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Knowledge about Stroke in Adults from Rural Communities

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KNOWLEDGE ABOUT STROKE IN ADULTS FROM RURAL COMMUNITIES

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ABSTRACT

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Fifty middle to low-income adult clients of a rural family care center were surveyed in a descriptive correlational study in order to determine their abilities to identify the signs and symptoms of a stroke and their knowledge of stroke risk. Additionally, Pearson's Correlation Coefficient was used to ascertain whether the participants' level of knowledge was related to their actual stroke risk, as identified by the American Heart Association's Stroke Risk Tool. Descriptive analysis of the item responses revealed that the percentage of the sample correctly identifying individual signs and symptoms ranged from 44 to 77%. When actual stroke risk was correlated with knowledge of stroke risk and knowledge of stroke signs and symptoms, no relationship was found.

This sample's knowledge regarding stroke, representing a *personal factor* in Pender's (1996) Health Promotion Model, was low. Educational intervention is recommended to enhance overall health.

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CHAPTER 1

INTRODUCTION

Stroke, or a cerebrovascular accident (CVA), is the irreversible damage caused to the brain from a thrombotic, embolic or hemorrhagic event. Strokes are the third leading cause of death in the United States (U.S.) and represent the number one cause of serious long-term disability (American Heart Association, 1998). Fortunately, the risk factors for a stroke are preventable and/or controllable. Unfortunately, public awareness of these risk factors is low. Only 3% of respondents, in a Stanford University poll, could define what a stroke was. Thirty-eight percent did not know what region of the body caused a stroke and 60% were not aware of the need for immediate treatment (Mahady, 1998).

Tissue plasminogen activator (TPA) is a thrombolytic agent that will expedite clot lysis and restore normal blood flow, thereby limiting brain injury. In 1996 the Food and Drug Administration (FDA) approved TPA for the treatment of an ischemic stroke. The treatment needs to be initiated within the first three hours of the onset of stroke signs and symptoms (Starkman, 1997). Unfortunately, 75% of patients are not aware of the need for immediate treatment.

In addition to their lack of awareness of treatment, many patients are not even aware of the risk factors of a stroke (Medical Tribune Cardiovascular Disease, 1998).

Examples of risk factors are hypertension, smoking, heart disease, high cholesterol, excess alcohol intake, obesity, sedentary lifestyle, diabetes, use of oral contraceptives, and stress. Many of these controllable risk factors of a stroke can be eliminated by simple lifestyle changes. These changes include monitoring blood pressure, abstaining from smoking cigarettes, recognizing and treating diabetes, keeping an alcohol intake at a moderate level, eating a diet that is low in fat, cholesterol and sodium, having regular medical checkups and maintaining a physically active lifestyle (American Heart Association, 1998).

It is well within the scope of practice of nurses to educate patients to these lifestyle changes. Advanced practice nurses (APN) services include emphasis on health promotion and disease prevention (Ditillo, 1998). The APN role enables nurses to educate and coordinate efforts that promote change in the patient population. In addition to educating the patient, family and extraneous influencing factors must be considered, by the APN, to effectively make a difference in the health and overall well-being of patients. To develop an effective education plan for the patient, the current knowledge base must first be determined. Patients who are lacking in knowledge regarding stroke signs, symptoms and risk factors are at higher risk for a stroke.

Susan Reece (1998) outlines the need for community analysis before developing an intervention. She defines community as "a dynamic interdependent system characterized by norms, roles, and established methods of resource allocation. A community could include student, faculty, or staff of a school; patients, providers, or staff of a health care system; employees of a business; and inmates or staff of a prison." (p. 49).

A seven-step process is utilized to develop a community analysis:

1. Identify the community or target group.

2. Establish the purpose of the assessment.

3. Determine the scope of the assessment.

4. Gather data on the community or target group by defining:

    - community

    - the people

    - the health issues of concern.

5. Analyze the data.

6. Validate the findings.

7. Develop a community diagnosis. (Reece, 1998 pp.49, 53-56)

In closing, Reece summarizes that a community analysis and health planning offer exciting opportunities for practitioners who want to broaden their practice role and become involved with health promotion and risk reduction of entire groups as well as their individual patients. This article clearly outlines the process for gathering data and developing an intervention for a target population. Reece's article parallels well with the intentions of this research study on stroke knowledge and risk factor awareness.

The purpose of this study was to identify patients' knowledge of their risk for stroke and their ability to identify the signs and symptoms of a stroke. Additionally, the American Heart Association's stroke risk tool was used to identify the patients' actual stroke risk. This information will be used later in an educational program to increase patient knowledge regarding stroke risk factors and the signs and symptoms of a stroke.

CHAPTER 2

LITERATURE AND CONCEPTUAL FRAMEWORK

Conceptual Framework

The Health Promotion Model (HPM) provided the framework for this study (Pender, 1996). The HPM is a framework developed to assist in the exploring of the correlation between variables involved in the performance of health promoting behaviors. Nola Pender first started developing this framework in the early 1980s. It has since evolved and was revised in 1996. The HPM incorporates constructs from expectancy-value theory and social cognitive theory.

Expectancy-value theory was described by Feather (1982). It states that a person will engage in a given action and persist in it until (a) the outcome of taking action is of a positive personal value, and (b) based on available information, taking this course of action is likely to bring about the desired outcome. Also, most persons will not persist at an action if it is felt to be unattainable.

Social cognitive theory by Albert Bandura (1986) places major emphasis on self-direction, self-regulation, and perceptions of self-efficacy. Behavior is not strictly driven by internal factors nor controlled by external factors. It is a combination of both, which help to determine choices regarding health promoting behaviors.

In order to assess or predict a patient's desire to actively change his/her behaviors and/or environment, we need to understand what influences the desire to make changes. The HPM (see Figure 1) identifies 10 categories of variables that can be influencing factors on health promoting behaviors.

The variables of *prior related behavior* and *personal factors* fall under the broader category of *individual characteristics and experiences*. Prior related behaviors can potentially influence future behaviors based on the frequency of the prior behavior. Personal factors can be biologic, psychologic and sociocultural. Even though personal factors can affect and predict health behaviors, they are seldom included in intervention strategies because some personal factors cannot be modified.

The variables of *perceived benefits* of action (plans to act are based on the perceived benefits of that action), *perceived barriers to action* (plans not to act are based on perception of barriers to the action), *perceived self-efficacy* (the belief in oneself to achieve), *activity-related affects* (feelings that occur from the given activity), *interpersonal influences* (the influences of family, peers, providers who can influence a person's choice of activities), and *situational influences* (personal perception of the situation can effect the behavior), all fall under the category called *behavior-specific cognitions* and affect.

All the above-mentioned variables potentially can lead to the behavioral outcome. *Immediate competing demands* (low control) and *preferences* (high control) and the *commitment to a plan of action* directly influence health promoting behaviors. *Health promoting behaviors* can be defined as behaviors that lead to achieving full health potential (Pender, 1996).

Pender (1996) proposes that prior related behavior has direct and indirect influences on behavior. Perceptions of self-efficacy, benefits, barriers, and activity-related affects exert indirect as well as direct influences on behavior.

In the revised HPM (Pender,1996) the personal factors have been classified as biologic, psychologic and sociocultural. Because there are so many different possible personal factors, it is recommended that only the personal factors relevant to the research study be utilized. Personal factors are proposed to have direct influences on behavior cognitions and affect as well as on health promoting behaviors.

Behavior cognitions and affect are a group of variables that are extremely influential to a person engaging in health promoting behaviors. This group of variables is also viewed as the prime area for nursing intervention to aid the client in change. These variables consist of perceived benefits of action, perceived barriers to action, perceived self-efficacy, activity related affect, interpersonal influences and situational influences. The variable of a commitment to a plan of action will lead directly to the proposed behavioral outcome only if the variable of immediate competing demands and preferences does not interfere in the desired behaviors.

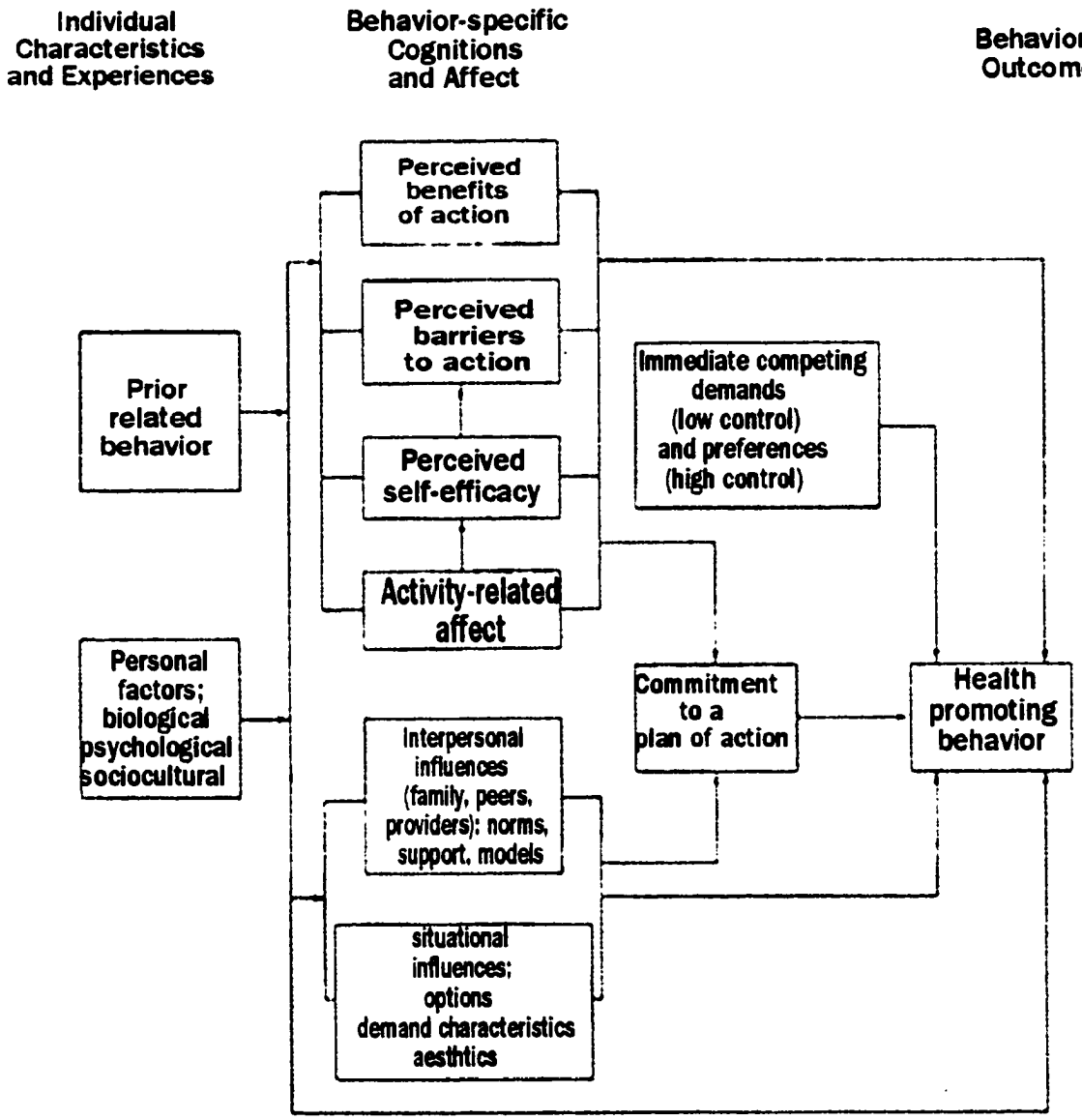

Figure 1 Revised Health Promotion Model

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In this research study, information was gathered on patient knowledge of their risk for stroke, as well as their awareness of the signs and symptoms of a stroke (personal factors in the HPM).

Other data gathered include demographic data, family history of strokes, personal history of stroke and other personal health data, such as history of, or currently being a smoker, hypertension, cardiac disease, and physical activity levels. These gathered data represent the HPM concepts of personal factors and prior related behaviors. The framework to this study, provided by the HPM, then illustrates possible ways to intervene to increase health promoting behaviors that can reduce the risk of a stroke.

The first step in developing any intervention is to gather data and to assess the patient's knowledge base. This study used a descriptive, non-experimental design to gather self-reported data within the framework of the HPM. In future work the data can be utilized to strategically develop an education program designed to address the specific areas of knowledge deficits.

