ASSOCIATION OF UNCONTROLLED STAGE I HYPERTENSION AND THE INCIDENCE OF MYOCARDIAL INFARCTION OR STOKE

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A Thesis Submitted to the
University of North Carolina Wilmington in Partial Fulfillment
Of the Requirements for the Degree of
Master of Science

School of Nursing

University of North Carolina Wilmington

2005

Approved by

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ABSTRACT

Myocardial infarction (MI) and stroke are two of the leading causes of death and disability among the populace of the United States. Hypertension is identified as a major risk factor in the development of both of these disease processes. The majority of people who suffer MI or stroke have a preexisting diagnosis of Stage I hypertension, defined as systolic blood pressure between 140 and 159mm/Hg or diastolic blood pressure between 90 and 99mm/Hg. Studies have shown that the incidence of hypertension is greatest among Americans aged 60 and older. Patients who receive home health services have been shown to have greater risk factors for uncontrolled hypertension than the general population. Many studies have been conducted that show direct correlations between both the degree of hypertension and the time of day hypertension is experienced and the incidence of MI and stroke. There are also studies available that present findings of the long-term affects of hypertension on the human body and the subsequent incidence of MI and stroke. There is a deficit in the literature, however, concerning the association of the length of time one experiences uncontrolled hypertension and his or her developing MI or stroke in the short term of two months or less. This study attempts to measure that association, and add data to the current literature as it relates to the monitoring of blood pressure and treatment of hypertension.

ACKNOWLEDGEMENTS

This research project is the culmination of a long and diligent pursuit of personal and professional growth. My aspirations to offer primary care in the role of an advanced practice nurse to underserved populations inspired it. I would like to first, thank the management and staff of Interim HealthCare who supported me through this project by providing support, information, and encouragement.

Dr. RuthAnne Kuiper has played an integral part in the completion of this project. Her guidance, as my advisor and chairperson of my research committee, has been indispensable during the process of composing this paper. Without her patience, encouragement and instruction, I would not have been able to successfully and competently develop and complete this project.

Dr. Dargan Frierson has been extremely helpful in assisting with the analysis of the data. Through his guidance, I gained a greater appreciation of the research process and a better understanding of the results of the data collected.

Dr. Douglas Turner added greater depth to my knowledge of the research process. I am grateful for the time that he has taken to be a member of my committee. His critiques and encouragement have helped to keep me focused and complete this project in a manner appropriate for graduate-level competency.

To Dr. P. Allen Gray, Jr., who assisted me with the requirements for entrance into the RN to MSN Program and believed in my ability to successfully complete it, I wish to give special thanks. Without his understanding, encouragement, and guidance, I would not have been able to successfully continue in and complete the program.

DEDICATION

I would like to dedicate this final project to Joyce, David, Russell, and Kathryn, who have sacrificed and supported me through my pursuit of higher education and continue to be my inspiration. I would also like to dedicate this project to the memory of my late grandfather, R.C. Morgan, who believed in my potential to succeed in life.

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INTRODUCTION

Statement of Problem

Myocardial Infarction (MI) and stroke are two of the most common causes of death, respectively among Americans (Staessen, Wang, & Thijs, 2003). Disability secondary to stroke is estimated to affect over 500, 000 people in the United States annually (Morgan, 2003). Hypertension is considered to be a major risk factor in the development of MI and stroke, and according to data collected through the Census Bureau and the National Heath and Nutrition Examination Survey (AHA, 2003), the incidence of hypertension among Americans has reached epidemic proportions, with about 65 million adults ages 18 and older having high blood pressure. This statistic translates to roughly 1 in 3 adults suffering from the disorder, and places this population at increased risk for MI and stroke. The study found that the incidence of hypertension was disproportionately high in certain populations, such as the elderly, African Americans, and lower socioeconomic groups. Individuals who suffered from even mild elevations in blood pressure were found to be at increased risk of MI and stroke, and those who were diagnosed with concomitant illness (i.e., Diabetes, Dyslipidemia, Chronic Renal Disease, Congestive Heart Failure) had a much higher risk of suffering MI and stroke, as compared to the general public (Gorman, 2003). Jokisalo, Kumpusalo, Enlund, & Takala (2001) concluded that obesity and inactivity, as well as diets high in fat and sodium contributed to the development of hypertension. Patients receiving home health services frequently exhibit one or more of the characteristics of populations at increased risk for experiencing uncontrolled hypertension, as many are elderly, African

American, have limited financial resources and support systems, have limited ability to exercise, and suffer from a variety of chronic illnesses (Levy, Kenchaiah, Larson, et al., 2002).

Through a search of the literature, one can find numerous articles that address the many facets associated with hypertension, including its role in the development of MI and stroke (e.g., Fields, 2004; Gorman, 2003; Hoyert, et al., 2001; Kario, et al., 2003; Lichtman, et al., 2002; Morgan, 2003; Staessen, Wang, and Thijs, 2003; Vasan, et al., 2001; White, 2001; Wilson, et al., 1998). While such areas as the degree of hypertension and the long-term effects of hypertension are represented, there is a deficit in the literature as it relates to the short-term effects, defined as a period of less than two months. Since many people are not able to measure their blood pressure themselves, they rely on the readings received during visits to the primary health care provider upon which to base the status of their blood pressure. These visits usually occur in intervals of two months or greater, allowing for the potential that these people could suffer from uncontrolled hypertension during this time, and a subsequent increased risk of MI and stroke.

