also be monitored. Approximately 10-20 percent of daily caloric intake should be from protein, 30 percent from fat, and 55-60 percent of calories from carbohydrates, both simple and complex (Fishman, 1996; Cefalu, 1998).

There have been few studies concerning the possible dietary determinants of stroke. One such study was a 20-year follow-up study of middle-aged men from the Framingham study, an inverse association was found between a fruit and vegetable intake

and the development of stroke. For each increment of three servings per day, there was a 22 percent decrease in the risk of all strokes. The findings were not substantially altered by adjustment for other cardiovascular risk factors (Gillman et al., 1995).

Another such study analyzed data in regards to fruit and vegetable intake from the Nurses' Health Study and the Professionals' Follow-up study. The data was found to support a protective effect of higher consumption of fruits and vegetables against ischemic stroke. In particular leafy green vegetables, citrus fruits, and citrus juice seemed to have a greater effect. The results support the recommendation to consume at least five servings of fruits and vegetables a day (Joshipura et al., 1999).

Stroke Risk Profile. Wolf, D'Agostino et al. (1991) developed a stroke risk profile based on the Framingham Study. The profile can be used to evaluate an individual's risk for stroke and suggest risk factor modification to reduce risk. D'Agostino, Wolf, Belanger, and Kannel (1994) modified the risk profile to better assess the effects of the use of antihypertensive medication. The authors recommend further investigation of treatments for blood pressure and also for other risk factors such as management of increased cholesterol and glucose.

Research Reports and Clinical Practice. Health care providers must frequently make prevention and health promotion recommendations for patients without the benefit of unambiguous data from well designed clinical trials. Keeping up with the latest trial data can be a challenge. In a national survey, Goldstein (1996 a & b) and co-researchers found discrepancies between trial data and clinical practice. They found frequent reported use of anticoagulants instead of carotid endarterectomy by primary care

physicians and internists for patients without surgical contraindications who had a recent TIA and had more than 70 percent stenosis of the extra cranial carotid artery. In addition, 39 percent of primary care physicians and 22 percent of internists who responded that they would seldom or never use carotid endarterectomy in this situation also reported that they always or often use anticoagulants for these patients. Aspirin and antiplatelet agents were used by most physicians regardless of degree of carotid artery stenosis, symptoms, or presence of surgical contraindications. However, carotid endarterectomy reduces the risk of stroke in symptomatic patients with at least 70 percent stenosis (Barnett et al., 1995; Goldstein et al., 1996b). Three randomized clinical trials established the efficacy of carotid endarterectomy and were published in 1991 (Goldstein et al., 1996a). The results imply that therapy of unproven value are possibly being used instead of therapy of proven value. In another national survey by Goldstein (1996a) and co-researchers, physician specialty was found to significantly influence the reported frequency of use of carotid endarterectomy. In patients with newly symptomatic high-grade stenosis, carotid endarterectomy was reported as always or often used by more than 80 percent of neurologists and surgeons but only by about half of internists and primary care physicians.

O'Connell and Gray (1996) also found discrepancies between recommendations from current research and actual practice. Out of 91 patients registered with a general practice in England, the majority of patients were not receiving aspirin or warfarin as primary or secondary stroke prevention. O'Connell and Gray (1996) recognized that one of the determinants of more widespread use of anticoagulants in the community is the

practicality of regular International Normalized Ratio (INR) monitoring in an older population. Although comparison studies were not available for APNs, it is possible that a primary care APN would manage a stroke survivor differently than an APN that specializes in neuroscience. For example, one of the practice guidelines for primary care nurse practitioners (NPs) by Uphold and Graham (1998) does not delineate strokes by type and location and therefore does not differentiate management issues.

Transition from Hospital to Community. Discharge instructions from the hospital or rehabilitation facility may set the pace for follow-up of stroke patients in the community. Gariballa, Robinson, Parker, and Castleden (1995) examined and followed 468 stroke patients for a period of one year that were admitted to one hospital. All of the patients were followed in the hospital and upon discharge or death. All medical records were reviewed. They found many risk factors were not corrected and preventive measures could be improved within both the hospital and community. Even though hypertension, the major risk factor for stroke, was the best treated risk factor in the community, 43 of the stroke patients with a past history of hypertension had not been on antihypertensive medication. Secondary and tertiary prevention needs to continue after discharge from the hospital or rehabilitation facility.

Limitations

There is a large amount of research on cardiovascular risk factors and primary prevention of stroke. Unfortunately there is a paucity of information on secondary prevention of stroke. Limited research is available on the effects of prevention behaviors on recurrent strokes. The majority of literature reflects studies on acute care and

immediate rehabilitation of stroke patients and prevention of initial stroke through stroke screening. Assessment tools to evaluate a stroke survivor were also limited. To date, no studies were identified that examine health seeking behaviors of persons experiencing signs of stroke, except in relation to timing of presentation with an acute stroke. Studies have been done to examine health beliefs of hypertensive patients.

Primary care management of stroke survivors has been limited in the literature perhaps due to specialist (neurology and rehabilitation) literature. However, research that is available reveals that primary care and internal medicine physicians may not be following recommendations (Golstein et al., 1996 a & b). No literature is available regarding APN care of stroke survivors.

Summary

The literature review reveals stroke to be a serious medical problem with financial, social, spiritual, and health consequences. The risk of stroke for elderly individuals is significant due to the predisposition to chronic diseases. The consequences of stroke can range from mild disability, to cognitive and functional impairment, to death. The signs and symptoms of stroke can be over looked, especially in those living independently. Early detection, proper treatment and rehabilitation, and prevention are essential if morbidity and mortality are to be reduced. Little information on secondary prevention was found as efforts have concentrated on primary prevention as evidenced by numerous articles on primary prevention. Primary care providers need to become aware of issues relative to adherence to secondary prevention and the consequences of not following preventive behaviors. Action must be taken on the part of the primary care

provider in order to improve the quality of health care information provided to stroke survivors, reduce the incidence of stroke recurrence which would decrease costs incurred by the survivor, families and society as a whole, and improve the quality of life for the individuals diagnosed with stroke. Information gained in this literature review and discussion of the HBM can be used for future evaluation of the health seeking behaviors and health promotion behaviors in the stroke population. Application of the information can be used to influence the development of educational programs, support groups, case management of stroke survivors, and stroke recurrence prevention in order to improve patient outcomes.

Project Plan

The focus of this project is the development of a risk assessment tool for APNs in primary care to improve knowledge and assessment skills, promote proper care and assist in the secondary prevention of stroke recurrence. Because little literature was found on secondary prevention and few specifics found in the family practice nurse practitioners' guidelines (Uphold & Graham, 1998), a resource tool is needed. The tool will be used to identify secondary prevention interventions for stroke survivors. This tool will be based on the HBM and a review of the literature. The assessment tool will be used in an ambulatory care setting by an APN. The initial assessment and information gathering appointment will take the greatest amount of time, unless this patient is an established patient. Updating the information at subsequent visits in the event that a change occurred in the data, may only take five to ten minutes.

The first part of the tool will address data that the patient would be able to answer ahead of the scheduled appointment time. Data the patient can complete includes patient demographics, medical diagnoses/problems, names of physicians seen by the patient, and information regarding dates of preventive care exams, such as last physical exam and last vision exam. The tool will elicit complete information relative to blood pressure, exercise, weight, dietary habits, and medications.

The second part of the tool will contain a chart review and the various risk factors divided into three sections: ischemic risk, hemorrhagic risk, and lifestyle factors. Each of the three sections will be further broken down into more specific areas with accompanying strategies for intervention in each area. The strategies for intervention will give broad-based ideas for the APN to individualize specific goals and interventions for the patient. To assess for barriers relative to adherence, the APN will have to ask non-threatening, open-ended questions that could elicit the information. The percentage risk for a recurrent stroke has not been researched as risks have been studied for first stroke. Thus, a risk score or percentage risk for a recurrent stroke cannot be determined at this time. Having had a stroke places the survivor at greater risk than the general population for further strokes.

Increasing awareness of stroke as a medical emergency and education about this condition is essential if the associated morbidity and mortality are to be reduced. Stroke survivors need to recognize and respond to stroke signs and symptoms quickly, as they would for chest pain. Stroke survivors also need to have a management plan tailored to the type of stroke they have had with individualized treatment goals. This tool can assist

the APN in the development of the stroke survivor management plan. Given that stroke is a complex problem with many areas requiring assessment and follow through, the tool will give some structure to the assessment process. Primary care providers such as APNs can play a significant part in coordinating stroke recurrence prevention efforts.

The format of the tool is open ended so that the maximum amount of information can be gathered, yet the information is easily followed and can be quickly utilized when in the office environment. Although this tool will not be a substitute for clinical judgement, formal education, or individual research on the topic of stroke, it will provide cues for the APN to consider various assessment items. There are other aspects of living with the disease that are assumed as this tool is not comprehensive. The physical needs, functional support, and impact of stroke on the family and patient are very important areas as well. They impact the survivor's ability to adhere to the management plan.

In summary, the risk assessment tool will be designed to be used by APNs in primary care. The tool will allow for organization of data from chart review and patient interviews and for stroke survivor care management post rehabilitation. In addition, the tool will assist with planning individualized interventions, setting goals, promoting continuity of care, and addressing secondary prevention with sound research and theory.

Procedure for the use of the Risk Assessment Tool in Primary Care Practice

The risk assessment tool (Appendix D) is intended for use in a primary care ambulatory center, for stroke survivors with minimal to mild disability. Because of the comprehensive nature of the tool and time constraints within each practice, the APN may

find it appropriate to complete the assessment tool over a series of office visits. The time required to complete the tool will decrease as the APN becomes more familiar with the tool. A well educated and experienced APN will quickly be able to identify neurologic deficits, barriers to adherence, and utilize the tool within a short period of time.