Review of Literature

Many studies have been published on various stroke topics. Specifically, studies were considered that have dealt with the topics of stroke risk knowledge, and the signs and symptoms of a stroke. How knowledge influences behavior was also explored; specifically, how knowledge can or cannot change the behaviors that can lead to increased risk for stroke. Finally, interventions that may or may not have influenced the factors related to stroke risk were examined. Each area is summarized below.

Stroke Risk Factors , Signs and Symptoms of a Stroke

A review of the literature was done on the topics of public awareness of stroke risk factors and the signs and symptoms of a stroke. A varied group of studies were reviewed. Some studies excluded those with stroke risk factors and some included those with stroke risk factors. In one study, ethnicity and gender was a factor and in another study only smokers were assessed. Overall, a diversified sampling of literature was reviewed.

Public knowledge of stroke warning signs and risk factors were assessed in a study done by Pancioli, et al. (1998). The design of this study was a population based telephone interview survey using random digit dialing. It was conducted in Cincinnati, Ohio in a metropolitan area felt to be similar to the United States overall in age, sex, percentage of black Americans, and economic levels.

The effects of demographics and the presence of risk factor influence on the respondents' knowledge of stroke warning signs and risk factors were evaluated using logistic regression. Variables considered were age, race, sex and level of education, as well as self-reported risk factors of current smoking, past smoking, hypertension, diabetes, and history of stroke or transient ischemic attack. The authors used criteria from the National Institute of Neurological Disorders and Stroke to define five warning signs of a stroke:

1. Sudden weakness or numbness of the face, arm, or leg
2. Sudden dimness or loss of vision
3. Sudden difficulty speaking or understanding speech
4. A sudden severe headache with no known cause
5. Unexplained dizziness, unsteadiness or sudden falls.

With only these warning signs to choose from, 57% correctly listed one sign, 28% correctly listed two or more signs, and only 8% correctly identified three signs of a stroke. The age of the participant was significantly related to knowledge about the warning signs of a stroke. In the group aged 75 years and younger, 60% could identify at least one sign of a stroke. For the group of participants over the age of 75 only 47% could identify a sign of a stroke.

The participant's age was also linked to the ability to identify risk factors of a stroke. In the group aged 75 and under, 72% identified at least one risk factor for stroke. In the group older than 75, only 56% of participants could identify at least one risk factor for a stroke. Overall, using logistic regression Panicioli et al. (1998) found that age

(OR= 0.6), female sex (OR= 1.5), higher levels of education (OR= 1.4), past history of smoking (OR= 1.3), history of hypertension (OR= 1.2), and history of previous stroke (OR= 1.9) were significantly associated with knowledge of stroke risk factors.

Despite current educational campaigns, public knowledge regarding the signs, symptoms and risk factors of a stroke is inadequate. Surveys of the general public suggest that up to 27% of the adult population do not know a single sign or symptom of a stroke and up to 25% do not know a single risk factor (Kothari et al., 1997). Kothari et al. (1997) interviewed people presenting to an emergency department (ED) with potential stroke to determine their knowledge at the time of symptom onset regarding the signs, symptoms, and risk factors of a stroke. Of the 163 potential stroke patients, 36% thought they might be having a stroke before ED arrival. Of these patients, 49% realized that a stroke was due to an injury to the brain. Of the 163 patients, 39% could not identify a single sign or symptom of a stroke. Knowledge regarding the risk factors for a stroke were no better than that for the signs and symptoms of a stroke. Of the total patients, 43% did not know a risk factor for a stroke and only 26% could identify more than one risk factor. Even in the 124 patients with a history of hypertension, only 31% identified hypertension as a risk factor. The authors also found that the elderly participants, who are at highest risk for stroke, were the least knowledgeable regarding a stroke.

Samsa et al. (1997), assessed awareness of stroke risk in patients who were at increased risk for stroke. The criteria for inclusion in the research study were a history of a stroke, transient ischemic attacks (TIAs) or exhibiting conditions that would predispose them to a stroke, such as atrial fibrillation, hypertension, and heart disease. Three different

sites were used for data collection. One site used in-person interviews while the other two sites used phone interviews.

Frequencies and cross-tabulations were used to report descriptive results. The relationships between knowledge of stroke risk and age, race, sex, income, education, marital status, symptom status (stroke, TIA, asymptomatic), physical function, disability, and depression during the last six months were evaluated. Chi-square was used to assess univariate associations between each variable and the knowledge of stroke risk. A logistic regression model that included all variables was then utilized to examine variables' relation to knowledge.

The univariate statistics indicated symptom status, age, current health, physical function, and depression as being strongly associated with the knowledge of stroke risk ($p < .01$ for each comparison). Logistic regression indicated symptom status, age, and current health status as the strongest predictors of knowledge of stroke risk ($p < .001$). Depression was also statistically significant ($p = .01$) for knowledge of stroke risk (individual statistics not provided in the article) (Samsa et al., 1997).

The authors also compared knowledge by age group and perceived health status. They found that 50% of patients less than 65 years were aware of their risk for stroke but only 30% of patients more than 65 years were aware of their risk. In total, 41% of those studied were aware of their risk for stroke. Patients who reported that they had poor health were more aware of their risk for stroke (66%) compared to those who self-reported excellent health (31%) (Samsa, et al., 1997). These findings can lead one to assume that those who believe they are in good health may underestimate their risk for

stroke. Thus, there is a need for increased public awareness of stroke risk.

A limitation to this study was the sampling design, as it does not reflect a random sample of those at risk for stroke. Participants tended to have high levels of education (49% had some college) and income (median income was $30,000). Also, another limitation is that the participants were only asked if they were at risk for stroke. They were not asked to provide details about the degree of their risk for stroke. Some may have answered yes or no depending on their perception of risk. For example they may acknowledge, on questioning, that high blood pressure is a stroke risk but their high blood pressure is not high enough to be a stroke risk.

Making patients better aware of their increased risk for stroke is a first step toward improving stroke prevention practice. Health care providers can play a crucial role in providing the necessary information to help increase patient awareness of stroke risk factors. From there, the patient education and stroke prevention can be put into practice.

Ayanian and Cleary (1999) examined smokers' perception of their risk for heart disease and cancer. A total of 3031 adults from age 25-74 years were interviewed. Of these, 737 were smokers, 868 were former smokers, and 1426 were non-smokers. Of the smokers, only 29% perceived that they were at increased risk for heart disease. Of the former smokers, only 15% perceived any increased risk. This percentage was the same for non-smokers. Among heavy smokers ($\geq$ 40 cigarettes in a day), 39% perceived that they were at increased risk of heart disease.

Ayanian and Cleary, (1999) pointed out three limitations to this study. First, questions regarding health risks were asked separately from the questions about smoking, so the data may reflect overall risks of heart disease and cancer as opposed to risks directly related to smoking. Second, cancer risk was assessed for all types of cancer and not for cancer specifically linked to smoking. Thirdly, patients may have varying degrees of risk for heart disease because of risk factors for heart disease other than smoking.

Despite attempts to educate smokers about their risk for disease, most do not perceive themselves to be at risk. Smoking remains the most important preventable cause of cardiac disease. Health care providers need to assess patients' perceptions of personal risk in order to be able to intervene and provide smoking cessation counseling.

Stroke risk factor knowledge was assessed in Hispanic and non-Hispanic women in New Mexico. This study was done by Kattapong, et al. (1998), in part to determine why Hispanic women in New Mexico had recently experienced an increase in cerebrovascular disease mortality as compared to non-Hispanic white women. The authors were trying to determine if stroke knowledge is affected by ethnicity, having had a stroke, or having one or more risk factors.

A stroke risk factor knowledge survey was administered to 215 hospitalized women, 40 years and younger. Item responses were compared among groups based on ethnicity, stroke or non-stroke diagnosis, and having or not having history of cardiovascular risk factors. Spontaneous reporting of stroke risk factors was poor among Hispanic and non-Hispanic groups. Stress, not a risk factor for stroke, was reported most

often as a stroke risk. Fifty percent of the total respondents reported stress as a risk factor. Age, a risk factor for stroke, was only reported by 3% of the respondents as a risk factor. Patients in all groups were able to correctly identify stroke risk factors, from a given list, better than being able to spontaneously report the risk factors. Ninety-seven percent identified hypertension as a stroke risk factor while diabetes mellitus, at 63%, was the least recognized risk factor. Patients did less well at identifying factors not related to stroke.

Two-way analysis of variance was used to determine whether composite knowledge scores differed among patient groups. For stroke and non-stroke patients, the mean score determined from the ANOVA for stroke patients was 6.7 and the mean for nonstroke was 6.8, which is not a significant difference ($p = .74$,). Combining stroke diagnosis with ethnicity, they found no significant difference ($p = .21$) between non-Hispanic whites ($M = 6.9$) and Hispanics ($M = 6.4$). For risk factor knowledge scores, women with prior history of cardiovascular disease risk ($M = 6.6$) did no better than women without cardiovascular disease risk ($M = 6.5$). No significant interaction was found between risk factor status and ethnic group ($p = .36$) This study did not provide standard deviations in the given data. (Kattapong, et al., 1998).

Limitations of this study include uncertain validity of the questionnaire, since no standardized stroke risk factor knowledge assessment tool exists. Additionally, the results of this study are not assumed applicable to other groups, such as men, other ethnic groups, other age groups, or healthy community members. In conclusion, the authors state that they found stroke risk factor knowledge to be inadequate in all groups of women

interviewed. They determined that there is a need for education on the risk factors for a stroke, and that education programs specific to a given population are needed.

In this review, one study found that increasing age, female gender, white race, higher education levels and a history of hypertension increased awareness of stroke risk factors and signs and symptoms of a stroke (Pancioli et al., 1998). But these findings did not hold up in the other studies reviewed (Ayanian and Cleary, 1999; Kattapong, et al., 1998; Kothari et al., 1997; and Samsa et al.,1997). In research involving Hispanic and non-Hispanic women, both were found to have knowledge deficits regarding stoke. The elderly were found to be the least knowledgeable, even though they were at greatest risk. Finally, smokers were found to be very poor at perceiving their increased risk for stroke. Overall, the reviewed data suggest that much education needs to be done to increase awareness of stroke risk factors and the signs and symptoms of a stroke.

Knowledge and Behavior

Studies on human behavior and the effects of knowledge on some behaviors were reviewed. Through education, knowledge can be gained. When this knowledge is applied, behaviors can be influenced. This premise was investigated by Wray, Herzog, Willis, and Wallace, (1998) in a study from the field of sociology, researching the effects of education on health behaviors. Specifically, the authors were considering whether education affected smoking cessation. The incident of having a heart attack was viewed as a crisis situation, and a potential trigger for change in behavior. The hypothesis being tested was that "middle-aged adults with more formal education will stop smoking more readily than

middle-aged adults with less education following the experience of a heart attack." (Wray, Herzog, Willis, & Wallace, 1998).

Wray, Herzog, Willis, and Wallace (1998) examined many variables in this study, but this review will address only the ones pertaining to the effects of knowledge on behavior. This study was conducted between 1992 and 1994 and included 2,391 adults between the ages of 51-61 who had suffered heart attacks and who were smokers. They were interviewed in 1992 and again in 1994. Data regarding their smoking status were gathered. A larger sample of 8,656 adults who had histories of heart attacks but were not all smokers was used to gather demographic data and to be used as a comparison group.

Logistic regression was used to examine relationships among the variables. Middle-aged adults without any smoking history had fewer risk factors for heart disease and had higher education levels. Highly educated people were less likely to have started smoking ($p < .001$).

In 1994, the data gathered on smokers who had a heart attack in 1992 were analyzed to evaluate who had stopped smoking and who continued to smoke. Heart attack alone was found to be a significant (odds ratio = 1.412) predictor of smoking cessation, but education alone was not a significant (odds ratio = 1.007) predictor of smoking cessation. The effects of education and heart attack together were essentially the same as heart attack alone (odds ratio = 1.436). An interaction term for education, heart attack and smoking cessation was introduced into the analysis (Wray, Herzog, Willis, & Wallace, 1998). The interaction term was significant and positive (odds ratio = 1.442).

A limitation to this study was that the data regarding history of heart attack was self reported, and therefore can only be as accurate as the person's knowledge or recall of his/her heart attack status. Another limitation, is that the data on smoking cessation between 1992 and 1994 were gathered without asking when the person quit, so theoretically they could have quit for as little as one day. Also limiting this study was that other long-term health problems were not controlled for as potential influences on smoking cessation.