Purpose

The purpose of this study was to explore the relationship between the length of time, in increments of eight weeks or less, that patients who received home health services were diagnosed with uncontrolled Stage I hypertension and subsequently developed MI or stroke. Study findings will be added to existing data to support or amend current standards of practice, as they relate to the monitoring of blood pressure and treatment of hypertension.

Research Questions

This study was directed by the following research questions:

1. What percentage of home health patients with a diagnosis of hypertension, who experience uncontrolled Stage I hypertension for less than two months develop MI or stroke during that time?

2. What differences exist in the incidence of MI or stroke between home health patients with a diagnosis of hypertension who receive daily monitoring of their blood pressure as compared to home health patients with a diagnosis of hypertension who receive bi-monthly or less frequent monitoring of blood pressure?
3. Does an association exist between the incidence of MI or stroke and the length of time, measured in increments of one to eight weeks, uncontrolled Stage I hypertension is experienced among home health patients?
4. What demographic characteristics, such as age, gender, race and socioeconomic status correlate with the incidence of MI or stroke among home health patients with a diagnosis of hypertension who experience uncontrolled Stage I hypertension for less than two months?

LITERATURE REVIEW

Introduction

A review of the literature provides evidence of significant research in the areas concerning the impact of MI and stroke; 1. on the mortality and morbidity rate, 2. quality of life issues, 3. role of hypertension as a risk factor in developing MI and stroke, and 4. populations at increased risk for hypertension who may receive home health services. Although many aspects related to the subject of hypertension are covered extensively in the literature, there is a significant deficit of research that addresses the association of uncontrolled short term Stage I hypertension and the incidence of MI and stroke over short durations of time.

Definition of Hypertension

Hypertension is the most common problem for which patients visit physicians (Woodwell, 1997). A study based on information obtained in a survey of 1000 physicians, concluded that one

out of every three adults in the United States suffers from hypertension (Fields, 2004). Hypertension has been identified in research as a significant risk factor for MI and stroke, and as such has been studied extensively. The latest report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure established new criteria to identify hypertension (Chobanian et al., 2003). These criteria defined a normal blood pressure range as "systolic under 120mm/Hg and diastolic under 80mm/Hg", and established new criteria for hypertension. In the report, blood pressure in the range of 120/80 to 139/89mm Hg is considered to be "Prehypertension" and constitutes a two-fold increase in the risk of suffering a stroke or MI. A blood pressure in the range of 140/90 to 159/99mm Hg is classified as "Stage 1 Hypertension" and constitutes a four-fold increase in one's risk of suffering a stroke or MI. Based on these findings, the importance of addressing all aspects of hypertension seems prudent.

External Influences Affecting Blood Pressure

Several studies have addressed the phenomenon of fluctuations of blood pressure during the day. Kario et al. (2003), Mead (2003), and White (2001) all found that blood pressure seemed to follow a circadian pattern, reaching a peak in the morning shortly after wakening and arising. These studies also found a subsequent increase in the incidence of MI and stroke during the times when blood pressure was greatest. The influence of "white coat syndrome" on blood pressure readings obtained in the clinical setting was addressed in studies by Chu (2004), Kreidle (1997), and Roberts (2004). These studies concluded that certain patients present with transient elevations in blood pressure that are related to the stress they felt at being in a clinical setting. The studies suggested that daily measurement of blood pressure in the patient's home was a more accurate indicator of blood pressure, and that some people may be receiving inappropriate treatment for hypertension based on falsely elevated levels during clinical visits.

Severity of Hypertension

Many studies have been performed on various aspects of hypertension. Some studies have shown that the degree of severity of hypertension is a risk for suffering a stroke or MI. Vidt (2001) studied the effect of hypertensive crisis, defined as having a blood pressure measurement of 180mm/Hg systolic or 120mm/Hg diastolic, on patients seen in the emergency department, and concluded that blood pressure in this range needed immediate treatment to prevent inevitable death or disability as a result or MI or stroke. On the other end of the spectrum, a study by Vasan et al. (2001) stated that given the population distribution of blood pressure, most ischemic strokes occur in individuals with blood pressure readings in the Prehypertensive or Stage 1 hypertensive ranges.

Impact of Demographic Factors on Hypertension

Certain segments of the population are at greater risk for developing hypertension and for experiencing adverse effects secondary to it. Results from the Third National Health and Nutrition Examination Survey, a comprehensive mixed methods study that examined health care trends in various age groups in the United States, showed that 50 percent of people aged 60 to 69 and approximately 75 percent of those aged 70 years or older were affected by hypertension (Burt et al., 1995). In the "Healthy People 2010" report, the incidence of hypertension, stroke and MI were found to be significantly higher in African Americans than Caucasians, with a mortality rate from cardiovascular disease 42 percent greater in men and 65 percent higher in African American women, as compared to their Caucasian counterparts (USDHHS, 2000). The report also indicated that people from lower socioeconomic status have greater rates of hypertension, stroke, and MI.