Instructions are available with the tool for both the stroke survivor and the APN. As previously described, the first part of the tool can be completed by the stroke survivor prior to the office visit. The first part of the tool should be self explanatory with the examples and directions provided. However, office staff should have an understanding of the tool to be a resource for possible questions. The instructions for patients encourage the patient to select and bring a support person with them to office visits, since support people are necessary for behavior change to occur. This part of the tool will alert the APN to the number of chronic illnesses, number of other health care providers, number of medicines, health habits, and perceived health problems. The APN may gain information from the first part of the tool to enable partial completion of the second part of the tool. It should be noted that it may not be possible to complete the entire tool in a single office visit.

The first step in part II of the risk assessment tool for the APN is a medical record review or patient history. An in depth review of the medical record is ideally completed prior to an initial interview with the stroke survivor and significant other(s) to expedite the interview. Referral letters from rehabilitation therapists, discharge summaries from acute care and rehabilitation, medical record from hospitalization, or conversation with other health care providers are options in which the APN can gather information prior to

the initial office visit. The medical record review should include stroke type, pattern of neurologic deficit, diagnostic tests and results, treatment including rehabilitation, and discharge plan. There are spaces to the left of the radiology and laboratory sections on the tool to indicate tests completed. The APN can document abnormalities immediately to the right (or left) of each item for reference. At the end of the first page of part II is a comment section for the APN to use at his or her discretion for additional notes specific to the stroke survivor. The tool can assist in organizing the data collection process to avoid omissions.

The initial interview or office visit post stroke allows for the collection and validation of a comprehensive history, which is a vital component for the continuing care of a stroke survivor. A comprehensive history should include but not be limited to past and present adult illnesses, present health status, functional health patterns, self care and preventive health habits, and social history. Present health status includes a clear description on the initial onset of symptoms of stroke, duration if TIA or RIND, diagnostics and rehabilitation. Though functional health patterns, self care, and social history are not on the tool, they are a part of the comprehensive care of a stroke patient and should be addressed to increase adherence. Discussion regarding self care is important for determining motivation to utilize abilities to the maximum level. Functional limitations affect the survivor's ability to complete self care.

Social history consists of the stroke survivor's lifestyle, interests, meaningful activities and roles. Obtaining educational background, cultural influences, patterns of socializing, patterns of stress and coping strategies will assist in designing the

intervention according to the HBM. Cultural beliefs, health motivation, self efficacy, and locus of control may affect adherence to the management plan. The impact of stroke on the survivor's life can have an effect on willingness to take on preventive health action. Other components include social support, economic and home environment assessment. Understanding these factors and identifying the social context provides the APN with clues for strategy utilization.

In addition to the risk assessment tool, a physical assessment with neurologic exam needs to be completed at the first visit post discharge. The physical exam incorporates appropriate follow-up diagnostics from the tool, if not already completed. Special attention should be paid to current functional and neurologic status as compared to status from the hospital or rehab facility. Confirming that status has not changed is important because many stroke recurrences happen within the first year of stroke (Samsa et al., 1999). Functional status consists of an assessment of impairment in communication, mobility, cognitive status, and psychosocial adjustment to stroke. Neurologic status is determined through a complete neurological exam to determine baseline ability and to determine need of further rehab and/or possible stroke extension. Neurologic symptoms may be grouped for ease into domains of neurologic impairment. The domains can also be documented in number and severity of deficits creating an outcome score (AHA, 1998). These domains are, motor, sensory, vision, language, cognition, and affect. Additional assessment within the physical exam should include a focus on the cardiovascular system, such as listening for carotid bruits.

After completion of data collection and assessment, a management plan is

developed utilizing the intervention strategies. Risk interventions for different stroke types are listed in part II of the tool. These risk interventions and goals need to evolve as new information and procedures become available. It is recommended that the tool be reviewed at least annually and be updated as appropriate. Interventions from the tool should be used to formulate individualized goals specific to the survivor's needs and comorbidities. The stroke survivor must be involved in goal setting for preventive behaviors to occur. Mutually set goals are then initiated.

These goals should be updated on subsequent visits to provide for close follow-up and monitoring of progress. Upon each follow-up visit, an assessment should be performed to monitor adaptation to the community and maintenance of gains made during recovery. Part I and the first page of part II of the tool should be placed in a prominent place in the patient's chart for easy access and remains a part of the permanent medical record. A separate sheet listing the mutually agreed upon goals provides for tracking and monitoring of outcomes with the stroke survivor once interventions have begun. Both the patient and the APN should sign the sheet to signify mutual agreement for goal setting. Prior to the patient leaving each office visit, he or she should receive a copy of the goals and an appointment date set for follow-up.

The APN would address the survivor's perception of barriers and benefits relative to treatment and goals as related to adherence. Strategies to intervene and decrease barriers would be a mutual process between the stroke survivor and the APN through goal setting. Risk assessment and goal setting toward risk reduction would be a priority.

Goal Setting

Goal setting has been regarded as extremely important in effective behavior change. Goal setting can direct attention away from a disease driven approach to a more problem based, holistic perspective. Goal setting is a strategy for clarification of expectations and responsibilities. It provides for client participation, open communication, motivation through feedback, and evaluation of outcomes. Goals must be specific, measurable, realistic, and contain a time frame (Brykczynski, 1982).

In the management of the person with stroke, the goals are to enable the survivor to function free of illness, to prevent recurrent stroke, to minimize impairments arising from stroke, and to maximize functional abilities. To attain these goals when utilizing strategies for intervention, it is imperative to go through the process of goal setting. Particularly important is the contribution by the primary participants, the stroke survivor and family. Therefore, it is necessary that the stroke survivor and support person participate in the planning process. Subjectively, recovery is distinguished by what matters most to the stroke survivor. The importance of respecting the survivor's personal goals should not be underestimated. Often the survivor has clear goals for himself, against which he measures success and progress. The role of the APN in lifestyle change is to make clear recommendations, offer support and encouragement, and respect the individual's personal goals in the goal setting process (Ozer et al., 1994; Lawler, Dowswell, Hearn, Forster, & Young, 1995; Hafsteinsdottir & Grypdonck, 1997).

Once the goals are agreed upon, the survivor can take on a greater role in monitoring the outcome. Survivors independently can self monitor blood glucose, blood

pressure, and weight. Monitoring of lipids and INR requires a laboratory, but the survivor can be educated about the results. The monitoring component of the management plan contributes to the over all effectiveness of the interventions. The survivor still requires proper supervision, especially in achieving and maintaining a therapeutic level of anticoagulation (Ozer et al., 1994).

At each follow-up visit, the goals need to be evaluated. The degree to which an individual goal or several goals have been achieved can spur the setting of new goals. The methods that helped with goal achievement must be reviewed and revised as needed. Barriers to reaching goals should be discussed with options for overcoming barriers given. After evaluation, new goals can be set as well as making appropriate means to reach them. The time for next evaluation or office visit can be revised based on the rate at which results are anticipated (Ozer et al., 1994).

Another important step in the planning process for stroke survivors is to assist the survivor examining the effects of the impairments on his life. This discussion helps to identify what is most important for that particular person. If not addressed, this focus could become a barrier for the individual in succeeding with the management plan. Defining the impairment, problem, or obstacle in functional terms can lead to ways of alleviating the problem even if the disability remains (Ozer et al., 1994).

The use of the tool along with goal setting should assist in identifying stroke survivors not receiving or adhering to proper medical treatment or recommended lifestyle changes. If secondary prevention is optimized with the support of the APN, stroke recurrence statistics will be reduced. Secondary prevention adherence through successful

goal setting should result in the stroke survivor's perception of control over health, maintenance and/or improvement in quality of life, and decreased costs to patient family and society. Positive outcomes would be identified by the decrease in the number of recurrences, decreased number of cardiovascular events, and improved risk factor management.

Evaluation of Tool

In order to evaluate the risk assessment tool, one needs to determine if the goals for the tool are met. The goals for the tool are to increase APN awareness of the different types of stroke and their management, review with the survivors and significant others their risk factors, consequences, signs and symptoms, and prevention of stroke recurrence. The outcome is to decrease the incidence of recurrence, morbidity, and mortality associated with stroke through prevention, early detection, and intervention. The evaluation of the tool can be based on process/implementation analysis or outcome analysis. Process/implementation analysis is a descriptive evaluation about the process of procedure implementation and how it functions during actual use. Outcome analysis is a descriptive evaluation of whether a procedure is effective in meeting its objectives. Neither analysis uses rigorous design. The purpose of these types of evaluation is to decide whether the tool should be discarded, revised, replaced or continued (Polit & Hungler, 1995).

Process/implementation analysis typically involves an in-depth evaluation of the performance of a procedure, often involving the collection of both qualitative and

quantitative data. This type of analysis may be used with the goal of improving a new or ongoing program (Polit & Hungler, 1995). For example, data could be compiled for completeness or ease of use of the tool by primary care APNs. An anonymous survey could be given to primary care APNs to obtain accurate assessment of the provider's thoughts and criticism related to the tool.

An outcome analysis typically documents the extent to which the goals of a program are attained, or the extent to which positive outcomes occur (Polit & Hungler, 1995). Examples of outcome analysis for the tool are a pre and post test of stroke survivors for knowledge and/or satisfaction survey, and a chart review for lifestyle changes, morbidity, mortality, and/or recurrence statistics. Increased awareness of the different types of stroke and their management, knowledge of the risk factors, consequences, signs and symptoms, and recurrence prevention can be obtained by verbal interview, survey (written or telephone), or pre and post test.