In conclusion, the authors state that they expected to confirm other studies showing increased levels of education leading to enhanced health. But they were surprised by the finding that a life-altering event such as heart attack, in conjunction with increased levels of education, would lead to greater positive health choices such as smoking cessation. Overall, this study supports the idea that increased knowledge does have a positive effect on limitation of adverse health behaviors. This suggests that the people who have had life altering events will be more susceptible to interventions to decrease stroke risk factors. This would be an area that would benefit from further research.

A brief report in the MMWR (1999) reviewed the prevalence of physician counseling about behavioral modifications to reduce risk for heart disease and stroke. Specifically, dietary advice and exercise advice were assessed. A phone survey was conducted in seven states and Puerto Rico involving 20,847 people, aged 18 years or older. They were questioned regarding a history of dietary and exercise advice from their physician. They also reported if they were then following the advice, and what their heart disease prevention behaviors were.

Overall, 41.5% (95% CI = ± 0.9) of the respondents reported receiving dietary advice from their physician. Of these 66.9% (95% CI = ±0.9) were engaged in healthy eating habits to decrease their risk for heart disease. Of the respondents, 42.3% (95% CI = ± 0.9) reported receiving physician advice on exercise to reduce their risk for heart disease. Of these, 60.7% (95% CI = ± 1.0), reported an increase in their exercise habits.

The number of respondents reporting a history of heart disease or stroke was 7.5% (95% CI = ± 0.5). Of these, 73.8% (95% CI = ± 2.8) reported receiving advice from their physicians regarding dietary changes to decrease further risk of heart disease. Also, 70.3% (95% CI = ± 2.9) reported receiving exercise advice. In people who did not have a history of heart disease or stroke, the percentage who received dietary counseling was 38.9% (95% CI = ± 1.0) and exercise advice was 40.0% (95% CI = ± 1.0).

Of the persons who reported receiving physician dietary advice, 82.8% (95% CI = ± 1.1) reported changing their dietary habits as compared to 55.6% (95% CI = ± 1.3) of persons, who did not report receiving this advice. Of the persons who reported receiving physician exercise advice, 74.7% (95% CI = ± 1.3) reported that they were exercising more as compared to 50.5% (95% CI = ± 1.3) who did not receive this advice.

This study was limited however, in that the gathered data did not reflect the depth or quality of the counseling. Also, there is bias because the data were self-reported and are subject to recall bias and over reporting or under reporting of behaviors and existing disease. Nevertheless, a higher percentage of persons who received physician counseling on diet and exercise reported engaging in the respective risk-reduction behavior. This emphasizes the importance of education for reducing risk factors for stroke and heart

disease. Health care providers should counsel all their patients on prevention measures of heart disease and stroke (MMWR, 1999).

This study demonstrates the importance of counseling patients regarding diet and exercise regardless of their risk for stroke. It appears that patients respond favorably to interventions from health care providers stressing the importance of diet and exercise. Health care providers need to be educated regarding the importance of their influence on their patients, so that they may provide the appropriate counseling.

Daley et al. (1997) reported on the delay of the public in seeking treatment for stroke and on delays in the medical community in initiating treatment for stroke. The paper described the education programs developed at the eight centers of the National Institute of Neurological Disorders and Stroke. A community needs assessment was the initial step in preparing a community education program. Later, basic strategies were individualized to fit each community. The basic strategies were identified as:

* Promotion of recognition of stroke onset, emergency response, and risk factor reduction
* outreach to a wide range of audiences of all educational and economic levels
* development of cost-effective, broad-based educational opportunities throughout the community and more remote referral areas using a variety of media and methods
* maximization of available resources to obtain these goals (Daley et al., 1997).

The authors (Daley et al., 1997) state that there were no standardized approaches to evaluate quality and effectiveness of education efforts at the eight study centers.

Anecdotal observations suggested a trend toward increased knowledge. The various different communities assessed the response to education in different ways. One community did an informal telephone survey which did indicate an increase in awareness of stroke risk and signs and symptoms. Another community indicated that they were seeing an increase in awareness as more education programs were developed within the community.

Overall, the authors conclude that further exploration and refinement in the stroke education process is needed. In order to change behaviors that lead to stroke, education needs to be tailored to the individual as well as to the community as a whole and not only the lay community but the medical community as well.

Interventions for Changing Stroke Risk Behaviors

Studies that addressed interventions for changing stroke risk behaviors were investigated. These interventions consisted of dietary changes and various physical activity programs, as well as a combination of both. Also, education as an intervention was investigated. Individual patient education was explored and an entire community education project.

A study done by Edmundson et al. (1996) examined the effects of an intervention on the personal determinants of diet and physical activity behaviors. The data used were obtained from the Child and Adolescent Trial for Cardiovascular Health (CATCH) study (Perry et al., 1990). The CATCH study was conducted at 96 schools at four study sites in

California, Louisiana, Minnesota, and Texas. It involved a school-based intervention to decrease or prevent the formation of habits that lead to the development of cardiovascular disease.

The techniques used in the intervention included behavioral modeling, skills training, practice, reinforcement, eliciting social support, goal setting, social norm setting, and improved access to the needed resources to put the desired behaviors into action. The intervention was designed to examine the personal, environmental and behavioral factors that had been identified as possible determinants of diet choices and physical activity levels. The intervention was delivered through education programs in the school. This consisted of a health education program, a physical education program, a school wide non-smoking policy and a school food service program.

Testing of the intervention was done via a questionnaire given to 6,956 students at the beginning and the end of the third grade. The questionnaire was also administered in the two subsequent years. The questionnaire measured dietary intention, which is defined as the intention to choose heart healthy foods. An account of usual food choices was obtained. Dietary knowledge for heart healthy food was assessed. Perceived support for physical activity was measured as either negative or positive. Social reinforcement for healthy food choices was assessed. Dietary and physical activity self-efficacy were measured to determine how confident the children were in being able to make the right choices. A positive effect of the intervention on diet choices was observed, with improvement in knowledge, intentions, self-efficacy, usual behaviors and perceived social reinforcement for healthy food choices ($p < .0001$) for each of these five personal

determinants. The improvements in physical activity were not sustained throughout the testing period, after the first year. Various theories as to why were addressed in this study. Possibly, this was related to the study being done in the classroom and not in the gym. Also, adequate resources available to participate in organized physical activities was not looked at (Edmunson, et al, 1996).

Overall, this intervention was successful in changing the psychosocial variables that might influence the formation of risk factor behaviors for cardiovascular disease. Since risk factors for cardiovascular disease starts early in life, interventions begun with school age children can have far reaching positive outcomes. This study demonstrated that by using the CATCH model, the psychosocial determinants of behavior could be addressed and altered in a positive way.

A limitation of this study was the expense and time involved in such a lengthy and involved intervention. Possibly, by modifying this study and incorporating education about healthy food choices, adequate activity levels and non-smoking policies to our schools curriculum, we could have a positive influence on our children's long term risk for stroke. Also, parental support data was not gathered so there is no way to discern if parental influence was a positive factor in this study.

Dietary interventions were the topic of a meta-analysis done by Brunner et.al. (1997). Seventeen studies on dietary interventions of at least a 3-month duration, were reviewed. The dietary intervention consisted of dietary advice. This advice was given by dieticians and/or health care providers during patient care visits. The data that were measured from these studies were self-reported changes in fat consumption and the

biophysical measurements of blood cholesterol, urinary sodium, and blood pressure parameters. The scores from the control group were then subtracted from the intervention scores obtained at 3 to 6 months and 9 to 18 months. Results from the 9 to 18 month groups showed a change of -.22 ($p < .01$) for blood cholesterol and a change of -1.2 mm Hg ($P = .09$) for diastolic blood pressure (Brunner, et al., 1997). All results supported dietary interventions as a means to decrease risk for heart disease.

Physical activity was the behavior studied in a clinical trial conducted by Dunn et al. (1997). Two types of physical activity interventions were compared to determine if one was more beneficial than the other in improving cardiovascular risk factors. The first intervention was a lifestyle physical activity counseling intervention, and the other was a gym-based intervention. Both lasted for six months. At initiation of the study and at six months, blood cholesterol, blood pressures, and body fat composition, as well as cognitive and behavioral measures were assessed.

The Centers for Disease Control (CDC) and the American College of Sports Medicine (ACSM) have guidelines that recommend 30 minutes or more of moderate intensity physical activity 5-7 days a week in order to decrease risk for cardiovascular disease. After six months both groups ($p < 0.05$) were meeting or exceeding the recommendations of the CDC and the ACSM. Both groups showed a significant change in blood cholesterol, blood pressure and body fat composition ($p \leq 0.05$ for all three measurements). (Dunn, et.al. , 1997). There were significant ($p < 0.05$) relationships between achieving the CDC/ACSM criteria and use of the behavioral/cognitive measures

(self-efficacy, benefits and barriers, substituting, enlisting, rewarding, committing and reminding). This was true for both groups.

The authors indicate theirs was the first randomized clinical trial demonstrating that a lifestyle approach to increasing physical activity is effective among adults (Dunn, et. al., 1997). They conclude that counseling for physical activity is as effective as a gym-based program in reducing the risk for cardiovascular disease. Further, this type of counseling intervention may be more cost effective than a gym-based program.

Two other studies investigated the link between physical activity and stroke. The Harvard Alumni Health Study (1998) by Lee and Paffenbarger and The Northern Manhattan Stroke Study (1998) by Sacco et al. both gathered data regarding physical activity. The Northern Manhattan Stroke Study utilized a broader population base which included men, women, people of different races and a wider range of ages. The mean age was 69.9$\pm$ 12 years. Of these, 57% were women, 18% whites, 30% African American, and 52% Hispanic (Sacco et al., 1998). The Harvard Alumni Health Study specifically looked at men only. The average age of the men was 58. Race was not mentioned in the Harvard Alumni Health Study but was presumed to be primarily white.

The Harvard Alumni Health Study was a prospective cohort study of 11,130 Harvard University alumni. Data were gathered via a questionnaire in1977 and again in 1988. Death certificates were obtained through 1990 to determine if cause of deaths were stroke related. Cox proportional hazards of regression were used to estimate the relative risks (Lee & Paffenbarger, 1998). The Northern Manhattan Stroke Study, was a population based incidence and case control study. The case subjects had first time strokes and the

control subjects were randomly digit dialed with 1:2 matching for age, sex, and race. Physical activity was recorded through in person interviews. Conditional logistic regression was used to calculate odds ratios (Sacco, 1998).

Although different methods were utilized to analyze the data the conclusions were essentially the same; physical activity was found to be associated with lower risk for stroke in both studies. In addition, both studies found that higher expenditures of energy corresponded to decreased risk for stroke. In the Northern Manhattan Stroke Study this also held true for all participants and not just the men. These two ex post facto studies allow us to conclude that physical activity is a constructive intervention to reduce the risk for stroke.

Stroke risk factor modification was examined in a study done by Joseph, Babikian, Allen and Winter (1999). Data were reviewed over a two-year time span from the Stroke Clinic of the Boston Veterans Hospital, to see if patients were following the recommendations of their health care providers to stop smoking, lose weight, control hypertension, control hyperlipidemia, control diabetes, and increase activity levels. Sixty-one patients were followed for a total of 341 clinic visits. Data from the first and last visits were compared to see if interval changes had occurred.

Of the 61 patients, 83% had hypertension. Of these patients, 90% were on anti-hypertensive medications at the first visit and 86% were on medications at the last visit. The other hypertensives were not on medication. Regardless of the diagnosis of hypertension, blood pressure readings were elevated in 58% of the patients at the first visit and in 50% at the last visit.

Weight measurements were obtained indicating that 67% of the sample population was overweight at their first and last visits. Of these patients, 26% reported altering a lifestyle practice in order to try to lose weight. Charts of 20 overweight patients were reviewed for documentation of advice given on diet and exercise to improve body weight. Of these 20 patients, only one achieved significant weight loss going from severely overweight to moderately overweight. Blood glucose measurements indicated that 32% of the patients had elevated blood sugars at the first visit and 30% at the last visit.