Hypertension as a Risk Factor for Myocardial Infarction and Stroke

MI and stroke are related to a varied and complex set of risk factors. Factors such as age, gender, locality, race, and heredity are considered non-modifiable risk factors. However, there are modifiable risks factors, one of which is hypertension (Pearson and Lewis, 1998). In fact, hypertension was listed among the predictors in the Framingham Study (Wilson et al., 1998) in determining risk for developing coronary heart disease, and subsequently increasing the risk of MI and stroke. Given that heart disease and stroke are two of the leading causes of death in the United States (Minino & Smith, 2001), respectively addressing this health concern seems to be pivotal to improving the nation's health. Specifically, one goal of the Healthy People 2010 heart disease and stroke objective is to "improve cardiovascular health and the quantity of life through prevention, detection, and treatment of risk factors", such as hypertension (USDHHS, 2000).

Incidence of Myocardial Infarction and Stroke

The Centers for Disease Control and Prevention (CDC) study conducted in 2002 noted that approximately 61 million individuals in the United States are afflicted with some form of cardiovascular disease, which includes both heart disease and stroke and contributes to an estimated four of every ten deaths in the United States (CDC, 2002). Heart disease and stroke cost the United States almost $298 billion annually (CDC). In 1999, cardiovascular disease contributed to one out of every 2.5 deaths, or over 958,775 individuals (AHA, 2002). Stroke affects more than 600,000 individuals every year, and the cost for treatment and rehabilitative service for stroke victims in the United States is an estimated $41 billion annually (AHA, 2001). A study by Hoyert et al. (2001) found that the age-adjusted death rate for heart disease was 265.9 deaths per 100,000, and for stroke was 61.4 deaths per 100,000.

Impact of Myocardial Infarction and Stroke on Quality of Life

In addition to being two of the leading causes of death and disability among Americans, it is generally recognized that MI and stroke impact other areas of victims' lives. Ware et al. (1993), Lyons, Lo and Littlepage (1994), and Ades et al. (2002) all found that compared to population norms, quality of life domains represented by physical function, physical role, emotional role, vitality, social functioning, bodily pain, mental health, and general health are lower for people who have suffered a stroke or MI. With heart disease and stroke, there is also an increased likelihood of recurrence of microvascular complications (Lichtman et al., 2002). In the study conducted by Lichtman and his associates, which followed all patients treated for acute MI at ten hospitals in Florida for a period of two years after discharge, one in 40 suffered an ischemic stroke within six months of discharge.

Treatment of Hypertension

The importance of the findings presented in the previous studies is related to the application of treatment modalities for hypertension. Treatments are directed toward diet, exercise, and pharmacologic interventions. The findings from a study conducted by Adler et al. (2000), demonstrated that each 10mm/Hg decrease in the systolic blood pressure level of diabetic patients was associated with an average reduction of 11% in the rate of MI among that population. Results of randomized controlled trials that included large diabetic populations, such as the Hypertension Optimal Treatment (HOT) trial, United Kingdom Prospective Diabetes Study (UKPDS) study, and the Heart Outcomes Prevention Evaluation (HOPE) study have demonstrated that adequate control of blood pressure decreases the risk of stroke and MI (ADA, 2003). It was data from these studies that influenced the Joint National Committee to lower the target rate for blood pressure in the diabetic population to less than 115/75mm/Hg (Chobanian et

al., 2003). Data collected on the subject of hypertension has the potential to change the perceptions of both health care providers and the general public. The majority of providers probably would have not treated a blood pressure of 140/88mm/Hg several years ago, but today the patient would be strongly encouraged to modify his or her lifestyle, and utilize an antihypertensive medication.

Home Health Patients as a Vulnerable Population

Many patients receiving home health care are elderly African Americans. In a study conducted by Levy et al. (2002), the researchers surveyed 500 home health agencies across the United States in an attempt to gather demographic data and found that the majority of home health patients are older than 60 years of age and suffer from a variety of disease processes, such as diabetes, congestive heart failure, renal disease, dyslipidemia, coronary artery disease, and previous instances of stroke or MI, these predispose them to adverse effects associated with uncontrolled hypertension. Studies by Cooper-Dehoff, Bristol, and Pepine (2003), and Boden-Albala and Sacco (2000) found that there are a disproportionate number of African Americans who receive home health services, and that many home health patients are unable or unwilling to modify their lifestyle secondary to physical, financial, or cognitive deficits.

Deficits in the Literature

A review of the literature contains numerous studies that provide substantial descriptions of the incidence and impact that MI and stroke have in the United States, and the role of hypertension as a significant risk factor in the development of these disease processes. Missing from these studies are results that deal with the association of the length of time one experiences uncontrolled hypertension and the development of MI or stroke. Thus, the current literature fails to provide a complete picture of all facets of hypertension that may play a role in the association

with the development of MI and stroke, and potentially inhibits the development of optimal protocols for the treatment of hypertension, which could reduce the incidence of these pathologies.

METHODS

Design

This study used a quantitative, retrospective longitudinal-correlational design in an attempt to explore the association between uncontrolled hypertension and the incidence of MI or stroke among home health patients. The purpose of this study was to explore the association between uncontrolled Stage I hypertension from one to eight weeks and the incidence of MI or stroke among home health patients. Following Institutional Review Board approval and receipt of a letter of support from the home health agency, charts of home health patients with a diagnosis of hypertension during the period from May 1, 2003 to May 1, 2004 were reviewed. Data was collected on the length of time uncontrolled Stage I hypertension, as defined by blood pressure readings documented in the chart, was experienced, along with the incidence of stroke or MI suffered in each patient during this time. The length of time uncontrolled Stage I hypertension was experienced by each patient was measured incrementally, from one week to eight weeks. The major control strategies included a carefully developed data-collection instrument and the collection of data on the possible demographic characteristics of age, gender, race, and socioeconomic status. Descriptive statistics were used to describe patients who suffered a stroke or MI during the time frame of the study. This design was appropriate because it efficiently detects correlational relationships.