To evaluate the impact on health outcomes, a chart review at primary care practice could be done before and after the APN intervention. Outcomes could be measured by recording results from the individually set goals at each follow-up visit. It would be important to note changes in behavior, goal accomplishment, and setting of new goals each visit, frequency of office visit, recurrence, and hospitalization. An area of interest would be to determine if the health care provider was providing closer monitoring and follow up of the stroke survivor which may positively impact preventive behavior adherence.

Implications for Advanced Practice Nurses

Practice

It is critical that APNs have a clear sense of the uniqueness they bring to health care. Advanced practice nurses deliver holistic care which includes the physical, psychosocial, mental, and spiritual aspects of patient care. APNs are educationally prepared to provide and coordinate care for a stroke survivor. APNs in primary care are in an optimal position to identify those at high risk for stroke as well as care for the stroke survivor. The management of the stroke survivor can be a challenge for any health care provider, but someone must coordinate care by playing a key role in assisting the stroke survivor adult adapt to stroke and the required lifestyle changes. The APN's role(s) in the care of the stroke survivor is not documented in the literature. However, the APN can play multiple roles in the care of the stroke survivor including advocate, assessor, clinician, educator, consultant, counselor, change agent, collaborator, case manager, evaluator, and researcher. Although, all of the roles are important, a selection of these roles will be discussed briefly within the scope of this project.

As assessor and clinician, the APN is capable of obtaining subjective and objective data on an ongoing basis. Completion of serial neurological exams is important to detect the extension of stroke and can be mastered by the APN. The APN formulates diagnoses and provides direct primary care based on sound theory. Advanced clinical judgement is used to promote self-care abilities, maintain health, prevent complications, and manage disabilities. Utilization of a quick reference tool by the APN can aide in assessment and increase quality and efficiency of the APN's practice.

As educator, APNs are able to teach potential stroke survivors methods to reduce risk factors, and how to recognize stroke recurrence because of their focus on health promotion, illness prevention, and support of the human response. Education is an important part of a plan of care followed by an assessment of the patient's, caregiver's, and family's level of understanding. Patients and families should receive written instructions regarding stroke pathophysiology and etiology, medications, and prescribed regimen. The NSA has many well-written brochures directed toward stroke survivors and care givers. Without the understanding of the disease process, purpose of medications, and the important supportive strategies, patient adherence is at risk. Knowledge deficit is a major barrier and one that can be reduced by the APN. A list of suggested topics for patient, family, and caregiver(s) is included in Appendix E (Gresham et al., 1995). In addition, informed stroke survivors and care givers are more likely to become effective partners in their care.

The APN with neuroscience expertise can function as consultant to other health care providers in the care of stroke patients. Consultants facilitate communication, develop knowledge of leadership structure, negotiate issues of role conflict of care givers, and provide expert clinical knowledge (Kearney & Yurick, 1996). Consultants utilize problem solving process and provide information to broaden the scope of health care planning for other health care professionals. Consultants can also provide educational sessions to lay groups.

As counselor, the APN assesses the human response to stroke. The APN provides support to the stroke survivor and family and allows for expression of feelings and

concerns. Assessment of coping behaviors in adjusting to the lifestyle modifications and providing alternative coping behaviors are also areas within the counseling role.

APNs can be change agents in the lives of a stroke survivor. Change agents utilize a deliberate approach to coordinate activities to bring about positive alterations in an individual's health behaviors. APNs in primary care can be the initial or follow up contacts related to health care for the consumer, thus putting them in an ideal position to provide the needed assessment, screening and education for stroke survivors.

Collaboration and utilizing the APN to the full extent of their training allows outreach opportunities and increased access to health care. Incorporation of the patient into the collaborative patient/health care provider relationship can increase patient satisfaction and adherence. Historically the nurse has had significant interaction with the patient, therefore, it would be a natural transition to have the APNs be the liaison or advocate for the patient. Part of getting the patient involved requires educating the patient on the collaborative process. Collaboration with the patient refers to provision of information by the APN to the patient to achieve joint responsibility in planning decisions. An example of collaboration in stroke care is the mutual goal setting and ongoing follow-up. Once the patient understands the methods of involvement, he will be able to make informed decisions, become an active participant, and more likely adhere to the treatment plan.

Collaboration between members of the health care team is also extremely important in stroke care. Interdisciplinary collaboration is the best means of ensuring that stroke survivors receive consistent information while receiving integrated care.

Interdisciplinary collaboration refers to a team approach to health care delivery. Members of each discipline, appropriate to the survivor's care, meet to discuss their individual assessments in order to reach agreement on their recommendations. In contrast, multidisciplinary collaboration refers to the process where each discipline is consulted separately, completes an individual assessment, and presents the findings and recommendations to the stroke client and/or to the provider who takes the responsibility to make an independent decision. Little or no communication occurs between the disciplines. The multidisciplinary process can lead to the client and provider receiving conflicting messages from the different disciplines which can confuse the client and make the decision making process difficult (Gage, 1994). In primary care, the APN would receive information from the disciplines previously involved in the care of the stroke survivor and would continue a collaborative relationship through exchange of information with the disciplines that are continuing to work with the survivor. Interdisciplinary collaboration is preferred, however, not always logistically feasible if not all of the providers are working within the same health center.

In summary, the APN has the capability of effectively providing high quality, cost-effective care to the stroke survivor. With tracking and monitoring of outcomes, APNs can validate their worth to the patient, family, society, peers, and the health care industry. The APN who has the knowledge and skills to care for the stroke survivor can educate, provide support, assess, and intervene to help the stroke client adhere to preventive health behaviors to maintain or improve quality of life.

Education

Since the prevalence of stroke is projected to continue, the challenge of stroke recurrence prevention is likely to continue. It is, therefore, essential to educate the public about stroke and stroke recurrence. Education programs for the community could be developed by the APN. Using the HBM, a program could be created to help identify those at risk for stroke, to teach high risk patients how to recognize stroke, and how to implement lifestyle changes to prevent stroke and stroke recurrence. Including significant others in education programs lends support to survivors. Providing stroke signs and symptoms to the patient and significant other will help them in identifying stroke symptoms so that they will emergently seek medical attention.

Education, of course, occurs one on one with the stroke survivor. APNs can utilize the HBM and the risk assessment tool to help effect behavior change in the stroke survivor, through education, for example. Increasing the stroke survivor's knowledge base about stroke recurrence prevention and taking appropriate action could help to prevent recurrent stroke. Increased knowledge will enable and empower care givers and stroke survivors to make informed choices regarding appropriate and effective interventions.

Education of the interdisciplinary team which cares for the stroke survivor is important. The APN educator/consultant is capable of providing education to other health care personnel. Health care providers need to understand the effect of stroke on the patient and family. It is essential that the health care team support each others efforts and is working toward the same goal in stroke care provision.

Research

Recurrent stroke has been identified as a perplexing problem facing the increasingly older population. Current research indicates that the prevalence of stroke will increase as the baby boomers reach their elder years. Current research abounds with information relative to primary prevention of heart disease and stroke. No research was found as to which lifestyle change strategies can alter stroke recurrence. In order to determine the appropriate interventions for stroke survivors to decrease recurrent stroke, it is necessary to conduct further research into stroke recurrence prevention and management of stroke survivors. Replication studies related to specific interventions and evaluation of intervention effectiveness could clarify the existing ambiguities regarding the management of stroke survivors. More research could mean an eventual decrease in number of recurrent strokes or a longer length of time before stroke recurrence. Undoubtedly, more research on stroke recurrence prevention will increase understanding of the disease process.

More research is needed to understand the barriers to adherence to preventive health behaviors for stroke survivors. Further research is needed in the area of age specific assessments as they impact diagnosis and treatment. Incorrect or delayed treatment greatly impacts outcomes both in terms of cost and quality of life. It would be relevant to research what type of follow-up enhances adherence.

Research is also warranted to validate the risk assessment tool as well as identify factors that may be involved in the health seeking behaviors of stroke survivors.

Research regarding behavior change and successful adaptation of preventive behaviors is

needed. A study could be developed to include a teaching plan related to stroke recurrence and methods to alter lifestyle related risk factors. Then, a follow-up study in six months to determine changes and degree of risk after intervention. In summary, more research is needed to guide the care of the stroke survivor and increase adherence with prescribed regimens. The goal of further research is to produce positive patient outcomes, decrease morbidity, mortality, and frequency of recurrence.

APNs within the researcher role can pursue the systematic and scientific investigation of the aforementioned topics for research. APNs can test nursing as well as other theories in the care of stroke patients. APNs can foster the spirit of inquiry within the nursing profession through participation in research with the goal of advancing nursing knowledge. APNs can also utilize research within clinical practice to improve the care of stroke survivors.

Conclusion

Stroke is the third leading cause of death in U.S. The risk of stroke increases as people age. Stroke and recurrent stroke is a common and serious medical problem for the elderly. As the baby boomers enter their elderly years, it is likely the number of individuals at risk for stroke will increase. Changes in the health care system have resulted in more stroke survivors being treated by primary care providers. The combination of increased stroke patients and advances in managed care could lead to APNs caring for an increasing number of stroke patients.

Even though pervasive, stroke is largely preventable. Prevention and early

intervention which maximize functional status and quality of life are desired. Education and prevention strategies tailored to the patient are important keys to recurrence prevention. No single strategy is effective for all patients as noted by the HBM. However, an APN intervention with the risk assessment tool can be beneficial to the management of stroke survivors. It is through education of the stroke survivor about the risk factors they face, what they can do about them, and mutual goal setting for implementation of risk intervention that they can become true partners in their health care. There is a demonstrated need for increased public and provider understanding of stroke recurrence and the need for implementing preventive health behaviors. The use of this tool offers a brief, easy-to-use checklist for the APN to increase awareness of stroke and preventive health behaviors. Acknowledging both the primary role of the stroke client as decision maker and the relevant social, environmental, and health beliefs involved helps to more fully explain the adoption of preventive health behaviors. With a better understanding, APNs will be better able to identify, implement, and test interventions that will have the greatest possible effect on preventive health behavior. Acknowledging both the primary role of the stroke client as decision maker and the relevant social and environmental factors and health beliefs involved helps to more fully explain the adoption of preventive health behaviors. With an improved understanding, APNs will be able to identify, implement, and test interventions that will have the greatest possible effect on preventive health. It is only by increasing awareness of stroke and preventive health behavior that both the quantity and quality of life for so many will be enhanced.