The majority of the patients studied, 65%, were not smokers. Smoking cessation advice was documented in the charts of the smokers. During the study period none of the patients quit smoking. Hyperlipidemia was found in 47 patients during the study period. Fewer than half of these patients had target cholesterol levels at first and last visits. The number of patients treated with lipid lowering agents during the study period was 15.

In a 24 months follow up period, 3% of the patients had a stroke and 25% had transient ischemic attacks. One patient had a retinal artery occlusion. Manifestations of heart disease were observed in 13% of the patients. These included ongoing/episodic congestive heart failure, angina, coronary artery bypass surgery, or the development of atrial fibrillation. There were no documented cases of myocardial infarction (Joseph, et al., 1999).

In conclusion, the authors (Joseph et al., 1999), state that although most patients were asked to quit smoking, received advice regarding diet and exercise, and were medicated for hypertension, elevated glucose, and cholesterol levels, their risk factor profiles showed little improvement during the 2-year time period. They suggest that more effective methods of controlling stroke risk factors are needed. A limitation to this study was that it

was retrospective, and done on a veteran population, which may not be applicable to a general population. More research into why this study was unsuccessful would need to be done. Verification of why the education and pharmacological interventions for this population did not work would be beneficial.

Another study on community education was conducted by Stern et al. (1999). This study investigated the effectiveness of a community education program, consisting of a slide/audio presentation alone or in conjunction with dialog from a trained individual. The target population was 657 adults living in the community.

Knowledge of stoke risk factors and signs and symptoms were assessed using pre- and post- testing. The results indicated that adding the dialog to the slide/audio showing did not increase the knowledge any more than the slide show alone. Paired *t* tests of persons receiving both the pre- and post-test showed significant improvement in knowledge ($p < 0.001$). ANCOVA demonstrated that the knowledge improvement was similar across the variables of sex, race, age, and education level.

In conclusion, Stern et al. (1999) state that there is a demonstrated need for increased public understanding of stroke risk factors, signs and symptoms and the need for rapid response to stroke symptoms. The slide/audio program appears to offer a brief, effective, and easily used educational tool to increase stroke awareness and knowledge.

In summary, the review of the literature predominantly points to a need to increase the public's awareness of stroke risk factors and the signs and symptoms of a stroke. Some of the literature reveals that increases in knowledge through education can lead to changes in behaviors that influence the risk of a stroke. Also, different interventions, including diet

programs, exercise programs, combinations of both, and education regarding a stroke, have been successful in decreasing the risk for stroke. Health care providers are in a unique position to be able to positively influence the behaviors of their patient population through various education and intervention strategies.

Interventions specific to a patient population can be developed by investigating the current level of knowledge on stroke risk factors and signs and symptoms of a stroke. By utilizing the predetermined knowledge deficits the intervention can be made to address the identified problem area. By using an such an intervention the chances of success will be greater. This information will also be useful baseline data for comparisons of pre- and post-intervention testing.

The questions to be investigated with this research study were: What are the given patient population's abilities to identify signs and symptoms of a stroke? What is the given patient population's knowledge of stroke risk factors? What is the patient population's risk for stroke? Does gender or age have an influence on these questions? Stroke risk was determined using the American Heart Association's stroke risk assessment tool.

Definition of Terms

Stroke risk factors- as outlined by the American Heart Association include modifiable (smoking, obesity, activity levels, control of diabetes, and hypertension) and non-modifiable (gender, age, and race) risk factors. Throughout this study reference to stroke risk factors refers to the modifiable risk factors.

Knowledge- (operational) knowledge was measured in this study via a questionnaire. A checklist format was used to show recognition of risks for a stroke and the signs and symptoms of stroke.

Knowledge- (conceptual) can be defined as "what one knows; the body of facts, etc. accumulated over time; fact of knowing; range of information or understanding; the act of knowing." (Webster, 1993).

Stroke risk knowledge- the amount of information or understanding that a patient has regarding the risk factors for a stroke.

Stroke risk- (operational) stroke risk was measured in this study via a questionnaire. Demographic and factual data was gathered utilizing the American Heart Associations stroke risk assessment tool. This tool weights the given answers in accordance to their effect on stroke risk.

Personal stroke risk- a person's risk for stroke based on how many stroke risk factors a person has.

Signs and symptoms of stroke- as identified by the American Heart Association include:

* sudden numbness or weakness on one side of the face or body,

*sudden confusion, trouble speaking or understanding

*sudden trouble seeing in one or both eyes

*sudden trouble walking, dizziness, loss of balance or coordination

*sudden, severe unexplained headaches

Stroke risk assessment tool- a mini questionnaire developed by the American Heart Association to help determine a person's risk for stroke.

CHAPTER 3

METHODS

Design

This research study used a nonexperimental descriptive correlational design. Independent variables were assessed utilizing a developed questionnaire. This study design is the appropriate choice because there is no manipulation or control of the variables. Data were gathered, then relationships among the variables were identified.

The challenge of interpreting correlational data is that, in the real world the many different variables can be interrelated in many, very convoluted ways. What may seem obvious on the surface may have many different causes on further inspection. Because of this, the conclusions of correlational research are not as strong, as other types of research designs, at predicting cause and effect relationships (Polit & Hungler, 1995).

Advantages to this type of research design, is that it is amenable to use in circumstances when an experimental design would not be ethical. Correlational research is an effective means for gathering large amounts of data in a given topic area. From this gathering of data, correlations can be made to assist in finding solutions to the given problem.

In a correlational design study, external validity needs to be addressed. The research results need to be applicable to an extended population. By gathering demographic data, as well as the data needed for the study, we will be able to compare the study group to the general population by using similar demographic data. The sample size and characteristics cannot be so narrow that they are not applicable to the general population. The Hawthorne effect is one threat to external validity. If a person answers the questionnaire in a certain way because they think they know what is expected of them, the data gathered is not a true reflection of the patient knowledge base. This can be avoided by not using leading questions.

An example of interaction of history and treatment effect in this research study would be if the gathering of information was done during "Stroke Awareness" month. The gathered data may reflect the new knowledge learned during the recent stroke education in the community and not offer a true reflection of the patient knowledge base. Data for this study was not gathered after recent stroke education events.

Also, the way that the data are gathered needs to be addressed. Data need to be gathered in the same manner as previous studies throughout all ensuing studies to decrease the chance that the results could vary. In this case, the American Heart Associations stroke risk tool was used to maintain a continuity of data gathering for comparison of current results to previous studies.

Sample and Setting

Data for this study were collected from a rural family practice clinic in north central lower Michigan. The population in this clinic was predominantly middle to low-income, Caucasian, men and women. Patients are cared for from the newborn period to death in this clinic.

The original intention was to distribute questionnaires to 25 men and 25 women within each age grouping. Due to fewer men willing to participate in the study, the questionnaires were distributed to willing participants regardless of gender. Ultimately, there were 31 male and 67 female respondents.

A convenience sample of 52 men or women between 25 and 50 years of age and 46 men or women between the ages of 51 to 75 were selected from the patients scheduled to be seen during the designated weeks of the data collection. The original goal was to have equal numbers of participants from each age grouping but after data collection it was discovered that the younger group had six more participants. The patients who were eligible for entrance into the study were offered the opportunity to participate. Prior history of stroke was a reason for exclusion from the study. It is felt that prior history of a stroke would bias patient answers, as theoretically they should have more stroke risk knowledge and awareness, because of their treatment for this condition.

The sample size of the studied population was 98. One hundred questionnaires were distributed with 98 returned. The demographics of this population are outlined in Table 1.

Table 1

Demographics of Rural Adult Population

Demographics		n	(%)
Gender			
	male	31	31
	female	67	68
Age			
	25-50 years	52	53
	51-75 years	46	47
Race			
	White	95	97
	Hispanic/Latino/a	2	2
	African American	1	1
Marital status			
	married	80	82
	divorced/separated	10	10
	widowed	5	5
	never married	3	3
Live Alone			
	no	90	92
	yes	8	8

Demographics of Adult Rural Population - continued

Family income			
	Under 10,000	5	5
	10,001-20,000	12	12
	20,001-30,000	22	22
	30,001-40,000	17	17
	40,001-50,000	11	11
	over 50,000	26	27
Perceived health status			
	excellent	8	8
	very good	20	20
	good	50	51
	fair	15	15
	poor	5	5
Education level			
	did not finish high school	15	15
	did finish high school	45	46
	some college	21	21
	2 year degree	10	10
	4 year degree	6	6
	masters or PhD	1	1
Work status			
	not working	15	15
	yes-working	65	66
	retired	17	17

Note. Ninety-eight (98) total questionnaires were returned providing this data.

Instrument

A questionnaire was developed to gather demographic data as well as pertinent medical history data (see appendix A). Incorporated into this questionnaire is the American Heart Associations "Stroke Risk Assessment Tool". According to George Hademenos (e-mail correspondence, August 2, 1999, appendix B), an American Heart Association representative, the "Stroke Risk Assessment Tool" was developed using data from the Framingham Heart study. This study was begun in the 1950s and spanned over 50 years. The validity and reliability of these data have been established by the many studies (Anderson, Odell, Wilson, & Kannel, 1991; Brand, Rosensman, Sholtz, & Friedman, 1976; Chambless, Dobson, Patterson, & Raines, 1990; Leaverton, et al., 1987; Levy, Wilson, Anderson, & Castelli 1990; Liao, McGee, Cooper & Sutkowski 1999) that have been done replicating the original findings from the Framingham Heart study.

Validity and reliability of the Framingham Risk Model

In the study by Liao, McGee, Cooper & Sutkowski, (1999), the conclusions state that the Framingham risk model for the prediction of coronary heart disease mortality rates provides a reasonable rank ordering of risk for individuals in the United States white population for the period of 1975 to 1990. This conclusion was reached by comparing the Framingham study with two more recent national studies, the First and Second National Health and Nutrition Examination Survey. The coronary heart disease risk in the newer studies was close to what was predicted from the Framingham study. This demonstrates validity of the Framingham Risk Model.

In the study by Leaverton et al., (1987), data from the First National Health and Nutrition Examination Survey were utilized and compared to the Framingham Study. The generalizability of the Framingham risk model was assessed. Validity was established when the authors found the Framingham Study to be very predictive of risk for the United States white population.

In a study done by Knuiman and Vu (1997) the stroke assessment tool was used along with two other instruments to analyze data gathered from Busselton, Australia. The findings demonstrated that the relative risk predictive scores for stroke were all very similar among the three instruments. It was concluded the Framingham assessment is useful in a white Australian population. This demonstrates that the tool can predict stroke in specific populations.

In an article from France on assessment of cardiovascular risk (Mahe and Bergmann, 2000) the authors state," the most widely used assessment method is the Framingham formula which integrates age, sex, blood pressure, smoking habits and presence or not of diabetes. This formula gives an objective, reproducible estimation of the cardiovascular risk and is a useful tool for therapeutic rationale and primary and secondary prevention."(p. 49) This observation implies validity of the Framingham stroke assessment tool by it being the most widely used assessment method for cardiovascular risk factors.

Reliability was not specifically addressed in regards to the Framingham stroke assessment tool. Since there is limited data specifically outlining reliability for the Framingham stroke risk assessment tool, *test/re-test reliability* studies were conducted with the new instrument, as outlined in the procedure section of this paper. Also, *content validity*

was obtained by establishing agreement from a panel of experts on their evaluations of the stroke risk assessment tool. The experts included five physicians who care for stroke patients and three nurse researchers. The collective agreement was that the tool would accurately measure patient stroke risk factor knowledge and their knowledge of signs and symptoms of a stroke (see Appendix D).

Stroke risk knowledge

Knowledge of signs or symptoms of a stroke and knowledge of risk factors for a stroke were measured from the instrument, adapted from the AHA Stroke Risk Assessment Tool. A total of 25 choices, with 14 correct answers interspersed among 11 wrong answers, was given to determine a persons ability to identify the correct answers.

Stroke risk

Actual patient risk for stroke was identified utilizing the American Heart Association's stroke risk assessment tool (appendix C). This tool gathers data and calculates risk from a weighted scale. The tool and scales were adapted from data from the Framingham study. Each risk factor is weighted according to its influence on potential stroke. The AHA Scientific Statement (Grundy et al., 1998) gives rational for the weighted scales. Hypertension was found to a powerful risk factor for stroke from the Framingham data. Hypertension is charted according to the degree of severity. Increasing blood pressure numbers carry a greater weight to correspond to the increase risk of a stroke with elevation of blood pressure. Gender differences were found in the Framingham data, and men's

hypertension scores are weighted heavier than those of women. This is due to larger physical size as well as because of men's gender being a risk factor heart disease and stroke (Grundy et al.,1998).