Sample

The sample for this study was patients with a diagnosis of hypertension during May 1, 2003 to May 1, 2004 and who also received home health services during this entire period. A strategy of simple random sampling was applied to a population of medical records of 796 patients meeting the inclusion criteria (receiving home health services and being diagnosed with hypertension during May 1, 2003 to May 1, 2004). Each medical record was associated with an identification number that was assigned by the home health agency during the admission process. One hundred of these numbers were chosen through a process of simple random sampling. The identification numbers were printed on two identical lists, one of which was cut so that each number was listed on a separate slip of paper. The slips were folded in half so that the numbers were covered, and then placed into a bag. The researcher pulled one slip of paper at a time from the bag, viewed the number on that slip, and circled the corresponding number on the intact list. This process continued until 100 identification numbers were circled. The population was obtained from patients receiving home health services located in ten counties throughout southeastern North Carolina.

Setting

Patient identification numbers were assigned by the home health agency and utilized as identifiers for the subjects in the study. These numbers were also associated with demographic information obtained from a central database at the agency, which was kept separate from the medical records being reviewed for the collection of data related to the incidence of episodes of uncontrolled hypertension, MI and stroke.

Data Collection Instruments

Data collection instruments consisted of a series of Excel™ files. The researcher reviewed the chart of every member in the sample population and recorded each incident of uncontrolled Stage I hypertension, the length of time in weeks the incident of hypertension was experienced, and the incidence of MI and stroke that occurred during each episode (Appendix A). Demographic information (age, gender, race, and payor source) for each subject in the accessible population was obtained through a central database at the setting, extrapolated for each subject in the sample population, and recorded in a separate file (Appendix B). Extraneous variables (smoking, obesity, alcohol [ETOH] abuse, diabetes, dyslipidemia, coronary artery disease [CAD], and a previous history of MI/stroke) associated with an increased risk of suffering an MI or stroke were recorded in a third file (Appendix C). The data in all files created was identified by the patient identification number of the subject associated with the information, which allowed the information to be cross-referenced among the various files. This process facilitated identification of the association of the length of time uncontrolled Stage I hypertension occurred and the incidence of MI and stroke, along with extraneous variables occurring in each patient who suffered an MI or stroke and allowed for the comparison of demographic information between the accessible population and the sample to determine if the sample was a statistically accurate representation of the accessible population.

Data Analysis

Data was examined through a series of established statistical methods in an attempt to identify the association, if any, of the length of time home health patients with a diagnosis of hypertension experience uncontrolled Stage I hypertension for a period of time less than two months and their developing MI or stroke. Once this part of the study was concluded, the patient

numbers from the data collection pertaining to hypertension and incidence of MI or stroke and those numbers containing the demographic information were cross-referenced in an attempt to identify any trends among the various strata.

Confidentiality

Confidentiality of the subjects was maintained through the use of identification numbers assigned by the home agency, which are not directly linked with the patents' names, insurance information, or Social Security Number. Medical records were reviewed at the facility, and all data collected was saved on a floppy disk that was kept under lock and key in the researcher's office when not in use. All information that pertained to individual subjects in the study was destroyed February 28, 2005. Patient identification numbers listed in Appendices "A", "B" and "C" are were created for the purpose of demonstration, and do not represent actual patient identification numbers of the sample.

Threats to Validity and Reliability

Internal Validity

The purpose of this study was to examine the association of uncontrolled Stage I hypertension and the incidence of MI or stroke in patients receiving home health services rather than to focus on a cause-and-effect relationship between the two variables. Threats to internal and external validity, and reliability of the data were discerned and strategies implemented to exercise control in an attempt to decrease the possibility of error and increase the likelihood that the study's findings were an accurate and meaningful reflection of reality. Issues related to instrumentation posed the greatest perceived threat to the internal validity of this study. The diagnosis of Stage I hypertension was based entirely on the measurements of each participant's blood pressure, which was documented in the medical record. If the sphygmomanometer used to

monitor the blood pressure was defective or the nursing assistant monitoring the blood pressure was careless or derelict in performing the task, the measurement could be incorrect. This could skew the data related to the incidence of documented uncontrolled Stage I hypertension, which would be reflected in the collection and analysis of the data, and the results of the study.

This researcher purposely chose a home health agency that utilizes only nursing assistants certified by the North Carolina Board of Nursing, who are trained in the use of a sphygmomanometer to monitor blood pressure. The agency implements a training program that includes education and certification of all nursing assistants in the use of the sphygmomanometer and engages the services of a certified technician to annually calibrate all sphygmomanometers used in the provision of services. The agency utilizes registered nurses to check the accuracy of the sphygmomanometers and the competency of the nursing assistants who use them at least every two months. The actions performed by the home health agency should decrease the impact of instrumentation on the data, as it related to blood pressure readings documented in the charts.