REFERENCES

REFERENCES

- Ahmed, S. M., Clasen, M. E., & Donnelly, J. F. (1998). Management of dyslipidemia in adults. American Family Physician, *57*(9), 2192-2204.
- Albers, G. W., Easton, J. D., Sacco, R. L., & Teal, P. (1998). Antithrombotic and thrombolytic therapy for ischemic stroke. Chest, *114*(5), 683S-698S.
- Al-Mubarek, N., Roubin, G. S., Gomez, C. R., Liu, M. W., Terry, J., Lyer, S. S., & Vitek, J. J. (1999). Carotid artery stenting in patients with high neurologic risks. American Journal of Cardiology, *83*(9), 1411-3, A8-9.
- Alter, M., Sobel, E., McCoy, R. L., Francis, M. E., Davanipour, Z., Shofer, F., Levitt, L. P., & Meehan, E. F. (1987). Stroke in the Lehigh Valley: Risk factors for recurrent stroke. Neurology, *37*, 503-507.
- Alter, M., Friday, G., Lai, S. M., O'Connell, J., & Sobel, E. (1994). Hypertension and risk of stroke recurrence. Stroke, *25*, 1605-1610.
- Alter, M., Lai, S. M., Friday, G., Singh, V., Kumar, V. M., & Sobel, E. (1997). Stroke recurrence in diabetics: Does control of blood glucose reduce risk? Stroke, *28*, 1153-1157.
- American Diabetes Association (1999). Position Statement: Standards of medical care for patients with diabetes mellitus. [Online]. Available: <http://www.diabetes.org/DiabetesCare/supplement199/S32.html> [1999, January].
- American Heart Association (1997). 1998 Heart and Stroke Statistical Update. Dallas, Texas: American Heart Association.
- American Heart Association (1998). The American Heart Association stroke outcome classification: Executive summary. [Online]. Available: <http://www.americanheart.org/Scientific/statements/1998/069803.html>
- Anderson, J. W. & Gustafson, N. J. (1987). High carbohydrate, high fiber diet. Is it practical and effective in treating hyperlipidemia? Postgraduate Medicine, *82*(4), 40-43, 47-50, 55.
- Barnett, H. J. M., Eliasziw, M., & Meldrum, H. E. (1995). Drugs and surgery in the prevention of ischemic stroke. The New England Journal of Medicine, *332*(4), 238-248.

Becker, M. H. (1974). The health belief model and sick role behavior. In Becker, M. H., (Ed.). Health Education Monographs, 2(4), 409-432.

Bratina, P., Rapp, K., Barch, C., Kongable, G., Donnarumma, R., Spilker, J., Daley, S., Braimah, J., Sailor, S., & the NINDS rt-PA Stroke Study Group. (1997). Pathophysiology and mechanisms of acute ischemic stroke. The Journal of Neuroscience Nursing, 29(6), 356-360.

Bronner, L. L., Kanter, D. S., & Manson, J. E. (1995). Primary prevention of stroke. The New England Journal of Medicine, 333(21), 1392-1400.

Bronstein, K. S., Popovich, J. M., Stewart-Amedei, C. (1991). Promoting Stroke Recovery. St. Louis, Missouri: Mosby Year Book.

Bryczynski, K. (1982). Health contracting. Nurse Practitioner, 7(5), 27-31.

Bucher, H. C., Griffith, L. E., & Guyatt, G. H. (1998). Effect of HMGCoA reductase inhibitors on stroke. Annals of Internal Medicine, 128, 89-95.

Buchmann, W. F. (1997). Adherence: a matter of self-efficacy and power. Journal of Advanced Nursing, 26, 132-137.

Burn, J., Dennis, M., Bamford, J., Sandercock, P., Wade, D., & Warlow, C. (1994). Long-term risk of recurrent stroke after a first-ever stroke: The Oxfordshire community stroke project. Stroke, 25(2), 333-337.

Burns, K. J. (1996). A new recommendation for physical activity as a means for health promotion. Nurse Practitioner, 21(9), 18-28.

Callahan, A. S. & Berger, B. L. (1997). Balloon angioplasty of intracranial arteries for stroke prevention. Journal of Neuroimaging, 7(4), 232-5.

Camarata, P. J., Heros, R. C., & Latchaw, R. E. (1994). Brain attack: The rationale for treating stroke as a medical emergency. Neurosurgery, 34(1), 144-158.

Cameron, C. (1996). Patient compliance: Recognition of factors involved and suggestions for promoting compliance with therapeutic regimens. Journal of Advanced Nursing, 24, 244-250.

CAPRIE Steering Committee (1996). A randomized, blinded, trial of clopidogrel versus aspirin in patients at risk of ischemic events (CAPRIE). Lancet, 348, 329-339.

Castelli, W. P., Ockene, J. K., & Roberts, W. P. (1997). Cardiovascular risk reduction: What really works? Patient Care, 47-60.

Cefalu, W. T. (1998). Practical guide to diabetes management. New York, New York: Medical Information Press.

Champion, V. L. (1984). Instrument development for health belief model constructs. Advances in Nursing Science, April, 73-85.

D'Agostino, R. B., Wolf, P. A., Belanger, A. J., & Kannel, W. B. (1994). Stroke risk profile: Adjustment for antihypertensive medication. The Framingham Study. Stroke, 25(1), 40-43.

Davidhizar, R. (1983). Critique of the health-belief model. Journal of Advanced Nursing, 8, 467-472.

Diener, H. C., Cunha, L., Forbes, C., Sivenius, J., Smets, P., & Lowenthal, A. (1996). A European stroke prevention study: Dipyridamole and acetylsalicylic acid in the secondary prevention of stroke. Journal of Neurological Science, 143, 1-13.

Doyle, A. E. (1993). A review of the short-term benefits of antihypertensive treatment with emphasis on stroke. American Journal of Hypertension, 6(3), 6S-8S.

Easton, J. D., Hauser, S. L., & Martin, J. B. (1998). Cerebrovascular diseases. In Fauci, A. S., Braunwald, E., Isselbacher, K. J., Wilson, J. D., Martin, J. B., Kasper, D. L., Hauser, S. L., & Longo, D. L. (eds.) Harrison's principles of internal medicine. New York, New York: McGraw-Hill Companies, Inc. (pp. 2325-2348).

Ernst, E. & Matrai, A. (1987). Abstention from chronic cigarette smoking normalizes blood rheology. Atherosclerosis, 64, 75-77.

Fiore, M. C., Bailey, W. C., Cohen, S. J. et al. for the smoking cessation guideline panel. (1996). Smoking Cessation. Clinical Practice Guideline No. 18. Rockville, Maryland: U.S. Department of Health and Human Services. Public Health Service, Agency for Health Care Policy and Research. AHCPR Pub. No. 96-0692. April 1996.

Fishman, P. (1996). Healthy People 2000: What progress toward better nutrition. Geriatrics, 51(4), 38-43.

Fleury, J. (1992). The application of motivational theory to cardiovascular risk reduction. Image: Journal of Nursing Scholarship, 24(3), 229-239.

Fleury, J., Peter, M. A., & Thomas, T. (1996). Health promotion across the continuum: Challenges for the future of cardiovascular nursing. Journal of Cardiovascular Nursing, 11(1), 14-26.

Fleury, J., Thomas, T., & Ratledge, K. (1997). Promoting wellness in individuals with coronary heart disease. Journal of Cardiovascular Nursing, 11(3), 26-42.

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). "Mini-Mental State": A practical method for grading the cognitive state of patients for the clinician. Journal of Psychiatric Research, 12, 189-198.

Gallagher, M. M. & Camm, A. J. (1997). Long term management of atrial fibrillation. Clinical Cardiology, 20(4), 381-390.

Gage, M. (1994). The patient-driven interdisciplinary care plan. Journal of Nursing Administration, 24(4), 26-35.

Gariballa, S. E., Robinson, T. G., Parker, S. G., & Castleden, C. M. (1995). A prospective study of primary and secondary risk factor management in stroke patients. Journal of the Royal College of Physicians of London, 29(6), 485-487.

Gavin, J. R., Peters, A., & Lewis, L. (1999). Syndrome X: Implications for cardiovascular risk. Patient Care for the Nurse Practitioner, February Diabetes Supplement, 14-18.

Gillman, M. W., Cupples, L. A., Gagnon, D., Posner, B. M., Ellison, R. C., Castelli, W. P., & Wolf, P. A. (1995). Protective effects of fruits and vegetables on development of stroke in men. Journal of the American Medical Association, 273(14), 1113-1117.

Given, B. & Given, C. W. (1983). Adherence to hypertensive therapy. Geriatric Nursing, 4(3), 172-175.

Goldberg, G. (1991). Secondary stroke prevention. Physical Medicine and Rehabilitation Clinics of North America, 2(3), 517-527.

Goldstein, L. B., Bonito, A. J., Matchar, D. B., Duncan, P. W., & Samsa, G. P. (1996a). U.S. national survey of physician practices for the secondary and tertiary prevention of ischemic stroke: Carotid Endarterectomy. Stroke, 27(5), 801-806.