In a study reviewing the Framingham data, Wilson, (1998), found that diabetes carried an increased risk for cardiovascular disease. The risk of cardiovascular disease is typically increased twofold in diabetic men and threefold in diabetic women (p. 91). Because of these findings from the Framingham data, women with diabetes are weighted a three and men a two on the assessment tool.

Smoking of tobacco products has been found to be a significant risk factor for heart disease and stroke on the assessment scale, persons identified as smokers are weighted heavily as opposed to non-smokers. This is due to the overwhelming data demonstrating the adverse effects of smoking on cardiovascular health, as well as on multiple body systems (Grundy et al., 1998).

A prior history of cardiovascular disease (heart attack, chest pain, narrowed coronary blood vessels, narrowed arteries in the legs or congestive heart failure) is a risk factor for stroke that is weighted heavier in men. Women tend to have a 10-15 year lag behind men in their onset of cardiovascular disease (Grundy et al., 1998), therefore, male gender itself is a risk factor for cardiovascular disease. Because men have a higher cardiovascular disease risk already, a prior history of cardiovascular problems were weighted as a higher risk score in men than in women.

Atrial fibrillation is identified as being a very strong risk factor for stroke. Lin et al., (1996) conclude that ischemic stoke related to atrial fibrillation was nearly twice as likely to be fatal as non-atrial fibrillation stroke. Atrial fibrillation is associated with the release of emboli (blood clots) into the blood stream which can go to the brain resulting in stroke. Stroke is the primary presentation of embolism to the brain in atrial fibrillation. Because of this known result of atrial fibrillation, this category is weighted heavy on the stroke risk assessment tool.

Physical inactivity was found to be a significant risk factor for stroke in men. There were no statistical differences in stroke risk for women due to physical inactivity (AHA,1998). Therefore, in the scoring for the risk scale, men are given a score of one for inactivity, while women are not given additional scores. These data come directly from the American Heart Association, (1998). More recent data, from Hu, Stampfer, & Colditz (2000), demonstrated that increased physical activity correlated strongly with a lower risk for total stroke. All women should be encouraged to engage in physical activity. Unfortunately, for this study the stroke risk assessment tool does not recognize sedentary behavior in women as a risk.

Validity and reliability of instrument

To establish content validity for the proposed study, six physicians who care for stroke patients were asked to evaluate the appropriateness of the questions in the new instrument in relation to the subject matter. They were also asked to suggest additional areas that should be addressed. Five responses were received (appendix D). These suggestions were then used in the questionnaire.

Reliability analysis utilizing Kuder-Richardson 20 (KR20) demonstrated a coefficient of .66 for internal consistency of the stroke risk factor knowledge instrument. A coefficient of .63 was found for internal consistency of the signs and symptoms of stroke knowledge scale.

Procedure

After approval was obtained from the Grand Valley University Human Research Review Committee, a pilot study was conducted to determine the stability of the knowledge questionnaire. Thirty questionnaire packets were distributed to the investigator's co-workers, friends, and family members who were of similar backgrounds to the clients of the clinic where recruitment would occur for the formal study. A verbatim was used to recruit the pilot study participants (see Appendix E) either in person, or by mail. Packets included a letter explaining the study and a consent form (Appendices F and G), as well as a stamped envelope for returning the questionnaires to the investigator. Of the 30 participants invited to participate, 18 provided usable data. Participants completed the questionnaires twice, two weeks apart, and the data from each completion were compared using Pearson's correlation coefficient and t-tests for dependent samples.

Scores on the risk factor knowledge instrument for time 1 and time 2 were significantly correlated ($r = .56$, $p = .016$), but the strength of the correlation was not as great as anticipated. Therefore, a t-test for dependent samples was used to further explore the data. The scores for each time period were found to be significantly different ($t = -2.204$, $df = 17$, $p = .042$). Each individual's raw scores at time 1 and time 2 were

examined, and it was determined that every participant had increased their score at the second administration period, sometimes by as much as 50%. This suggests that the disparity in scores was because of actual efforts by the respondents to increase their knowledge of stroke risk prior to completing the assessment tool a second time. However, instability of the instrument cannot be ruled out.

The signs and symptoms scores obtained by the test-retest procedure were not found to differ significantly ($t = -.741$, $df = 17$, $p = .469$), and the correlation of the scores was stronger than that obtained for the risk factor items ($r = .64$, $p = .004$). However, as in the case of the risk factor items, participants' scores increased for the second testing period. This presents further evidence that the respondents made efforts to increase their knowledge before completing the questionnaire a second time. This is encouraging from the standpoint of indicating the respondent's motivation to learn about strokes. However, it leaves question as to whether the correlation obtained is a low estimation of the stability of the instrument, or an accurate measure of this characteristic.

After stability of the instrument was determined, subjects for the formal study were recruited when they presented to the Care Center for non-emergent/non-acute visits. The receptionist handed out the questionnaire packets to patients of the proper age range, who were interested in participating. In each room, there was a basket for packets and a sealed box with a slit in the top for a post card requesting study results (Appendix P). Once the packet envelope was sealed, completed questionnaires were placed

in this basket or handed to the office staff. Persons who choose not to participate were also instructed to place their unused packets in the baskets. If someone chose to take home the questionnaire, the receptionist provided them with a self addressed, stamped envelope to facilitate returning of the questionnaire. Questionnaire packets that were not used were checked for completeness and recycled back to the receptionist who continued distributing packets until they were all used.

The questionnaire packet included the questionnaire, a letter explaining the research study (appendix A and H), a consent form (appendix I) and an index card for identifying who has requested study results . The letter explaining the study also alerted participants to a packet of information from the American Heart Association (AHA) that was to be made available after all data were collected. The AHA informational packet outlines risk factors for stroke, signs and symptoms for stroke and helps the subject calculate their own risk for stroke (appendix J). This packet of information was made available in the waiting room area of the clinic for anyone to review after data collection was finished. Patients were able to call the office, unidentified, and ask any questions they may have had regarding the interpretation of the questions. Office staff members were directed to ask the researcher for clarification of the question. Staff members then relayed the information to the patient. The office staff were also trained to answer any questions that patients in the office may have had. Subjects were assured that if they chose not to participate it would not have any bearing on the care that they received at the clinic (verbatim instructions are given in appendix K).

There were not any potential hazards involved in the gathering of these data to the pilot study subjects or the research study subjects. Responses were anonymous and privacy was maintained by the lack of identifying features on the questionnaire. The questionnaire contained a code number for tracking of statistics only. The cost to the subject related to participation in this study was the time involved in answering the questions, which was estimated to take approximately 15 minutes. The benefits to the participants included learning about stroke signs and symptoms, the risk factors of a stroke and what their own personal risk for stroke is. This information was made available to the participants after all data were collected.

CHAPTER 4

DATA ANALYSIS

Statistical Techniques

The ability to identify risk factors for a stroke and the signs and symptoms of a stroke were evaluated utilizing descriptive analysis. The statistical program used was SPSS version 10 for microcomputers. Frequency distribution tables were used to generate Tables 2 & 3. Patients' knowledge of the risk factors for stroke was correlated, using *Pearson's r*, with their actual risk based on the American Heart Associations risk assessment tool. Age and gender influences on the calculated risk score was established by utilizing the *t-test* for equality of means

Research Questions

The questions to be investigated with this research study were: What were the given patient population's abilities to identify signs and symptoms of a stroke? What was the given patient population's knowledge of stroke risk factors? What was the patient population risk for stroke? Does sex or age have an influence on these questions?

The ability to identify signs and symptoms of a stroke are summarized in Table 2.

Slurred speech was the most identified sign at 78% and severe headache was the least often identified sign at 45%. The ability to identify risk factors for stroke are summarized in Table 3. The most identified risk factor was hypertension at 94%. The least often identified risk factor was alcohol abuse at 31%.

The significance of age on knowledge of risk factors was analyzed utilizing a *t-test.* Age was divided into two groups consisting of participants 25-50 years of age and 51-75 years of age. The results of the *t-test* demonstrated that there was no significant difference in the age groups in ability to identify signs and symptoms of a stroke or in the ability to identify risk factors for stroke. Additionally, there were no differences between genders in ability to identify signs and symptoms or risk factors of a stroke (see Table 4). AHA risk scores were significant between sexes with men at increased risk for a stroke (see Table 5). As expected, AHA risk scores were significantly greater in the older age group than in the younger age group (see Table 5).

Table 2

The Ability to Identify the Signs and Symptoms of a Stroke

Stroke Signs and Symptoms	n	(%)
weakness	65	66
severe headache	44	45
confusion	61	62
dizziness	59	60
slurred speech	77	78
numbness	64	65
visual changes	64	65
loss of coordination	65	66

Table 3

The Ability to Identify Risk Factors for Stroke

Stroke Risk Factors	n	(%)
diabetes	47	48
hypertension	92	94
obesity	59	60
inactivity	55	56
alcohol abuse	30	31
smoking	76	78
heart disease	56	57
elevated cholesterol	78	80

Table 4

Significance of Age and Gender on Knowledge of Signs and Symptoms of Stroke and Knowledge of Risk Factors for Stroke.

Group	M	SD
Age		
risk factor knowledge scores		
ages 25-50	4.94	2.12
ages 51-75	5.13	1.97
signs & symptoms knowledge scores		
ages 25-50	5.15	2.18
ages 51-75	5.02	2.08
Gender		
risk factor knowledge scores		
male	4.52	2.10
female	5.27	1.98
signs & symptoms knowledge scores		
male	4.58	2.03
female	5.33	2.09

Note. A total score of eight was possible for each category.

Table 5

American Heart Association Risk Scores for Age and Gender.

Group	M	SD	t	p
AGE				
ages 25-50	4.40	2.74	- 4.65	.00
ages 51-75	8.00	4.07		
Gender				
male	7.52	4.41	2.31	.02
female	5.43	3.41		

Note. Total range of scores 0- 11 or greater.

Patients' knowledge of the risk factors for a stroke were correlated, using *Pearson's r*, with their actual risk based on the American Heart Association's risk assessment tool. There was no relationship found (r = - .10; p = .38). Of the 98 questionnaires returned, only 79 of them were complete enough to determine the participants' actual stroke risk. According to the AHA Stroke Risk Assessment tool a score of 0-4 is low risk, a score of 5-10 is moderate risk and scores above 11 are considered high risk. The majority (57%) of the respondents fell in the moderate- to high risk range. Low risk comprised 43% of the sample.

Other Findings

Gender differences in ability to identify the individual signs and symptoms of a stroke were assessed. Eight signs and symptoms were intermingled with six distractors. Participants needed to identify which of the 14 listed symptoms were signs or symptoms of a stroke. Overall, the mean percentage of total responses was better from women than from men (men, M = 57%; women, M = 67%). The same format was used to assess gender differences in ability to identify the individual risk factors for a stroke. Again, women's total mean percentage of correct answers were better than that of the men (men, M = 56%; women, M = 66%) (see Table 6).

Table 6
Gender Differences in Identifying Signs and Symptoms of Stroke and Risk factors for stroke

	Male n (%)	Female n (%)
Signs and Symptoms		
weakness	24 (77%)	41 (61%)
severe headache	12 (39%)	32 (48%)
confusion	15 (49%)	46 (69%)
dizziness	19 (61%)	40 (60%)
slurred speech	21 (68%)	56 (84%)
numbness	16 (52%)	48 (72%)
visual changes	17 (55%)	47 (70%)
loss of coordination	18 (58%)	47 (70%)
Risk Factors		
diabetes	12 (39%)	35 (52%)
hypertension	28 (90%)	64 (94%)
obesity	14 (45%)	45 (67%)
inactivity	14 (45%)	41 (61%)
alcohol abuse	7 (23%)	23 (34%)
smoking	24 (77%)	52 (78%)
heart disease	19 (61%)	37 (55%)
elevated cholesterol	22 (71%)	56 (84%)

In this study participants were divided into two age groups consisting of 25-50 years of age and 51-75 years of age. Age group differences in selection of the individual signs and symptoms of a stroke were assessed, as well as the age group differences in ability to identify individual risk factors for a stroke (see Table 7).