External Validity

A potential threat to the external validity of this study related to the interaction of selection and the independent variable of hypertension. Subject characteristics such as age, gender, and race, along with coexisting risk factors for MI or stroke, such as diabetes, dyslipidemia, obesity, smoking, ETOH abuse, coronary artery disease, and a history of suffering an MI or stroke may have affected the incidence of MI or stroke in the sample population. The researcher utilized two tables to identify those extraneous variables. The first table consisted of demographic information individualized to each participant, and the second table identified lifestyle choices and coexisting disease processes that have been discussed in previous research (Adler, et al., 2000; American Heart Association, 2002; Boden-Albala, et al., 2000) as risk

factors for MI and stroke. Both of these tables were created so that they could easily be cross-referenced with the tool proposed to collect data on the incidence of Stage I hypertension, MI, and stroke among the sample population.

Reliability

This researcher viewed the greatest threat to the reliability of the study as the possibility that the results would not be generalizable to other populations. The sample for this study consisted of 100 patients receiving home health services who lived in Southeastern North Carolina. Patients receiving home health services generally are elderly, have low socioeconomic status, and suffer from various chronic illnesses (Boden-Albala, et al., 2000). People from Southeastern North Carolina demonstrate demographic characteristics specific to the region, such as choices in lifestyle, which might not be applicable to populations in other areas of the state, country, or world. Although a single data collector might lend to consistent data retrieval, this could also be a threat to the reliability of the study. This could have resulted in possible errors that would skew the results of the study. The researcher double-checked all data entered in the collection tools to ensure accuracy. The researcher also utilized the services of the Director of Integrity and Compliance at the home health agency where the data collection was conducted, to check the data collection by comparing the data from randomly selected charts with the data contained in the collection tools. A statistical consultant was recruited as part of the thesis committee for the purpose of identifying potential threats to the validity and reliability of the study, providing guidance in the construction and utilization of collection tools to gather data, and assisting in the analysis and interpretation of the collected data.

Disclosure of Results

The results of the study will be presented during the defense of the project, and once accepted by the committee will be placed in the Randall Library at the University of North Carolina Wilmington. The researcher plans to eventually publish the results of the study in a peer-reviewed cardiovascular journal, so as to add to the current body of research concerning the association of hypertension and the incidence of MI or stroke, as it pertains to patients receiving home health services.

FINDINGS

Introduction

The sample for this study consisted of 100 charts randomly selected from a total of 796 charts of home health patients diagnosed with hypertension during the period of time from May 1, 2003 to May 1, 2004. Since the primary purpose of this study was to explore the association between the length of time uncontrolled Stage I hypertension was experienced by home health patients and their experiencing MI or stroke, the researcher selected 100 charts to achieve a level of significance with $\alpha = .05$ (95% accuracy), power = .80, and effect size = medium (.30). Tables 1 and 2 reflect the demographic components of the accessible and sample populations. Demographic information for the sample was determined to be statistically similar to that of the accessible population using the statistical method of resampling with replacement, and thus the sample was deemed to be representative of the accessible population.

Table 1

Demographic Information for the Accessible Population

Gender	(Male) 23.37%		(Female) 76.63%	
Age	(<60) 31%	(60-69) 48%	(70+) 21%	
Payor	(Medicaid) 92.21%	(Private Ins) 3.64%	(Self-Pay) 4.15%	
Race	(African American) 45.85%	(Native American) 13.57%	(Caucasian) 39.57%	(Other) 1.02%

Table 2

Demographic Information for the Sample

Gender	(Male) 17%		(Female) 83%	
Age	(<60) 30%	(60-69) 50%	(70+) 20%	
Payor	(Medicaid) 93%	(Private Ins) 3.1%	(Self-Pay) 3.9%	
Race	(African American) 41%	(Native American) 20%	(Caucasian) 37%	(Other) 2%

Research Question 1.

What percentage of home health patients with a diagnosis of hypertension, who experience uncontrolled Stage I hypertension for less than two months, develop myocardial infarction (MI) or stroke during that time?

Hypertension is recognized as one of the major risk factors in the development of MI and stroke (Wilson et al., 1998). The researcher recognizes the value of practical application of the results of data analysis and that uncontrolled hypertension has the potential to contribute in the development of MI and stroke. Therefore, data was collected concerning the incidence of MI or stroke in individuals of the sample in an attempt to address the research question. The data revealed that of the 100 patients involved in the study, 71 experienced at least one episode of uncontrolled Stage I hypertension for at least one week during the time studied. Of those 71 patients, 9 experienced a stroke (12.68%), and 7 experienced an MI (9.86%). One person suffered 2 MIs during the period. This led to a cumulative occurrence of 22.54% for the development of MI or stroke among those patients experiencing uncontrolled Stage I hypertension for less than two months during the course of the study.

There was one incident of MI and no incidents of stroke recorded among the 29 subjects who did not experience any episodes of uncontrolled Stage I hypertension during the period covered. This translated to an occurrence rate of 3.45% for MI and 0.00% for stroke among the subjects whose blood pressure was controlled to a systolic reading below 140mm/Hg and a diastolic reading below 90mm/Hg. The occurrence rate of the incidence of MI and stroke among those subjects experiencing one of more episodes of uncontrolled Stage I hypertension and those subjects who did not experience any episodes of uncontrolled Stage I hypertension are compared in Figure 1.