Goldstein, L. B., Bonito, A. J., Matchar, D. B., Duncan, P. W., & Samsa, G. P. (1996b). U.S. national survey of physician practices for the secondary and tertiary prevention of ischemic stroke: Medical therapy in patients with carotid artery stenosis. Stroke, *27*(9), 1473-1478.

Gonzalez-Torrecillas, J. L., Mendlewicz, J. & Lobo, A. (1995). Effects of early treatment of poststroke depression on neuropsychological rehabilitation. Int-Psychogeriatrics, *7*(4), 547-560.

Gorelick, P. B., Sacco, R. L., Smith, D. B., Alberts, M., Mustone-Alexander, L., Rader, D., Ross, J. L., Raps, E., Ozer, M. N., Brass, L. M., Malone, M. E., Goldberg, S., Booss, J., Hanley, D. F., Toole, J. F., Greengold, N. L., & Rhew, D. C. (1999). Prevention of a first stroke: A review of guidelines and a multidisciplinary consensus statement from the National Stroke Association. Journal of the American Medical Association, *281* (12), 1112-1120.

Gresham, G. E., Duncan, P. W., Stason, W. B., et al. (1995). Post-Stroke Rehabilitation. Clinical Practice Guideline No. 16. Rockville, Maryland: U.S. Department of Health and Human Services. Public Health Service, Agency for Health Care Policy and Research. AHCPR Pub. No. 95-0662. May 1995.

Hafsteinsdottir, T. B. & Grypdonck, M. (1997). Being a stroke patient: a review of the literature. Journal of Advanced Nursing, *26*, 580-588.

Hansson, L., Zanchetti, A., Carruthers, S. G., Dahlof, B., Elmfeldt, D., Julius, S., Menard, J., Rahn, K. H., Wedel, H., & Westerling, S. (1998). Effects of intensive blood-pressure lowering and low-dose aspirin in patients with hypertension: Principal results of the Hypertension Optimal Treatment (HOT) randomized trial. The Lancet, *351*(9118), 1755-1762.

Hart, R. G., Coull, B. M., & Hart, D. (1983). Early recurrence embolism associated with nonvalvular atrial fibrillation: A retrospective study. Stroke, *14*, 688-693.

Hickey, J. V. (1997). The clinical practice of neurological and neurosurgical nursing. (4th ed.). Philadelphia, Pennsylvania: Lippincott-Raven Publishers.

Hier, D. B., Foulkes, M. A., Swiontoniowski, M., Sacco, R. L., Gorelick, P. B., Mohr, J. P., Price, T. R., & Wolf, P. A. (1991). Stroke recurrence within 2 years after ischemic infarction. Stroke, *22*, 155-161.

Horton, J. D. & Bushwick, B. M. (1999). Warfarin Therapy: Evolving strategies in anticoagulation. American Family Physician, *59*(3), 635-646.

Janz, N. K. & Becker, M. H. (1984). The health belief model: A decade later. Health Education Quarterly, 11(1), 1-47.

Johnson, J., Pearson, V., & McDivitt, L. (1997). Stroke rehabilitation: Assessing stroke survivors' long-term learning needs. Rehabilitation Nursing, 22(5), 243-248.

Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure and the National High Blood Pressure and the National High Blood Pressure Education Program Coordinating Committee. [JNC VI] (1997). The sixth report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure. Archives of Internal Medicine, 157(24), 2413-2446.

Jones, P. K., Jones, S. L., & Katz, J. (1987). Improving follow-up among hypertensive patients using a health belief model intervention. Archives of Internal Medicine, 147, 1557-1560.

Jorgensen, H. S., Nakayama, H., Reith, J., Raaschou, H. O., & Olsen, T. S. (1997). Stroke recurrence: Predictors, severity, and prognosis. The Copenhagen stroke study. Neurology, 48, 891-895.

Joshi, K. J., Ascherio, A., Manson, J. E., Stampfer, M. J., Rimm, E. B., Speizer, F. E., Hennekens, C. H., Spiegelman, D., & Willett, W. C. (1999). Fruit and Vegetable intake in relation to risk of ischemic stroke. Journal of the American Medical Association, 282(13), 1233-1239.

Kane, R. L., Ouslander, J. G., & Abrass, I. B. (1994). Essentials of clinical geriatrics. (3rd ed.). New York, New York: McGraw-Hill.

Kasl, S. & Cobb, S. (1966). Health behavior, illness behavior, and sick role behavior. Archives of Environmental Health, 12, 246-266.

Kearney, J. A., & Yurick, C. M. (1996). Nurse to nurse referral: The role of the child psychiatric nurse consultant. Journal of Pediatric Health Care, 10(3), 115-120.

Kelly-Hayes, M. (1991). A preventive approach to stroke. Nursing Clinics of North America, 26(4), 931-942.

Kiely, D. K., Wolf, P. A., Cupples, L. A., Beiser, A. S., & Kannel, W. P. (1994). Physical activity and stroke risk: The Framingham study. American Journal of Epidemiology, 140(7), 608-620.

Lawler, J., Dowswell, G., Hearn, J., Forster, A., & Young, J. (1999). Recovering from stroke: A qualitative investigation of the role of goal setting in late stroke recovery. Journal of Advanced Nursing, 30(2), 401-409.

Lee, I. M., Hennekens, C. H., Berger, K., Buring, J. E., & Manson, J. E. (1999). Exercise and risk of stroke in male physicians. Stroke, 30, 1-6.

Lewin, K., Dembo, T., Festinger, L., & Sears, P. S. (1944). Level of aspiration. In Hunt, J. McV. (ed.) Personality and the behavior disorders: A handbook based on experimental and clinical research. New York, New York: The Ronald Press, (pp. 333-378).

Matchar, D. B., McCrory, D. C., Barnett, H. J., & Feussner, J. R. (1994). Medical treatment for stroke prevention. Annals of Internal Medicine, 121(1), 42-53.

McBride, P. E. (1992). The health consequences of smoking: Cardiovascular disease. Medical Clinics of North America, 76(2), 333-353.

Meissner, I., Whisnant, J. P., & Garraway, W. M. (1988). Hypertension management and stroke recurrence in a community (Rochester, Minnesota, 1950-1979). Stroke, 19(4), 459-463.

Mohr, J. P., Albers, G. W., Amarenco, P., Babikian, V. L., Biller, J., Brey, R. L., Coull, B., Easton, J. D., Gomez, C. R., Helgason, C. M., Kase, C. S., Pullicino, P. M., & Turpie, A. G. G. (1997). Etiology of stroke. Stroke, 28(7), 1501-1506.

Morris, P. L. P., Raphael, B., & Robinson, R. G. (1992). Clinical depression is associated with impaired recovery from stroke. The Medical Journal of Australia, 157, 239-242.

Mosby (1996). Multimedia medical encyclopedia for health professionals [CD-ROM].

National Institutes of Health (1997). Cholesterol lowering in the patient with coronary artery disease. NIH Publication No. 97-3794.

National Stroke Association. (1998a). National Stroke Association: Risk reduction through medical management. [Online]. Available: http://www.stroke.org/NS803.0.3_RiskReducMed.html [1999, February 12].

National Stroke Association. (1998b). National Stroke Association: Stroke facts. [Online]. Available: http://www.stroke.org/Stroke_Facts.html [1998, March 12].

O'Connell, J. E. & Gray, C. S. (1996). Atrial fibrillation and stroke prevention in the community. Age and Aging, 25, 307-309.

Ozer, M. N., Materson, R. S., & Caplan, L. R. (Eds.) (1994). Management of persons with stroke. St. Louis, Missouri: Mosby-Year Book, Inc.

Pender, N. J. (1996). Health promotion in nursing practice (3rd ed.). Stamford, Connecticut: Appleton & Lange.

Plawecki, H. M. & Mallory, D. M. (1988). Compliance and health beliefs in the black female hypertensive client. Journal of National Black Nurses' Association, 2, 38-45.

Polit, D. F. & Hungler, B. P. (1995). Nursing research: Principles and methods. (5th ed.). Philadelphia, Pennsylvania: J. B. Lippincott Company.

Powers, W. J. (1993). Acute hypertension after stroke: The scientific basis for treatment decisions. Neurology, 43, 461-467.

Reddy, M. P. & Reddy, V. (1997). After a stroke: Strategies to restore function and prevent complications. Geriatrics, 52(9), 59-62, 71, 75.

Robbins, S. (1978). Stroke in the geriatric patient. In Reichel, W. (Ed.). The geriatric patient. New York, New York: H. P. Publishing.

Rosamond, W. D., Folsom, A. R., Chambless, L. E., Wang, C., McGovern, P. G., Howard, G., Copper, L. S., & Shahar, E. (1999). Stroke incidence and survival among middle-aged adults: 9-year follow-up of the atherosclerosis risk in communities (ARIC) cohort. Stroke, 30, 736-743.

Rosenstock, I. M. (1966). Why people use health services. Milbank Memorial Fund Quarterly, 44, 94-127.

Rosenstock, I. M., Strecher V. J., & Becker, M. H. (1988). Social learning theory and the health belief model. Health Education Quarterly, 15(2), 175-183.

Sacco, R. L., Benjamin, E. J., Broderick, J. P., Dyken, M., Easton, J. D., Feinberg, W. M., Goldstein, L. B., Gorelick, P. B., Howard, G., Kittner, S. J., Manolio, T. A., Whisnant, J. P., & Wolf, P. A. (1997). Risk factors. Stroke, 28(7), 1507-1517.

Sacco, R. L., Foulkes, M. A., Mohr, J. P., Wolf, P. A., Heir, D. B., & Price, T. R. (1989). Determinants of early recurrence of cerebral infarction: The Stroke Data Bank. Stroke, 20, 983-989.

Sacco, R. L., Wolf, P. A., Kannel, W. B., & McNamara, P. M. (1982). Survival and recurrence following stroke: The Framingham Study. Stroke, 13(3), 290-295.