There was no significant difference in the ability of the different age groups to identify the signs and symptoms of stroke (ages 25-50, M = 64%; ages 51-75, M = 63%). In the ability to identify risk factors for a stroke the younger age group scored slightly better than the older age group (ages 25-50, M = 62%; ages 51-75, M = 59%) but these findings were not statistically significant.

Table 7

Age Group Differences in Selection of Signs and Symptoms of Stroke and Risk Factors for Stroke

	Ages 25-50 n (%)	Ages 51-75 n (%)
Signs and Symptoms		
weakness	36 (69%)	29 (63%)
severe headache	20 (39%)	24 (52%)
confusion	34 (65%)	27 (59%)
dizziness	31 (60%)	28 (61%)
slurred speech	41 (79%)	36 (78%)
numbness	34 (65%)	30 (65%)
visual changes	36 (69%)	28 (61%)
loss of coordination	36 (69%)	29 (63%)
Risk Factors		
diabetes	26 (50%)	21 (46%)
hypertension	47 (90%)	45 (98%)
obesity	29 (56%)	30 (65%)
inactivity	28 (54%)	27 (59%)
alcohol abuse	15 (29%)	15 (33%)
smoking	41 (79%)	35 (76%)
heart disease	31 (60%)	25 (54%)
elevated cholesterol	40 (77%)	38 (82%)

CHAPTER 5

DISCUSSION

Discussion of Findings

According to the data gathered, this population could identify a sign or symptom of stroke on average 63% of the time, with slurred speech being identified by a total of 77 people (78%) and severe headache being identified less frequently by only 44 people (45%) (see Table 2). The ability to identify the risk factors for stroke ranged from a low of 30 people (31%) identifying alcohol abuse and a high of 92 people (94%) identifying hypertension (see Table 3). These results are very similar to findings of other studies. Pancioli et al.(1998) cited that only 57% of their sample could correctly identify a warning sign of stroke. Kothari et al. (1997) stated that up to 27% of the adult population did not know a sign or symptom of a stroke and up to 25% did not know a single risk factor for stroke. Kattapong et al. (1998) stated that 97% identified hypertension as a stroke risk factor while diabetes mellitus, was only identified by 63%.

In the current study, these data were hard to compare to other studies because of the way the signs and symptoms and risk factors were distinguished. From a list of 14 topics the 8 signs and symptoms were to be identified. This same format was used for

identification of risk factors for stroke. In contrast, Panicioli et al. (1998) presented five actual signs and symptoms of stroke to study participants to assess how many could be identified while Kothari et al. (1997) asked people who presented to an emergency room with stroke symptoms if they could identify any signs, symptoms or risk factors for stroke. Samsa et al. (1997) assessed awareness of stroke risk in patients who were at increased risk for stroke via in-person interviews and phone interviews. Kattapong et al. (1998) assessed stroke risk factor knowledge in women in New Mexico. It was found there that spontaneous reporting of risk factors for stroke was poor but participants did much better when given a list to choose from. The current study, as well as these studies, obtained similar end results even though the methods of obtaining the data were different.

In this study, gender and age were not significant in relation to being able to identify stroke risk factors or knowledge of stroke signs and symptoms. Only one study reviewed (Pancioli et al., 1998) found gender to be significant. But these findings did not hold up in the other studies reviewed (Ayanian & Cleary, 1999; Kattapong, et al., 1998; Kothari et al., 1997; Samsa et al., 1997). Framingham data (Grundy et al., 1998) demonstrated that men are at higher risk for stroke than women. Unfortunately, in this population the men had the least knowledge regarding strokes. Even though the older age group is at higher risk they are the least knowledgeable about stroke. This was demonstrated in studies done by Kothari et al. (1997), and Samsa et al. (1997) . These prior studies revealed that the older participants were the least knowledgeable about stroke risk factors. This reveals that current education regarding stroke is not adequate.

Many studies are available that have reviewed the gender differences in health behaviors. Different theories are being evaluated to try to determine why men have less health knowledge than women. "Men in the United States suffer more severe chronic conditions, have higher death rates for all 15 leading causes of death, and die nearly 7 years younger than women. Health related beliefs and behaviors are important contributors to these differences." (Courtenay, 2000). Courtenay, (2000) proposes a relational theory of men's health from a social constructionist and feminist perspective. The theories of planned behavior and self regulation were utilized by Taylor, Bagozzi and Gaither, (2001) to understand gender differences in management of hypertension. The study results confirmed that there were differences in perceived health maintenance between the genders. The need to address gender differences in health perceptions of heart disease was underscored in a study done by Evangelist, Kagawa_Singer, & Dracup, (2001). The results of the study demonstrated that women had a better understanding of their health risks than men did and that they also demonstrated better psychosocial adjustment to illness. The authors stress the need for gender specific teaching and counseling in patients with heart disease to improve patient outcomes. There is a need for further research in this area.

This study examined the knowledge of risk factors for stroke and the knowledge of the signs and symptoms of stroke in a rural population. This knowledge base was correlated with the actual risk for stroke. No significant correlation was found between ability to identify signs and symptoms of a stroke with the actual stroke risk. Also, there was no statistically significant correlation between ability to identify stroke risk factors

with the actual stroke risk. None of the studies reviewed prior to the current study specifically compared knowledge of stroke risk factors with the actual risk for stroke. The current study is felt to be a unique contribution to the area of research studying public awareness of stroke.

Even though there was no positive or negative correlation with ability to identify signs and symptoms of stroke or the ability to identify the risk factors for stroke, the given population is at risk for stroke. Fifty eight percent (58%) of the sample were either at moderate risk (n = 45) or high risk (n = 13) according to the AHA stroke risk assessment tool. Interestingly, the sample population rated themselves to be very healthy. Seventy eight participants (79%) felt that their health status was good to excellent. This discrepancy indicates that client perception of health status does not reflect on the actual number who are at risk for stroke. These findings are comparable to findings of Samsa et al. (1997) in that patients who believe they are in good health may underestimate their risk for stroke. This reinforces the need for better patient education programs to increase public awareness of personal risk for this health problem. The existing educational programs need to be evaluated and refined so as to address these identified discrepant areas.

Fit of Framework

The Health Promotion Model (HPM) provided the framework for this study (Pender, 1996). The HPM is a framework developed to assist in the exploring of the correlation between variables involved in the performance of health promoting behaviors. The HPM (see Figure 1) identifies 10 categories of variables that can be influencing

factors on health promoting behaviors. In this research study, information was gathered on patient knowledge of their risk for stroke, as well as their awareness of the signs and symptoms of a stroke (personal factors in the HPM). Other data gathered included demographic data, family history of strokes, personal history of stroke and other personal health data, such as history of, or currently being a smoker, hypertension, cardiac disease, and physical activity levels. In the reported study, the variables represent the HPM concepts of personal factors and prior related behaviors.

Behavior cognitions and affect are a group of variables within the HPM that are extremely influential to a person engaging in health promoting behaviors. These variables consist of perceived benefits of action, perceived barriers to action, perceived self-efficacy, activity related affect, interpersonal influences and situational influences. These areas also need to be assessed in order for an intervention to be successful. If a person does not perceive a need for change or perceives barriers to making a change, then an educational program will not be successful. Interpersonal as well as situational influences also need to be assessed before developing an intervention.

The framework to this study, provided by the HPM, then illustrates possible ways to intervene to increase health promoting behaviors that can reduce the risk of a stroke. The first step in developing any intervention is to gather data and to assess the patient's knowledge base. Then appropriate interventions can be developed accordingly.

This study used a descriptive, non-experimental design to gather self-reported data within the framework of the HPM. In future work the data can be utilized to develop an education program designed to address the specific areas of knowledge deficits.

Limitations

This study had several limitations. First, since no standardized stroke risk factor knowledge assessment tool exists, there are issues related to validity of the questionnaire. Second, as this sample population was predominately Caucasian the results of this study may not be applicable to a more diverse population. Mahady (1998) reports that according to the AHA, black males are 94% more likely to die of stroke than their white counterparts. It would be important in a different ethnic population to target specific knowledge deficits influenced by ethnicity. Third, because the data were self-reported, the answers are subject to recall bias and over-reporting or under-reporting of behaviors and existing disease. Fourth, this was a small sample size. There was a predominance of women so these findings may not be applicable to a larger population with more men in it. Grundy et al. (1998) refer to the Framingham data as demonstrating that women lag behind men 10-15 years in onset of heart disease. This makes men at higher risk for stroke. In the study of a population with more men the results may reflect this higher risk as indicated by an increased number of AHA risk scores in the elevated ranges.

Implications

Areas for future research include identifying why people don't accurately estimate their own risk for stroke. An education model needs to be developed to educate the public to increase awareness of stroke risk factors, signs and symptoms of stroke as well as help people better determine and be aware of their own risk for stroke.

The Advanced Practice Nurse (APN) is in a key position to be able to educate patients about their risk for stroke. The APN can identify and educate specifically to the

given patients identified risks for stroke. In patients not yet at risk, the APN can stress a preventive lifestyle. Nursing education can include teaching nurses how to identify stroke risk in their patients. Even nurses without advanced training can be taught to recognize and educate their patients in regards to stroke risk and to encourage a more healthy lifestyle.

Conclusion

Overall, this study demonstrated gaps in patient knowledge regarding stroke risk factors and the signs and symptoms of stroke. Even though no relationship was found between stroke risk knowledge and the actual stroke risk, as identified by the AHA stroke risk assessment tool, there is a definite need for education of this population in regards to their personal risk for stroke.

This study's results were fairly consistent with other studies that looked at patient knowledge of stroke risk factors and knowledge of signs and symptoms of a stroke and found that knowledge is poor among the lay public. This study's results demonstrated that people tend to underestimate their own actual risk for stroke. This, also, is consistent with other studies reviewed.

APPENDICES

APPENDIX A

Questionnaire

APPENDIX A

Questionnaire

STROKE KNOWLEDGE

ID# _ _ _ DATE_____

Please answer the following questions by checking the correct box.

1. What is your age in years?

- ❑ 25-50
- ❑ 51-75

2. What is your marital status?

- ❑ married
- ❑ divorced/separated
- ❑ widowed
- ❑ never married

3. Do you live alone?

- ❑ yes
- ❑ no

Who lives with you? _____

4. What is your gender?

- ❑ Male
- ❑ Female

5. What is your race?

- ❑ White
- ❑ Hispanic/Latino/Latina
- ❑ African American
- ❑ Asian
- ❑ Other

6. What is your highest level of education?

- ❑ did not finish high school
- ❑ did finish high school
- ❑ some college
- ❑ 2 year degree at Community College
- ❑ 4 year degree at an University
- ❑ masters or PhD

7. Are you employed?

- ❑ yes
- ❑ no
- ❑ retired

8. What is your household income?

- ❑ under 10,000
- ❑ 10,001-20,000
- ❑ 20,001-30,000
- ❑ 30,001-40,000
- ❑ 40,001-50,000
- ❑ over 50,000

9. How do feel your health is?

- ❑ excellent
- ❑ very good
- ❑ good
- ❑ fair
- ❑ poor

10. Who in your family has had a stroke?
(Check all that apply).

- ❑ mother
- ❑ father
- ❑ sister
- ❑ brother
- ❑ aunt
- ❑ uncle
- ❑ grandmother
- ❑ grandfather
- ❑ other- who _____

11. Which of the following ailments are ***signs or symptoms*** of a stroke?

- ❑ weakness
- ❑ severe headache
- ❑ confusion
- ❑ dizziness
- ❑ sweating
- ❑ slurred speech
- ❑ infection
- ❑ vomiting
- ❑ numbness
- ❑ fatigue
- ❑ fainting
- ❑ body aches
- ❑ visual changes (blurry, or blindness)
- ❑ loss of coordination or balance

12. Which of the following health problems or habits are ***risks*** for a stroke?

- ❑ diabetes
- ❑ high blood pressure
- ❑ smoking
- ❑ cancer
- ❑ broken bones
- ❑ heart disease
- ❑ lung disease
- ❑ high cholesterol
- ❑ obesity
- ❑ inactivity
- ❑ thyroid disease
- ❑ alcoholism
- ❑ skin disease
- ❑ alzheimer's

13. How tall are you? _____
    What is your weight? _____

14. Have you ever had a stroke?

- ❑ yes
- ❑ no

15. Have you ever had a TIA (transient ischemic attack) or mini-stroke?

- ❑ no
- ❑ yes

16. Have you ever taken a blood thinner medication?

- ❑ no
- ❑ yes
- ❑ currently

17. Your blood pressure reading had two numbers. For example 120/80. The number 120 is the highest number. It is called the systolic blood pressure.