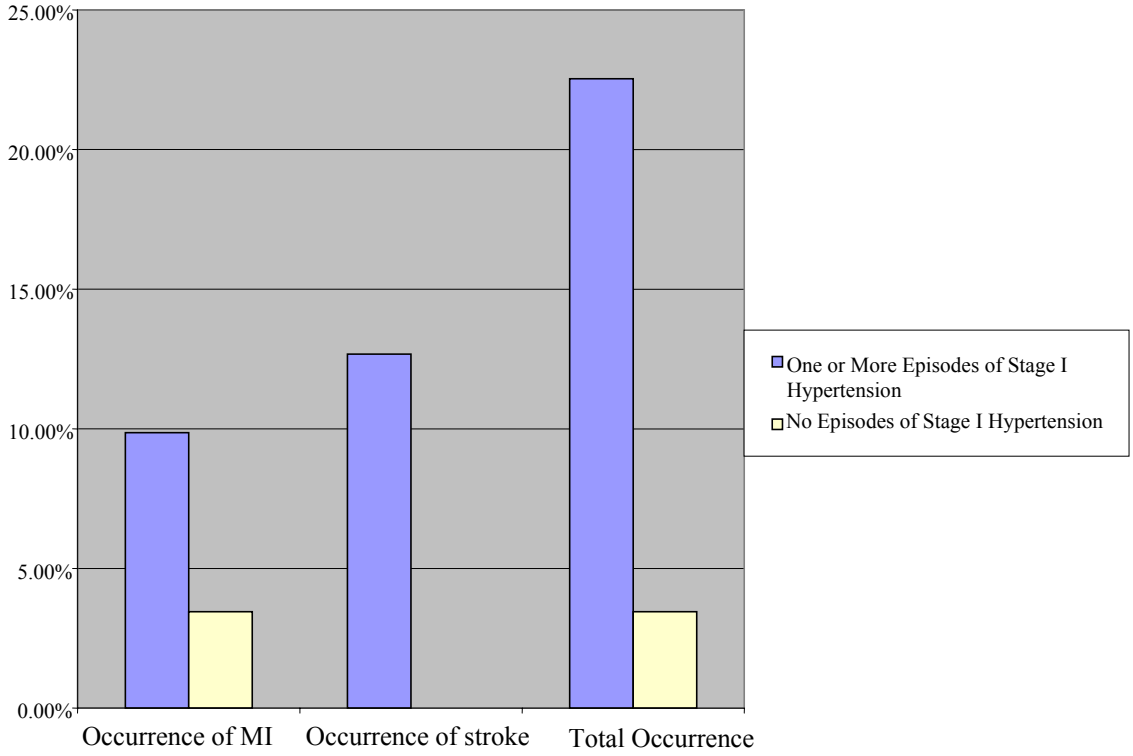
Research Question 2.

What differences exist in the incidence of MI or stroke exist between home health patients with a diagnosis of hypertension who receive daily monitoring of their blood pressure as compared to home health patients with a diagnosis of hypertension who receive bi-monthly or less frequent monitoring of blood pressure?

The incidence of MI and stroke was compared between those subjects who received daily monitoring of blood pressure and subjects who received bi-monthly or less frequent monitoring of their blood pressure (i.e., via visits to the physician) to identify trends suggesting the level of benefit of daily blood pressure monitor in decreasing the incidence of MI or stroke in home health patients with a diagnosis of hypertension.

Many home health agencies provide daily monitoring of blood pressure for clients with a diagnosis of hypertension. The agencies incur a great deal of expense related to this service in the form of providing training, equipment and supervision needed to properly and safely perform daily monitoring of blood pressure. A deficit exists in the literature concerning the value of daily monitor of blood pressure in decreasing the incidence of MI and stroke among any population, including home health patients. It was hoped that the findings from this study would either demonstrate support for the practice of daily blood pressure monitor (via a statistically significant decrease in the incidence of MI and stroke among those patients receiving daily monitor of blood pressure as compared to those receiving bi-monthly or less frequent monitor) or challenge the benefit

Figure 1. Comparison of the Occurrence of MI and Stroke Between Subjects Experiencing Uncontrolled Stage I Hypertension and Subjects With No Episodes



During a review of the charts, it was found that 769 of the 796 patients diagnosed with hypertension received daily monitoring of blood pressure, and 98 of the 100 patients in the sample population received the same. There were not enough subjects in the control group (those patients receiving bi-monthly or less frequent monitor of blood pressure) to make a fair comparison with the sample, and this issue warrants further study. A home health agency that demonstrates a more evenly distribution of patients with a diagnosis of hypertension who receiving bi-monthly or less frequent monitoring of blood pressure as compared to patients with a diagnosis of hypertension who receive daily monitoring would be an ideal setting in which to replicate this study.

Research Question 3.

Does an association exist between the incidence of MI or stroke and the length of time, measured in increments of one to eight weeks, uncontrolled Stage I hypertension is experienced among home health patients?