Samsa, G. P., Bian, J., Lipscomb, J., & Matchar, D. B. (1999). Epidemiology of recurrent cerebral infarction: A Medicare claims-based comparison of first and recurrent strokes on 2-year survival and cost. Stroke, 30, 338-349.

Samsa, G. P., Cohen, S. J., Goldstein, L. B., Bonito, A. J., Duncan, P. W., Enarson, C., DeFries, G. H., Horner, R. D., & Matchar, D. B. (1997). Knowledge of risk among patients at increased risk for stroke. Stroke, 28, 916-921.

Schretzman, D. (1999). Acute ischemic stroke. The Nurse Practitioner, 24(2), 71-88.

SHEP Cooperative Research Group. (1991). Prevention of stroke by antihypertensive drug treatment in older persons with isolated systolic hypertension: Final results of the Systolic Hypertension in the Elderly Program (SHEP). Journal of the American Medical Association, 265, 3255-3264.

Staessen, J. A., Fagard, R., Thijs, L., Celis, H., Arabidze, G. G., Birkenhager, W. H., Bulpitt, C. J., de Leeuw, P. W., Dollery, C. T., Fletcher, A. E., Forette, F., Leonetti, G., Nachev, C., O'Brien, E. T., Rosenfeld, J., Rodicio, J. L., Tuomilehto, J., Zanchetti, A., for the Systolic Hypertension in Europe (Syst-Eur) Trial Investigators. (1997). Randomized double-blind comparison of placebo and active treatment for older patients with isolated systolic hypertension. The Lancet, 350, 757-764.

Stroke Prevention Council. (1998). Stroke Prevention Council: Home Page [Online]. Available: <http://www.strokeprevention.org/> [1998, July 22].

Terry, M. L., Berkowitz, H. D. & Kerstein, M. D. (1998). Tobacco: Its impact on vascular disease. Surgical Clinics of North America, 78(3), 409-429.

Tuomilehto, J., Rastenyte, D., Birkenhager, W. H., Thijs, L., Antikainen, R., Bulpitt, C. J., Fletcher, A. E., Forette, F., Goldhaber, A., Palatini, P., Sarti, C., Fagard, R., for the Systolic Hypertension in Europe Trial Investigators. (1999). Effects of calcium-channel blockade in older patients with diabetes and systolic hypertension. New England Journal of Medicine, 340(9), 677-684.

U. K. Prospective Diabetes Study Group (1998). Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38. British Medical Journal, 317, 703-713.

Uphold, C. R. & Graham, M. V. (1998). Clinical guidelines in family practice. (3rd ed.). Gainesville, Florida: Barmarrae Books.

U.S. Census Bureau. (1995). Statistical brief: Sixty-five plus in the United States. [Online]. Available: <http://www.census.gov/socdemo/www/agebrief.html> [1997, May 13].

U.S. Department of Agriculture (1992). Food guide pyramid: A guide to daily food choices. Human Nutrition Information Service, August 1992, Leaflet No. 572.

U.S. Department of Commerce. (1997). Census Brief: Disabilities affect one-fifth of all Americans, proportion could increase in coming decades. [Online]. Available: <http://www.census.gov/prod/3/97pubs/cenbr975.pdf> [1998, December].

Viitanen, M., Eriksson, S., & Asplund, K. (1988). Risk of recurrent stroke, myocardial infarction and epilepsy during long-term follow-up after stroke. European Neurology, 28, 227-231.

Whisnant, J. P., Homer, D., Ingall, T. J., Baker, H. L., O'Fallon, W. M., & Wiebers, D. O. (1990). Duration of cigarette smoking is the strongest predictor of severe extracranial carotid artery atherosclerosis. Stroke, 21(5), 707-714.

Wiles, R., Pain, H., Buckland, S., & McLellan, L. (1998). Providing appropriate information to patients and carers following a stroke. Journal of Advanced Nursing, 28(4), 794-801.

Wolf, P. A., Abbott, R. D., & Kannel, W. B. (1991). Atrial fibrillation as an independent risk factor for stroke: the Framingham study. Stroke, 22, 983-988.

Wolf, P. A., D'Agostino, R. B., Belanger, A. J. & Kannel, W. B. (1991). Probability of stroke: A risk profile from the Framingham study. Stroke, 22(3), 312-318.

Wolf, P. A., D'Agostino, R. B., Kannel, W. B., Bonita, R., & Belanger, A. J. (1988). Cigarette smoking as a risk factor for stroke: The Framingham study. Journal of the American Medical Association, 259(7), 1025-1029.

Wolf, P. A. & Singer, D. E. (1997). Preventing stroke in atrial fibrillation. American Family Physician, 56(9), 2242-2250.

Yesavage, J. A., Brink, T. L., Rose, T. L., Lum, O., Huang, V., Adey, M., Lierer, V. O. (1983). Development and validation of a geriatric depression screening scale: A preliminary report. Journal of Psychiatric Research, 17(1), 37-49.

APPENDICES

APPENDIX A

GERIATRIC DEPRESSION SCALE

Functional Assessment of the Elderly™

Assessment

Affect

Geriatric Depression Scale *

This may be administered in oral or written format. If administered orally, the examiner may have to repeat the question in order to get a response that is more clearly a yes or no. An independent form, "Attitude Survey", is available for client's use as indicated. If client is doing independently, instruct to ✓ the appropriate space at the right of each question. Shaded squares checked indicate a depressive answer.

	Yes	No	Point for Answer
1. Are you basically satisfied with your life?	☐	☒	_____
2. Have you dropped many of your activities and interests?	☒	☐	_____
3. Do you feel that your life is empty?	☒	☐	_____
4. Do you often get bored?	☒	☐	_____
5. Are you hopeful about the future?	☐	☒	_____
6. Are you bothered by thoughts that you just cannot get out of your head?	☒	☐	_____
7. Are you in good spirits most of the time?	☐	☒	_____
8. Are you afraid that something bad is going to happen to you?	☒	☐	_____
9. Do you feel happy most of the time?	☐	☒	_____
10. Do you often feel helpless?	☒	☐	_____
11. Do you often get restless and fidgety?	☒	☐	_____
12. Do you prefer to stay home at night, rather than go out and do new things?	☒	☐	_____
13. Do you frequently worry about the future?	☒	☐	_____
14. Do you feel that you have more problems with memory than most?	☒	☐	_____
15. Do you think it is wonderful to be alive now?	☐	☒	_____
16. Do you often feel downhearted and blue?	☒	☐	_____
17. Do you feel pretty worthless the way you are now?	☒	☐	_____
18. Do you worry a lot about the past?	☒	☐	_____
19. Do you find life very exciting?	☐	☒	_____

* Spanish and French Version from T. L. Brink available: Used with the permission of author T. L. Brink Ph.D.

Reference: Yesavage, J.A., Brink, T.L., Rose, T.L., Lum, O., Hwang, V., Aday, M., and Leirer, V.O., (1983). Development & Validation of a Geriatric Depression Screening Scale: A Preliminary Report. *Journal of Psychiatric Research* (17), pp. 37-49.

Mental Status
1

Assessment

Affect (Cont.)

	Yes	No	Point for Answer
20. Is it hard for you to get started on new projects?	☒	☐	_____
21. Do you feel full of energy?	☐	☒	_____
22. Do you feel that your situation is hopeless?	☒	☐	_____
23. Do you think that most people are better off than you are?	☒	☐	_____
24. Do you frequently get upset over little things?	☒	☐	_____
25. Do you frequently feel like crying?	☒	☐	_____
26. Do you have trouble concentrating?	☒	☐	_____
27. Do you enjoy getting up in the mornings?	☐	☒	_____
28. Do you prefer to avoid social gatherings?	☒	☐	_____
29. Is it easy for you to make decisions?	☐	☒	_____
30. Is your mind as clear as it used to be?	☐	☒	_____
TOTAL			_____

Scoring: Count 1 point for each depressive answer.

0 - 10 = normal

11 - 20 = mild depression

21 - 30 = moderate or severe depression

Comments: _____

APPENDIX B

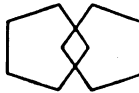
MINI-MENTAL STATE EXAM

Mental Status 1

Functional Assessment of the Elderly™ Assessment

2. The Folstein Mini-Mental State Examination*

	Client Score	Max Score
ORIENTATION		
1. What is the (year) (season) (date) (day) (month)?	_____	5
2. Where are we (state) (country) (town) (hospital) (floor)?	_____	5
REGISTRATION		
3. Name three objects: one second to say each. Then ask the patient all three after you have said them. Give one point for each correct answer. Repeat them until he learns all three. Count trials and record number.	_____	3
ATTENTION & CALCULATION		
4. Begin with 100 and count backward by 7 (stop after five answers). Alternatively, spell "world" backward.	_____	5
RECALL		
5. Ask for the three objects repeated above.	_____	3
LANGUAGE		
6. Show a pencil and a watch and ask the patient to name them	_____	2
7. Repeat the following: "No ifs, ands or buts"	_____	1
8. A three-stage command: "Take a paper in your hand, fold it in half and put it on the floor."	_____	3
9. Read and obey the following: (show written item) <i>CLOSE YOUR EYES</i>	_____	1
10. Write a sentence	_____	1
11. Copy a design (complex polygon)	_____	1
TOTAL	_____	30



Normal elderly score a mean of 27.6.