Do you take blood pressure medication?

❑ no

❑ yes

Circle the (highest) number from your most recent blood pressure measurement

Use these numbers if you do <u>not</u> take blood pressure medication.

❑ NO Medication	97-105.....(0)
	106-115.....(1)
	116-125.....(2)
	117-135.....(3)
	136-145.....(4)
	146-155.....(5)
	156-165.....(6)
	166-175.....(7)
	176-185.....(8)
	186-195.....(9)
	196-205.....(10)

Use these numbers if you <u>do</u> take blood pressure medication.

❑ YES Medication	97-105.....(0)
	106-112.....(1)
	113-117.....(2)
	118-123.....(3)
	124-129.....(4)
	130-135.....(5)
	136-142.....(6)
	143-150.....(7)
	151-161.....(8)
	162-176.....(9)
	177-205.....(10)

Check the statements that are true for you-

18. Diabetes...

- ❑ I ***do*** have a history of diabetes (0)(0)
- ❑ I ***do not*** have a history of diabetes (2)(3)

19. Cigarette smoking...

- ❑ I ***do not*** smoke (0)(0)
- ❑ I ***do*** smoke (3)(3)

20. Do you use other tobacco products?

- ❑ cigars
- ❑ chewing tobacco (snuff)

21. Did you ever smoke?

- ❑ yes
- ❑ no
- ❑ how long?_____
- ❑ how much?_____

22. Cardiovascular disease...

- ❑ I ***have never*** had the problems listed below (0)(0)
- ❑ I ***do have*** a history other than stroke of coronary or cardiovascular disease (listed below) :
  - heart attack,
  - chest pain,
  - narrowed coronary blood vessels,
  - narrowed arteries in the legs,
  - congestive heart failure (4)(2)

23. Atrial fibrillation...

(a specific kind of rapid, irregular heartbeat)
❑ I ***do not*** have a history of atrial fibrillation (0)(0)
❑ I ***do*** have a history of atrial fibrillation (4)(5)

24. Physical activity...

❑I do live an ***active*** life (0)(0)
❑I am ***inactive*** (my job requires me to sit at a desk most of the day and I spend much of my leisure time in sitting activities [watching TV, reading, etc.]).(1)(0)

APPENDIX B

E-mail correspondence from AHA

APPENDIX B

E-MAIL correspondence from AHA

Greg & Julie Billett

From: George Hademenos <GeorgeH@heart.org>
To: <bubba@pathwaynet.com>
Sent: Monday, August 02, 1999 3:00 PM
Subject: Response to inquiry

Thanks for your message. I am not sure if and what steps were done regarding the validity studies of the Risk Assessment Tool. The tool was developed based on data from the Framingham Study. I might suggest that you perfrom a MedLine search to see if any publiished papers exist regarding this tool.

Dr. George Hademenos

APPENDIX C

AHA stroke risk tool

APPENDIX C

AHA stroke risk tool

How To Find Out

Every year about 500,000 Americans suffer a stroke. About 150,000 of them die. In fact, stroke — also known as brain attack — is the third leading cause of death in the United States. It's also the No. 1 cause of serious long-term disability. Are you at risk? Take this quiz to find out!

Instructions: Mark the appropriate point value in each category. Then total your points and find your risk level in the "Scoring" section.

MEN

1. Systolic Blood Pressure

The first (highest) number from your most recent blood pressure measurement

			Points	Scoring
If you...	are not taking blood pressure lowering medications and your systolic blood pressure is:	97–105	0	
		106–115	1	
		116–125	2	
		126–135	3	
		136–145	4	
		146–155	5	
		156–165	6	
		166–175	7	
		176–185	8	
		186–195	9	
		196–205	10	
	are taking blood pressure lowering medications and your systolic blood pressure is:	97–105	0	
		106–112	1	
		113–117	2	
		118–123	3	
		124–129	4	
		130–135	5	
		136–142	6	
		143–150	7	
		151–161	8	
		162–176	9	
		177–205	10	

2. Diabetes

If you...	do not have a history of diabetes	0	
	have a history of diabetes	2	

3. Cigarette Smoking

If you...	do not smoke	0	
	smoke	3	

4. Cardiovascular Disease

If you...	have never had any of the problems listed below	0	
	have a history of coronary or cardiovascular disease (heart attack, chest pain, narrowed coronary blood vessels, narrowed arteries in the legs or congestive heart failure) other than stroke	4	

5. Atrial Fibrillation

A specific type of rapid, irregular heartbeat

If you...	do not have a history of atrial fibrillation	0	
	do have a history of atrial fibrillation	4	

6. Physical Activity

If you...	live an active life	0	
	are inactive (your job requires you to sit at a desk most of the day and you spend much of your leisure time in sitting activities [watching TV, reading, etc.])	1	

TOTAL SCORE

WOMEN

1. Systolic Blood Pressure

The first (highest) number from your most recent blood pressure measurement

			Points	SCORE
If you...	are **not** taking blood pressure lowering medications and your systolic blood pressure is:	85–94	0	
		95–106	1	
		107–118	2	
		119–130	3	
		131–143	4	
		144–155	5	
		156–167	6	
		168–180	7	
		181–192	8	
		193–204	9	
		205–216	10	
	are taking blood pressure lowering medications and your systolic blood pressure is:	85–94	0	
		95–106	1	
		107–113	2	
		114–119	3	
		120–125	4	
		126–131	5	
		132–139	6	
		140–148	7	
		149–160	8	
		161–204	9	
		205–216	10	

2. Diabetes

If you...	do not have a history of diabetes	0
	have a history of diabetes	3

3. Cigarette Smoking

If you...	do not smoke	0
	smoke	3

4. Cardiovascular Disease

If you...	have never had any of the problems listed below	0
	have a history of coronary or cardiovascular disease (heart attack, chest pain, narrowed coronary blood vessels, narrowed arteries in the legs or congestive heart failure) other than stroke	2

5. Atrial Fibrillation

A specific type of rapid, irregular heartbeat

If you...	do not have a history of atrial fibrillation	0
	do have a history of atrial fibrillation	5

Note: In the Framingham Heart Study, risk reduction for stroke associated with physical activity is not statistically significant for women.

TOTAL SCORE

Stroke Connection Information & Referral 1-800-553-6321

Scoring

Add your answers for each question to get your total score.

If your total score is:	*Your stroke risk is:*
0 to 4	Low
5 to 10	Moderate
11 or more	High

Your score is just an estimate of your possible risk. A high score doesn't mean you'll surely have a brain attack, and a low score doesn't mean you're completely safe.

Check your individual category scores to see which factors are increasing your risk of stroke the most. Then read the next three pages and make changes to develop a more healthful lifestyle.

The American Heart Association gratefully acknowledges the help of the Framingham Heart Study in developing this risk assessment.

APPENDIX D

Feedback from physicians caring for stroke patients

APPENDIX D

Feedback from physicians caring for stroke patients

Julie Billett, NP
545 N. State Street
P.O. Box 638
Stanton, MI 48888
Phone 517-831-6301
Fax 517-831-4308
Email CFC@PATHWAYNET.COM

January 13, 2000

Dr. Wakefield
Stanton Family Care Center

Dear Chuck,

I am currently working on completing my master's thesis. The topic of this research study is to assess patient knowledge of stroke risk, stroke signs and symptoms and the patients awareness of their own personal risk for stroke. Part of this project involves a questionnaire that I intend to use to gather data. I am asking for your help in validating the questionnaire.

In your opinion, do the questions adequately reflect current knowledge on stroke signs and symptoms, and the risks for stroke?

YES NO

Are there other questions that might be included to achieve a more thorough topic coverage?

Weight ? Planning on Stuff

Blood Thinners ? Have they ever been on Them

Thank you for your assistance in this matter. Please return this page in the enclosed envelope.

Sincerely,

Julie Billett, NP

Julie Billett, NP
545 N. State Street
P O Box 633
Stanton, MI 48888
Phone 517-831-8301
Fax 517-831-4306
Email CFC@PATHWAYNET.COM

January 13, 2000

Dr Summitt
Cardiology

Dear Dr Summitt,

I am a Nurse Practitioner working for the Carson Health Network. I am in practice with Dr. Wakefield. I am currently working on completing my master's thesis. The topic of this research study is to assess patient knowledge of stroke risk, stroke signs and symptoms and the patients awareness of their own personal risk for stroke. Part of this project involves a questionnaire that I intend to use to gather data. I am asking for your help in validating the questionnaire.

In your opinion, do the questions adequately reflect current knowledge on stroke signs and symptoms and the risks for stroke?

(YES) NO

But should include vision change (ie Amaurosis fugax) on #11, monocular blindness hemianopsia etc.

Are there other questions that might be included to achieve a more thorough topic coverage?

Thank you for your assistance in this matter. Please return this page in the enclosed envelope.

Sincerely,

Julie Billett, NP

Julie Billett, NP
545 N. State Street
P.O. Box 638
Stanton, MI 48888
Phone 517-831-8301
Fax 517-831-4305
Email CFC@PATHWAYNET.COM

January 13, 2000

Dr. Sears
Internal Medicine

Dear Rob,

I am currently working on completing my master's thesis. The topic of this research study is to assess patient knowledge of stroke risk, stroke signs and symptoms and the patients awareness of their own personal risk for stroke. Part of this project involves a questionnaire that I intend to use to gather data. I am asking for your help in validating the questionnaire.

In your opinion, do the questions adequately reflect current knowledge on stroke signs and symptoms and the risks for stroke?

YES NO

Are there other questions that might be included to achieve a more thorough topic coverage?

May want to think about adding TIA "mini stroke" to question #14

Question #20 technically could bias your findings as risk is normalized on your data

Call if I can help

Thank you for your assistance in this matter. Please return this page in the enclosed envelope.

Sincerely,

[redacted]

Julie Billett, NP

Julie Billett, NP
545 N. State Street
P.O. Box 539
Stanton, MI 48888
Phone 517-831-8301
Fax 517-831-4306
Email CFC@PATHWAYNET.COM

January 13, 2000

Dr. Morris
Ashley/Elsie Clinics

Dear Roger,

I am currently working on completing my master's thesis. The topic of this research study is to assess patient knowledge of stroke risk, stroke signs and symptoms and the patients awareness of their own personal risk for stroke. Part of this project involves a questionnaire that I intend to use to gather data. I am asking for your help in validating the questionnaire.

In your opinion, do the questions adequately reflect current knowledge on stroke signs and symptoms, and the risks for stroke?

YES NO

Are there other questions that might be included to achieve a more thorough topic coverage?

Thank you for your assistance in this matter. Please return this page in the enclosed envelope.

Sincerely,

[redacted]

Julie Billett, NP

APPENDIX E

Verbatim instructions for preliminary sampling

APPENDIX E

Verbatim instructions for preliminary sampling.

Thirty tests will be distributed to friends, family and co-workers of J. Billett. I will explain " This test is the tool I will use to gather the data that is needed in my research study. I need to have it tested first by people who are not in the research study. This will help to determine if this questionnaire is truly measuring what it is supposed to". I will say "This test will need to be taken two times. Once today and again two weeks after the first test". I will explain " Taking this test two times will help to establish stability of the testing instrument. This means that we will be able to tell if the instrument is measuring what it is supposed to".

The test will be either hand delivered or mailed. Mailed tests will have included, a self-addressed stamped envelope to facilitate returning of the testing material. Included, also, with the test will be a consent form, a letter explaining the nature of the study and phone numbers of J. Billett and the GVSU representative so that any potential questions or problems can be addressed.

APPENDIX F

Pilot study explanation letter

APPENDIX F

Pilot study explanation letter

ID # _ _ _

Julie Billett, NP
545 N. State St.
P.O. Box 638
Stanton, MI 48888

Dear participant,

I am working on my thesis for my Master's degree in Nursing. This questionnaire is part of my research study for my thesis. When I am finished with the study I will have useful information on how we can lower the number of strokes in our community.

This pilot study is designed to test the accuracy of the questionnaire to test stroke knowledge. The test will be taken a total of two times, once today and again in two weeks. This is part of Test-Retest reliability. Test-Retest reliability is a statistical measure for accuracy and reliability of questionnaires.