The association between the incidence of MI or stroke and the length of time uncontrolled Stage I hypertension was experienced among the sample population was measured using the chi-square statistical formula to test the null hypothesis that variables are independent of each other (i.e., that there is no association or dependence between the variables). Chi-square is a nonparametric statistic used to determine whether the frequency in each category is different from what would be expected by chance. If the calculated chi-square is high enough, the researcher would conclude that the frequencies found would not be expected on the basis of chance alone, and the null hypothesis would be rejected. The p-values are used to measure the chi-square statistical evidence that either supports or rejects the null hypothesis. The p-values of less than .05 give evidence to reject the null hypothesis, while p-values greater than .05 give

evidence that the null hypothesis of independence (or of no association) should not be rejected. The chi-square statistic with (r-1) (c-1) degrees of freedom, where r = number of rows in the table and c = number of columns in the table, was used to test the null hypothesis of no association between the row variable and the column variable in the study.

A frequency distribution was computed of the number of episodes of uncontrolled Stage I hypertension experienced during each of the time periods (from zero to eight weeks) involved (Table 3). There were 721 separate incidents of uncontrolled Stage I hypertension reported, ranging from 29 incidents lasting less than one week to 9 episodes lasting eight weeks.

The chi-square statistic was used to test the null hypothesis first on the association of uncontrolled Stage I hypertension for a period of less than two months and the incidence of MI demonstrated in the sample (Table 4). The two variables being compared were uncontrolled Stage I hypertension and the incidence of MI. The Pearson chi-square statistic for two-way tables, which involves the differences between the observed and expected frequencies, where the expected frequencies are computed under the null hypothesis of independence was implemented, resulting in a calculated chi-square value of 7.7865. The degrees of freedom (DF) was calculated using the formula (r-1)(c-1), with r indicating the number of rows and c indicating the number of columns in the table, resulting in a DF of 8. The p-value (Asymptotic Pr) calculated to 0.4546. Since this value is greater than .05, the null hypothesis was supported, indicating no association between uncontrolled Stage I hypertension for periods of less than two months and the incidence of MI.

Table 3

Frequency Distribution of Episodes of Uncontrolled Stage I

Hypertension Experienced by Subjects in the Sample

HTN_Weeks	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	29	4.02	29	4.02
1	494	68.52	523	72.54
2	106	14.70	629	87.24
3	31	4.30	660	91.54
4	26	3.61	686	95.15
5	8	1.11	694	96.26
6	12	1.66	706	97.92
7	6	0.83	712	98.75
8	9	1.25	721	100.00

Table 4

Comparison of Uncontrolled Stage I Hypertension and the Incidence

of Myocardial Infarction Using Pearson Chi-Square Statistical Test

Table of MI by HTN_Weeks										
MI	**HTN_Weeks**									
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
0	28 3.88 3.93 96.55	491 68.10 68.96 99.39	103 14.29 14.47 97.17	30 4.16 4.21 96.77	25 3.47 3.51 96.15	8 1.11 1.12 100.00	12 1.66 1.69 100.00	6 0.83 0.84 100.00	9 1.25 1.26 100.00	712 98.75
1	1 0.14 11.11 3.45	3 0.42 33.33 0.61	3 0.42 33.33 2.83	1 0.14 11.11 3.23	1 0.14 11.11 3.85	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	9 1.25
Total	29 4.02	494 68.52	106 14.70	31 4.30	26 3.61	8 1.11	12 1.66	6 0.83	9 1.25	721 100.00

Pearson Chi-Square Test	
Chi-Square	7.7865
DF	8
Asymptotic Pr > ChiSq	0.4546

The chi-square statistic was then used to test the null hypothesis as it related to the association of uncontrolled Stage I hypertension for a period of less than two months and the incidence of stroke among the sample in the study (Table 5). The variables compared were uncontrolled Stage I hypertension and the incidence of stroke. The Pearson chi-square value was 27.9791, the degrees of freedom (DF) was 8, and the p-value (Asymptotic Pr) was 0.0005. Since the p-value was less than 0.5, the null hypothesis was rejected, indicating an association between uncontrolled Stage I hypertension for a period of less than two months and the incidence of stroke among the sample in the study.

Research Question 4.

What demographic characteristics, such as age, gender, race and socioeconomic status correlate with the incidence of myocardial infarction or stroke among home health patients with a diagnosis of hypertension that experience uncontrolled Stage I hypertension for less than two months?

Demographic characteristics of age, gender, race and payor source were gathered for all subjects in the sample, those subjects who experienced an MI, and subjects who experienced a stroke. Payor source was used as an indicator for socioeconomic status, as those patients who had Medicaid as their source were assumed to have met the criteria required for eligibility (i.e., income below the poverty level, total value of assets under $1000.00), and patients with private insurance or who choose to self-pay have greater assets and/or income than those patients with Medicaid (Boden-Albala & Sacco, 2000). The data was then compiled into a table and formatted into a graph for comparison of each characteristic in an attempt to identify trends (Figure 2).