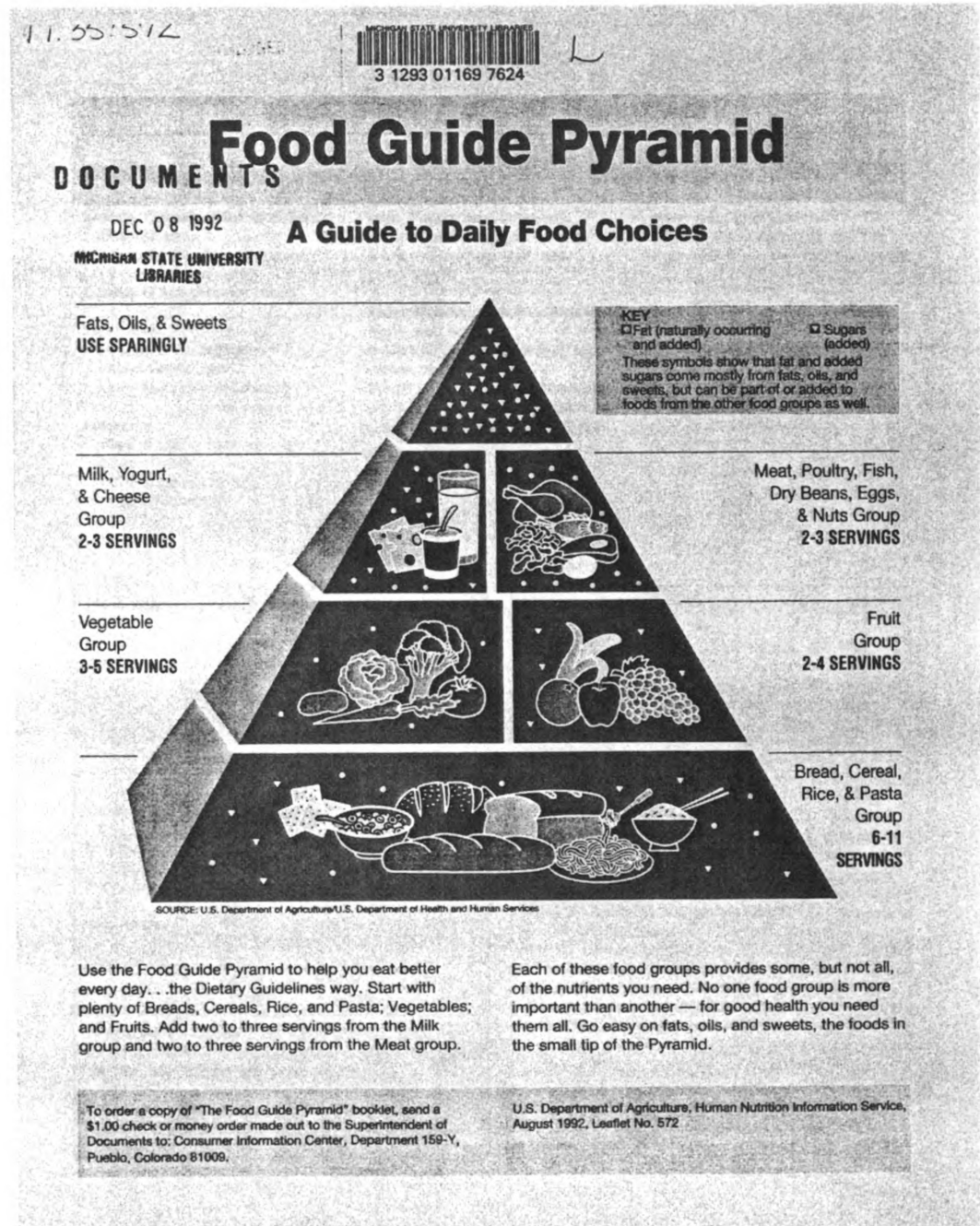
Comments: _____

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Rev. 10.22.91

APPENDIX C

FOOD GUIDE PYRAMID



How to Use The Daily Food Guide

What counts as one serving?

Breads, Cereals, Rice, and Pasta

1 slice of bread
1/2 cup of cooked rice or pasta
1/2 cup of cooked cereal
1 ounce of ready-to-eat cereal

Vegetables

1/2 cup of chopped raw or cooked vegetables
1 cup of leafy raw vegetables

Fruits

1 piece of fruit or melon wedge
3/4 cup of juice
1/2 cup of canned fruit
1/4 cup of dried fruit

Milk, Yogurt, and Cheese

1 cup of milk or yogurt
1-1/2 to 2 ounces of cheese

Meat, Poultry, Fish, Dry Beans, Eggs, and Nuts

2-1/2 to 3 ounces of cooked lean meat, poultry, or fish
Count 1/2 cup of cooked beans, or 1 egg, or 2 tablespoons of peanut butter as 1 ounce of lean meat (about 1/3 serving)

Fats, Oils, and Sweets

LIMIT CALORIES FROM THESE especially if you need to lose weight

The amount you eat may be more than one serving. For example, a dinner portion of spaghetti would count as two or three servings of pasta.

How many servings do you need each day?

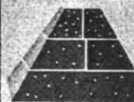
	Women & some older adults	Children, teen girls, active women, most men	Teen boys & active men
Calorie level*	about 1,600	about 2,200	about 2,800
Bread group	6	9	11
Vegetable group	3	4	5
Fruit group	2	3	4
Milk group	**2-3	**2-3	**2-3
Meat group	2, for a total of 5 ounces	2, for a total of 6 ounces	3 for a total of 7 ounces

*These are the calorie levels if you choose lowfat, lean foods from the 5 major food groups and use foods from the fats, oils, and sweets group sparingly.

**Women who are pregnant or breastfeeding, teenagers, and young adults to age 24 need 3 servings.

A Closer Look at Fat and Added Sugars

The small tip of the Pyramid shows fats, oils, and sweets. These are foods such as salad dressings, cream, butter, margarine, sugars, soft drinks, candies, and sweet desserts. Alcoholic beverages are also part of this group. These foods provide calories but few vitamins and minerals. Most people should go easy on foods from this group.



Some fat or sugar symbols are shown in the other food groups. That's to remind you that some foods in these groups can also be high in fat and added sugars, such as cheese or ice cream from the milk group, or french fries from the vegetable group. When choosing foods for a healthful diet, consider the fat and added sugars in your choices from all the food groups, not just fats, oils, and sweets from the Pyramid tip.

APPENDIX D

RISK ASSESSMENT TOOL FOR SECONDARY STROKE PREVENTION

Instructions to the APN:

RISK ASSESSMENT TOOL (Part I)

- 1.) Part I can be filled out by the stroke survivor prior to the office visit. The tool can be mailed to the survivor's home with the instructions to assist in the completion of the forms. If unable to mail the tool, request that the survivor arrive 15 minutes prior to the scheduled time to facilitate form completion.
- 2.) Make sure the office staff understands the tool so that they can be available for questions.
- 3.) Review Part I with the stroke survivor during the appointment to clarify responses.

RISK ASSESSMENT TOOL (Part II)

- 4.) Gather medical record information, preferably prior to office visit.
- 5.) Comments section is provided for the APN's discretionary use.
- 6.) Determine ischemic (I), hemorrhagic (II), or lifestyle factor(s) risk by reviewing pages 2-4 of Part II.
- 7.) Determine appropriate strategies for intervention based on H & P, risk factors, and consultations as appropriate.
- 8.) Mutually set attainable goals with survivor for lifestyle change. Document those goals on a separate sheet of paper for the chart. Encourage signatures (APN & survivor) and obtain copy for the survivor.
- 9.) Review goals and progress made each office visit. Revise or create new goals and complete the signature and copy process.

RISK ASSESSMENT TOOL (Part I)

INSTRUCTIONS FOR THE ATTACHED RISK ASSESSMENT TOOL:

1) PLEASE COMPLETE THE FOLLOWING FORMS BEFORE YOUR SCHEDULED APPOINTMENT.

2) BRING COMPLETED FORMS WITH YOU TO YOUR SCHEDULED APPOINTMENT.

3) WE RECOMMEND THAT YOU SELECT A SUPPORT PERSON TO CONSISTENTLY COME TO OFFICE VISITS WITH YOU. PLEASE BRING THAT PERSON WITH YOU TO EACH SCHEDULED APPOINTMENT.

4) IF YOU NEED ASSISTANCE OR HAVE QUESTIONS REGARDING THE RISK ASSESSMENT TOOL, ASK YOUR SUPPORT PERSON OR GIVE OUR OFFICE A CALL. (HOURS: _____)
PHONE #: _____).

5) WE ENCOURAGE ALL OF OUR PATIENTS TO HAVE AN UPDATED COPY OF THEIR MEDICATIONS. WE WILL BE HAPPY TO PROVIDE YOU WITH EXTRA FORMS AND/OR A COPY OF THIS COMPLETED FORM.

THANK YOU FOR YOUR TIME IN COMPLETING THESE FORMS.