This information will be gathered with complete confidentiality. This means that I will not discuss these results with anyone outside of the university, and will

keep your identity secret. You will never be identified by name when data from the study are reported for my thesis or professional publications.

Participation in this pilot study is completely voluntary. Your relationship with Julie Billett, graduate student will not be affected by whether or not you choose to participate in this research study.

Thank you for your help,

Julie Billett, NP

(517) 831-8301

Professor Paul Huizenga

(616) 895-2472

Chair of Human Research

Grand Valley State University

APPENDIX G

Pilot consent form

APPENDIX G

Pilot study consent form

Stroke Knowledge

I understand that the following questionnaire is pilot study for a research project investigating the awareness of stroke risk factors and of the signs and symptoms of a stroke. This pilot study will help to determine the reliability of this questionnaire. I understand that I will be asked to retake this test in two weeks.

I also understand that:

1. My answers will be kept confidential.
2. I have been selected to fill out this questionnaire based on being an acquaintance of Julie Billett, graduate student.
3. I will be given material from the American Heart Association after filling out the second questionnaire to help me identify my own awareness of stroke.
4. A summary of all results will be made available on request.
5. No individual information will ever be made public.

I agree that:

I have been given an opportunity to ask questions about this pilot study and they have been answered.

At any time during filling out this questionnaire I may decide to quit and not be involved in this pilot study.

If I quit this study it will not effect the relationship with Julie Billett, graduate student.

I have been given phone numbers of the researcher and the Grand Valley State Chair of Human Research.

I have read and understand the above information, and I agree to participate in this pilot study.

Signature:_____Date:_____

APPENDIX H

Formal study explanation letter

APPENDIX H

Formal study explanation letter

Julie Billett, NP
545 N. State St.
P.O. Box 638
Stanton, MI 48888

Dear participant,

I am working on my thesis for my Master's degree in Nursing. This questionnaire is part of my research study for my thesis. When I am finished with the study I will have useful information on how we can lower the number of strokes in our community.

This research study is designed to gather information on stroke knowledge. Specifically, awareness of stroke signs and symptoms, stroke risk factors and knowledge of personal risk for stroke. You are being asked to complete this questionnaire during your visit to the clinic today and to deposit your finished survey in the baskets I have provided in the exam rooms or at the front counter, for this purpose.

This information will be gathered with complete anonymity. This means that I will not know who did or did not fill out a questionnaire. You will never be identified by name when data from the study are reported for my thesis or professional publications.

Participation in this pilot study is completely voluntary. Your relationship with Julie Billett, graduate student will not be affected by whether or not you choose to participate in this research study.

Any questions that you have about this study can be asked of Julie Billett, graduate student or the staff of the Stanton Family Care Center. Any questions that you may have about your rights as a research participant that have not been answered by Julie Billett, graduate student, may be answered by contacting the Grand Valley State University, Human Subjects Review Committee Chair. (Phone numbers provided below)

Thank you for your help,

Julie Billett, NP

(517) 831-8301

Professor Paul Huizenga

(616) 895-2472

Chair of Human Research

Grand Valley State University

APPENDIX I

Formal study consent form

APPENDIX I

Formal study explanation letter

Stroke Knowledge

I understand that the following questionnaire is part of a research project studying the awareness of stroke risk factors and of the signs and symptoms of a stroke. The information gathered from this study may help health providers plan an educational program for stroke prevention.

I also understand that:

1. My answers will be anonymous.
2. I have been randomly selected to fill out this questionnaire.
3. I will be given material from the American Heart Association after filling out this questionnaire to help me identify my own awareness of stroke.
4. A summary of all results will be made available on request.
5. No individual information will ever be made public.
6. If I participated in the pilot study I may not participate in this research study.
7. If I have a prior history of stroke I will not be eligible to participate.

I agree that:

I have been given an opportunity to ask questions about this research study and they have been answered.

At any time during filling out this questionnaire I may decide to quit and not be involved in this research study.

If I quit this study it will not affect the care that I receive at this clinic.

I have been given phone numbers of the researcher and the Grand Valley State Chair of Human Research.

I have read and understand the above information, and that I agree to participate in this study.

Signature:_____ Date:_____

Please, keep this consent form after signing it. By turning in your completed questionnaire without this form you are giving me your consent anonymously.

APPENDIX J

Patient information from AHA

APPENDIX J

Patient information from AHA

Stroke Is a Medical Emergency— Call 911!

American Stroke Association.
A Division of American Heart Association

WHAT EVERYONE SHOULD KNOW ABOUT STROKE

A stroke – also called a brain attack – occurs when a blood vessel carrying oxygen to the brain ruptures or is blocked by a blood clot.

Stroke can strike anyone. . .
- About 600,000 Americans a year suffer a stroke.
- Stroke strikes someone every 53 seconds... and kills someone every 3 3 minutes.
- In one study, 28% of stroke victims were under age 65.

. . .but the elderly and African Americans are at greatest risk.
- Stroke risk more than doubles in each decade after age 55.
- Blacks have a 2-3 times greater risk of stroke caused by a blood clot, and they are 2.5 times more likely to die of stroke.

Stroke is #3 killer in America.
- Stroke killed nearly 160,000 Americans in 1996.
- 31% of people who have their first stroke die within a year.
- Stroke kills more women than men.

Stroke is a leading cause of serious disability in the U.S.
- About 4 million stroke survivors are alive today.
- Stroke survivors often need assistance after they leave the hospital. In one study, 31% needed help caring for themselves, 20% needed help walking and 71% had an impaired ability to work an average of seven years later.

Stroke – like heart attack —is a medical emergency. Call 911.
- Learn the warning signs and get help immediately if any warning signs occur.

A stroke is not a hopeless situation.
- Treatment and rehabilitation can help stroke survivors and their families recover and cope.

Call the AHA Stroke "Warmline"
at 1-800-553-6321
for information on stroke prevention and recovery.

American Stroke Association
A Division of American Heart Association

WHAT EVERYONE SHOULD KNOW ABOUT STROKE

A stroke – also called a brain attack – occurs when a blood vessel bringing oxygen to the brain ruptures or is blocked

- **Stroke can strike anyone, but the elderly and African Americans are at greatest risk.**
  - It strikes someone in the U.S. every 53 seconds and kills someone every 3.3 minutes.
  - Stroke risk doubles in each decade after age 55.
  - Blacks are 2.5 times more likely to die of stroke.
- **Stroke is #3 killer in America.** Nearly a third of first-time stroke victims die within a year.
- **Stroke is a leading cause of serious disability.** About 4 million stroke survivors are alive today but many need assistance with daily living activities.
- **Stroke is a medical emergency -- call 911.** Learn the warning signs and get help immediately if any occur.
- **Stroke is not a hopeless situation.** Treatment and rehabilitation can help many survivors and their families recover and cope.

Remember the 3 R's of Stroke:

- **Reduce** Your Risk.
- **Recognize** the Warning Signs.
- **Respond** Immediately -- Call 911

(over)

American Stroke Association
A Division of American Heart Association

WHAT EVERYONE SHOULD KNOW ABOUT STROKE

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(over)

APPENDIX K

Verbatim instructions for testing procedure

APPENDIX K

Verbatim instructions for testing procedure

Site: Stanton Family Care Center

Description: A family practice clinic with two health care providers serving a range of patients. The predominant race is white. The family income levels are classed as predominantly middle to low income with some families at either end of the spectrum of income. Health care is provided from birth through death.

Time: A two week period in the fall of 2000.

Sample: 25 men and 25 women between the ages of 25-50.
25 men and 25 women between the ages of 51-75.

Contained in a large envelope will be the questionnaire, consent form, and letter explaining the study. These packets will be kept at the receptionists work area. They will be coded on the exterior with M2539, F2539, M4075, and F4075. This will designate the gender and age groupings. The receptionist will hand the packets to the appropriately aged men and women. Receptionist will say " This a packet of information on the research study that J. Billett our Nurse practitioner is doing to complete her Master's degree. Please, look it over and decide if you like to be involved in this project. It involves filling out a short questionnaire. If you decide not to participate you can place the packet in the designated basket in the exam rooms. If you do decide to participate you can seal the envelope after filling out the questionnaire and leave it in the basket in the exam room or you can hand it to any staff member. Also, you may take it home with you and I will provide you with a self-addressed stamped envelope so that you can mail it back to us. Any of the staff will be able to help you fill out the questionnaire if needed"

The receptionist will be instructed not to hand out packets to acutely ill patients who will not want to be bothered with anything other than feeling better. Also, patients with known history of previous stroke will not be included. The office manager, clinical and clerical staff will also, be able to hand out the packets if they are at the front window.

All staff will be inserviced in the use of the questionnaire. The consent form, and letter explaining the study will be reviewed. Each question will be reviewed to ensure that everyone understands the question and the answers. Staff will understand that if patients choose not to participate it will not reflect on the care that they receive in the clinic. Staff will understand that if they can't answer a patients question they can go to J. Billett at any time to get the answer.

Clinical staff will return the unused packets to the receptionist hourly. The packets will be checked for completeness before being returned to the stack of unused packets. If any part of the packet is missing or damaged it can be replaced with the extra material that will be laid out on the extra desk in J. Billett's office.

Completed packets will be placed in a box in J. Billett's office marked "completed packets". If the number of required questionnaires are not completed in a two week time frame the data gathering period will be extended.

APPENDIX L

Correspondence with Carson City Hospital

APPENDIX L

Correspondence with Carson City Hospitals

Julie Billett

I apologize for the delay. The Board of Directors was made aware of your project, and expressed no objections.

[redacted]

12/21/98

APPENDIX M

Permission from Nola Pender

APPENDIX M

Permission from Nola Pender

THE UNIVERSITY OF MICHIGAN
SCHOOL OF
NURSING

March 2, 1999

Julie Billett, RNC, NP
100 S. Camburn
P.O. Box 638
Stanton, MI 48884

Dear Julie:

You have my permission to use the Health Promotion Model in your thesis. Thank you for your interest in my work and good luck with your research.

Cordially,

[redacted]

Nola J. Pender, PhD, RN, FAAN
Associate Dean for Research

UMCNR
CENTER FOR NURSING RESEARCH
400 North Ingalls Bldg. • Ann Arbor, Michigan 48109-0482

APPENDIX N

Permission from Appleton & Lange

APPENDIX N

Permission from Appleton & Lange

9/9/99

To Whom it may concern,

I am currently writing my master's thesis utilizing Nola Pender's Health Promotion Model as the theoretical framework. Appleton and Lange is the publisher for the book titled "Health Promotion in Nursing Practice". Copyright 1996.

I am requesting permission to use a copy of the diagram of the Health Promotion Model. This is figure 3.1 on page 52.

Thank you,

[redacted]

Julie Billett, RN, BSN, NP, MSNc.
545 N. State St.
PO Box 638
Stanton, MI 48888
517/831-8301

October 14, 1999
Permission granted to include this material in your thesis.

[redacted]

Michelle Johnson
Permissions Editor
Prentice Hall

APPENDIX O

Permission from American Heart Association

APPENDIX O

Permission from American Heart Association

American Heart Association
Fighting Heart Disease and Stroke

National Center
7272 Greenville Avenue
Dallas, Texas 75231-4596
Tel 214 373 6300
http://www.americanheart.org

May 14, 1998

Julie Billett, N.P.
100 S. Camburn, P. O. 638
Stanton, MI 48888

Dear Ms. Billett:

We have received your letter requesting permission to reproduce a portion of <u>What's Your Risk of Brain Attack</u>.

The American Heart Association is pleased to grant you permission to reproduce pages two and three from <u>What's Your Risk of Brain Attack</u> (50-1131).

We understand that this will be included in as a patient education questionnaire for your master's thesis. We ask that the material not be adapted or changed. **When reproducing, you must use the following credit lines on each page, which our materials appear:**

> **Reproduced with permission.**
> **<u>*What's Your Risk of Brain Attack,*</u> 1996**
> **Copyright American Heart Association.**

This permission letter does not give you permission to use this material in any future questionnaires, other than this one. We would need to review each request for any future use of this material.

We hope we have been of service to you on this matter.

Sincerely,

[redacted]

Misty Aranda
Copyright Specialist

1948-1998 50 years of funding research and finding answers.

Please remember the American Heart Association in your will.

APPENDIX P

Index card indicating interest in study results

APPENDIX P

Index card indicating interest in study results

I am interested in receiving summary of the study results.

Please send to me at:

Name _____

Street _____

City _____State_____

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