RISK ASSESSMENT TOOL (Part I)

NAME: _____ DATE OF BIRTH: _____ SEX: _____

PHONE (DAY): _____ (EVENING): _____ MARITAL STATUS: _____

ADDRESS: _____

DO YOU LIVE ALONE? _____ WITH SPOUSE? _____ OTHER? _____

HIGHEST LEVEL OF EDUCATION: _____ OCCUPATION: _____

PRIMARY SUPPORT PERSON (To Be Involved in Office Visits and Teaching):

SUPPORT PERSON'S NAME: _____ RELATIONSHIP: _____

SUPPORT PERSON'S ADDRESS: _____

SUPPORT PERSON'S PHONE (DAY): _____ (EVENING): _____

MEDICAL DIAGNOSES/PROBLEMS:

(1) Example: Difficulty speaking _____ (7) _____

(2) _____ (8) _____

(3) _____ (9) _____

(4) _____ (10) _____

(5) _____ (11) _____

(6) _____ (12) _____

HEALTH CARE PROVIDERS: _____

REHABILITATION (Type & Frequency): _____

PERSONAL RECOVERY GOALS: _____

PREVENTIVE CARE:

DATE OF LAST EYE EXAM: _____ LAST HEARING EXAM: _____
LAST PHYSICAL EXAM: _____ LAST DENTAL EXAM: _____

USE OF (AMOUNTS PER WEEK): TOBACCO: _____ ELICIT DRUGS: _____
CAFFEINE: _____ ALCOHOL: _____

EXERCISE (TYPE & FREQUENCY): _____

WHAT IS YOUR USUAL BLOOD PRESSURE? _____

HOW OFTEN DO YOU CHECK YOUR BLOOD PRESSURE? _____

TYPE OF DIET: _____ DO YOU FOLLOW THAT DIET? _____

DIFFICULTY CHEWING OR SWALLOWING? _____

CONCERNS ABOUT WEIGHT LOSS/GAIN? _____

_____ WHAT IS YOUR USUAL WEIGHT? _____

24 HOUR DIET RECALL

(LIST FOODS AND BEVERAGES AND AMOUNTS OF EACH FROM YESTERDAY)

BREAKFAST

LUNCH/DINNER

DINNER/SUPPER

SNACK(S)

ALLERGIES: _____

MEDICATIONS
(including prescribed, over-the-counter, homeopathic, vitamins,
food supplements, and herbal remedies):

<u>MEDICATION</u>	<u>DOSE (MG)</u>	<u>TAKEN HOW OFTEN</u>	<u>REASON TAKEN</u>	<u>DOCTOR*</u>
<u>example:</u>				
<u>Vitamin E</u>	<u>400 I. U.</u>	<u>One per day</u>	<u>Preventive care</u>	<u>Self</u>
<u>1</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>2</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>3</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>4</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>5</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>6</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>7</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>8</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>9</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>10</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>11</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>12</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>13</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>14</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u>15</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

* If self prescribed or recommended by someone else, indicate relationship.

RISK ASSESSMENT TOOL (Part II)

CHART REVIEW (stroke history) [Hospital: _____ Medical Record #: _____]

NAME: _____ DATE OF BIRTH: _____ SEX: _____

Date and time of occurrence of symptoms: _____
(Initial symptoms, progression/regression?): _____

Diagnosis and type of event: _____

Location and pattern of neurologic deficit (vascular territory involved): _____

Date of most recent of Prognostic Indicators & Results:

● Radiology

_____ CT Scan (Initial, ? repeated after 48 hours)

_____ MRI/MRA (Gives more detailed view of cerebellum and brainstem)

_____ EKG

_____ Chest Film

_____ Holter Monitor

_____ Transesophageal Echocardiogram (TEE) (Identify embolic source)

_____ Carotid Duplex Ultrasonography or Carotid Doppler (Identify stenosis)

_____ Cerebral arteriography (Identify degree of extracranial stenosis & intracranial disease)

● Laboratory

_____ CBC (differential & platelet count)

_____ Prothrombin Time

_____ Activated Partial Thromboplastin Time

_____ INR (International Normalized Ratio)

_____ ESR (Erythrocyte Sedimentation Rate)

_____ Fasting Glucose

_____ Electrolytes

_____ BUN/CR

_____ Lipid Profile

_____ Urinalysis

● Adult Illnesses

(comorbidities, risks & complications post stroke):

● COMMENTS (Discharge summary, rehab goals, notes, & etc.): _____

RISK

I.) ISCHEMIC:

Cardioembolic Risk (20%)

Nonvalvular Atrial Fibrillation
MI, Prosthetic Valves, Rheumatic
Heart Disease, Ischemic
Cardiomyopathy, Coronary
Artery Disease

Atheroembolic Risk

Aortic Atheromatous Disease

Atherothrombotic Risk (Atherosclerotic Cerebrovascular Disease) (20%)

Carotid Disease

Cerebral Disease

Vertebrobasilar Disease

INTERVENTION STRATEGY

● Coumadin (Warfarin Sodium)

-Contraindications: patient refusal, nonadherence, GI bleeding, Pregnancy, alcoholism, coagulopathy, recent CNS or eye surgery, history of significant bleeding during anticoagulation, & others (see prescribing information).

-Monitor patients every 2-3 days at the beginning of therapy until INR stabilized at 2.0-3.0; then monitor at least every 2 months.

-Review survivor's medications as many classes of drugs (e.g. antibiotics & anticonvulsants) can interfere with anticoagulation.

-Monitor within 7 days of beginning or ending medication known to affect Coumadin response.

-Diet: avoid foods containing vitamin K.

● ASA 325 mg can be used if Coumadin contraindicated. (Enteric coated)
Antiplatelet therapy (325 mg ASA qd, 75 mg Plavix qd, 250 mg Ticlid bid, or Dipyridamole & ASA) can also be used instead of Coumadin.

● Atrial fibrillation: consider ablation therapy

● < 70% carotid stenosis: Antiplatelet therapy

● > 70% carotid stenosis: carotid endarterectomy, or Antiplatelet therapy if surgery contraindicated

● Consider balloon dilatation/stenting

● Coumadin or antiplatelet therapy as above

● Consider cerebral bypass

● Coumadin or ASA therapy as above

● Consider cerebral bypass

RISK

Lacunar Disease (25%)
(Penetrating Artery Disease (also
lipohyalinotic risk)

Cryptogenic Risk (Unknown cause) (30%)

Other, Unusual Risk (5%)

Prothrombotic states,
Dissections, Arteritis, Migraine/
Vasospasm, Elicit Drug use (list
not all inclusive)

II.) HEMORRHAGIC:

Hemorrhagic Risk

III.) LIFESTYLE FACTORS:

HTN

Management Goal:
<140/85 mm HG
or
<130/82 mm Hg in renal
insufficiency, heart failure or
diabetes (optimal <120/80)

Diabetes

Management Goal:

HbA1c <7

Hyperlipidemia

Management Goal:
LDL < 100 mg/dl

Secondary goals:
HDL > 35 mg/dl
TG < 200 mg/dl

INTERVENTION STRATEGY

● HTN management

● Therapy based on presumed cause, though no evidence found. Often suggestive of embolism despite clear source not identified.

● Therapy based on underlying cause

● HTN management

● Eliminate excessive alcohol use

● Eliminate use of illicit drugs (e.g. cocaine & amphetamines)

● Weight control

● Physical activity or exercise prescription

● Limited sodium intake

● Moderation of alcohol intake

● Advise smoking cessation

● Add blood pressure medication

individualized to patient's needs as per JNC VI and HOT research

● Weight control

● Physical Activity

● Blood pressure control

● Hyperlipidemia management

● Add appropriate therapy to achieve goals

● Emphasize weight management and physical activity.

● Advise smoking cessation

● Encourage AHA diet and high fiber intake

● Add appropriate therapy to achieve goals

RISK

Smoking

Goal:

Complete Cessation

Weight

Goal:

**BMI (Body Mass Index) of
21-25 kg/m²**

Physical Activity

Goal:

**30 minutes or more of moderate-
intensity physical activity on most,
preferably all days of the week**

INTERVENTION STRATEGY

- Strongly encourage survivor & family to stop smoking
- Provide counseling, nicotine replacement, formal cessation program as appropriate per AHCPR Guideline

- Encourage life long eating habits
- Measure height, weight, BMI at each visit
- Encourage support program, office weigh in's, and resources such as dietician and Weight Watchers as appropriate

● Nutritional Goals:

~10-20% of daily caloric intake from protein

~55-60% of calories from carbohydrates (simple & complex)

<30% of calories from fat

<10 % of calories from saturated fat

*** 20 to 30 grams of dietary fiber from a wide variety of foods**

*** Limit sodium intake**

- Encourage 30 or more minutes of moderate-intensity activity up to 7 days a week tailored to patient ability. Moderate-intensity activity is equated to a brisk walk of 3 to 4 miles per hour. Start slow.
- Increase daily lifestyle activities such as walking to the mailbox, gardening, household cleaning, grocery shopping.
- Utilize exercise prescription
- Utilize light weights to build muscle mass, increase calorie burn, as well as strengthening.

APPENDIX E
ISSUES FOR PATIENT AND FAMILY/CAREGIVER EDUCATION
(adapted from AHCPR No. 16: Post-Stroke Rehabilitation)

What is stroke?

- Etiology/pathophysiology of stroke
- Signs & symptoms of stroke
- Effects of stroke on the survivor
- Effects of stroke on the family
- Role of family member(s) and caregiver(s) in treatment plan

Routine Physical/Medical Care

- Maintenance of nutrition and hydration
- Bowel and bladder care
- Sleep and rest
- Reliable medication taking
- Behavioral issues and how to deal with them
- Positioning and moving in bed
- Prevention of blood clots
- Prevention of skin breakdown
- Safety measures to prevent falls
- Rehabilitation
- Exercise during and after rehabilitation
- Techniques for performing specific tasks, such as transfers, personal hygiene, etc.
- Training in specific skills for which patient needs assistance

Complications of Stroke (tailored to patient's specific circumstances)

- Respiratory complications (care of tracheostomy/use of respiratory equipment)
- Cognitive deficits, safety
- Speech or language deficits; facilitating communication
- Depression and other psychological disturbances
- Swallowing problems
- Care/use of indwelling bladder catheter or feeding tube

Prevention of recurrent stroke

- Monitoring blood pressure
- Medical or surgical interventions to prevent recurrent stroke
- Lifestyle modification
- Smoking cessation
- Alcohol restriction/abstinence
- Exercise (recreational, leisure, & work activity)
- Nutrition

After hospital care

- Care giver concerns
- Optimizing social functioning
- Optimizing family functioning
- Spiritual care
- Support groups for caregiver, family, and stroke survivor
- Respite care
- Sexual functioning
- Recreational and vocational pursuits (vocational counseling)
- Automobile driving or operating machinery
- Community resources

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