Table 5

Comparison of Uncontrolled Stage I Hypertension and the Incidence of Stroke Using Pearson Chi-Square Statistical Test

Table of Stroke by HTN_Weeks										
Stroke	**HTN_Weeks**									
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
0	29 4.02 4.07 100.00	493 68.38 69.24 99.80	100 13.87 14.04 94.34	30 4.16 4.21 96.77	26 3.61 3.65 100.00	8 1.11 1.12 100.00	11 1.53 1.54 91.67	6 0.83 0.84 100.00	9 1.25 1.26 100.00	712 98.75
1	0 0.00 0.00 0.00	1 0.14 11.11 0.20	6 0.83 66.67 5.66	1 0.14 11.11 3.23	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.14 11.11 8.33	0 0.00 0.00 0.00	0 0.00 0.00 0.00	9 1.25
Total	29 4.02	494 68.52	106 14.70	31 4.30	26 3.61	8 1.11	12 1.66	6 0.83	9 1.25	721 100.00

Pearson Chi-Square Test	
Chi-Square	27.9791
DF	8
Asymptotic Pr > ChiSq	0.0005

Analysis of the data revealed differences, as they pertained to the demographic characteristics of subjects who experienced an MI or stroke compared to the demographics of the sample population. Males comprised only 17% of the sample population but experienced 75% of MIs and 89% of strokes. Subjects over the age of 69 accounted for 20% of the sample but experienced 37% of MIs. African Americans comprised 41% of the sample but experienced 50% of MIs and 56% of strokes, Native Americans comprised 20% of the sample but experienced 30% of MIs and 34% of strokes, and while Caucasians accounted for 37% of the sample they only experienced 20% of MIs and 10% of strokes.

Extraneous Variables

Numerous studies (Gorman, 2003; Jokisalo, Kumpusalo, Enlund, & Talala, 2001; Pearson & Lewis, 1998; Wilson et al., 1998) have identified factors in addition to hypertension, which contribute to the incidence of MI and stroke. The researcher acknowledged the ability of these factors to impact the incidents of MI and stroke experienced in the study and threaten the external validity of the findings.

The researcher collected data demonstrating the incidence of extraneous variables identified as contributory risk factors (i.e., diabetes, smoking, obesity, alcohol [ETOH] abuse, coronary artery disease [CAD], and a history of experiencing an MI or stroke) in the development of MI and stroke for each subject in the sample population and entered the data in an Excel™ file (Table 6). The researcher then developed a file showing the incidence of these variables among those subjects suffering at least one incident of MI or stroke during the time studied (Table 7).

Figure 2. Comparison of Demographic Data Among Sample Population, Subjects Experiencing MI, and Subjects Experiencing Stroke

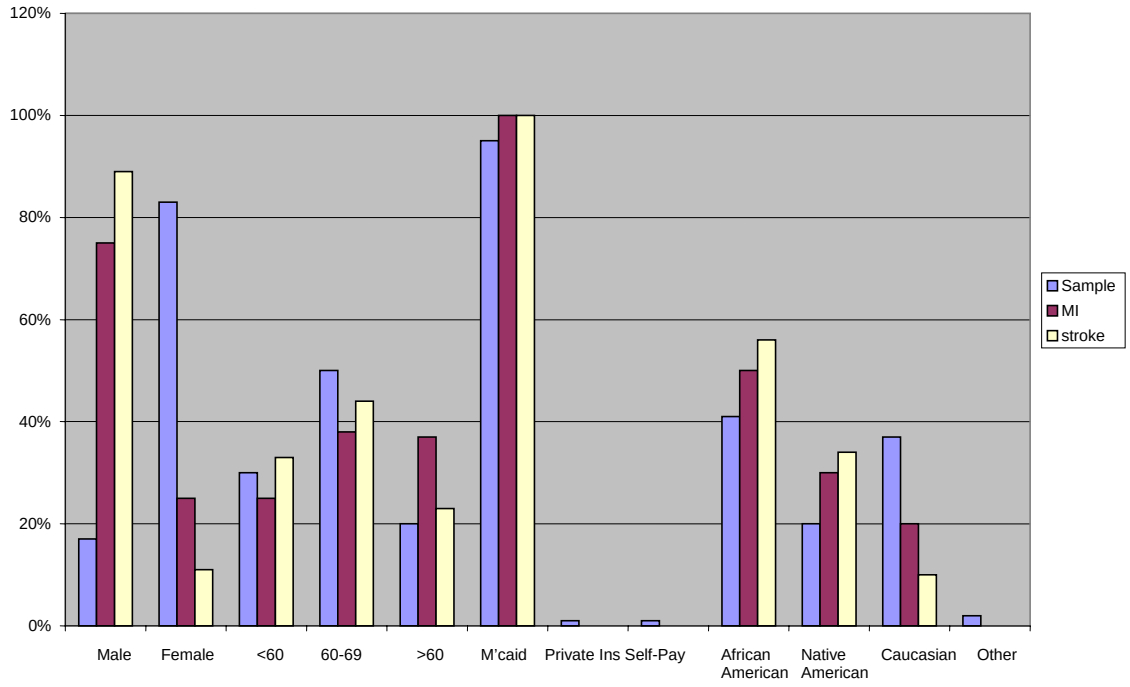


Table 6

Incidence Among Sample of Extraneous Variables Identified as Contributory Factors in the Development of MI and Stroke

Variables	Smoking	Obesity	ETOH Abuse	Diabetes	Dyslipidemia	CAD	Hx MI/Stroke
Sample	45%	48%	17%	31%	29%	53%	29%

Table 7

Incidence Among Subjects Suffering MI or Stroke of Extraneous Variables Identified as Contributory Factors in Their Development

Variables	Smoking	Obesity	ETOH Abuse	Diabetes	Dyslipidemia	CAD	Hx MI/Stroke
Patients Experiencing MI and/or Stroke	83.33%	38.89%	44.44%	33.33%	33.33%	66.67%	50%

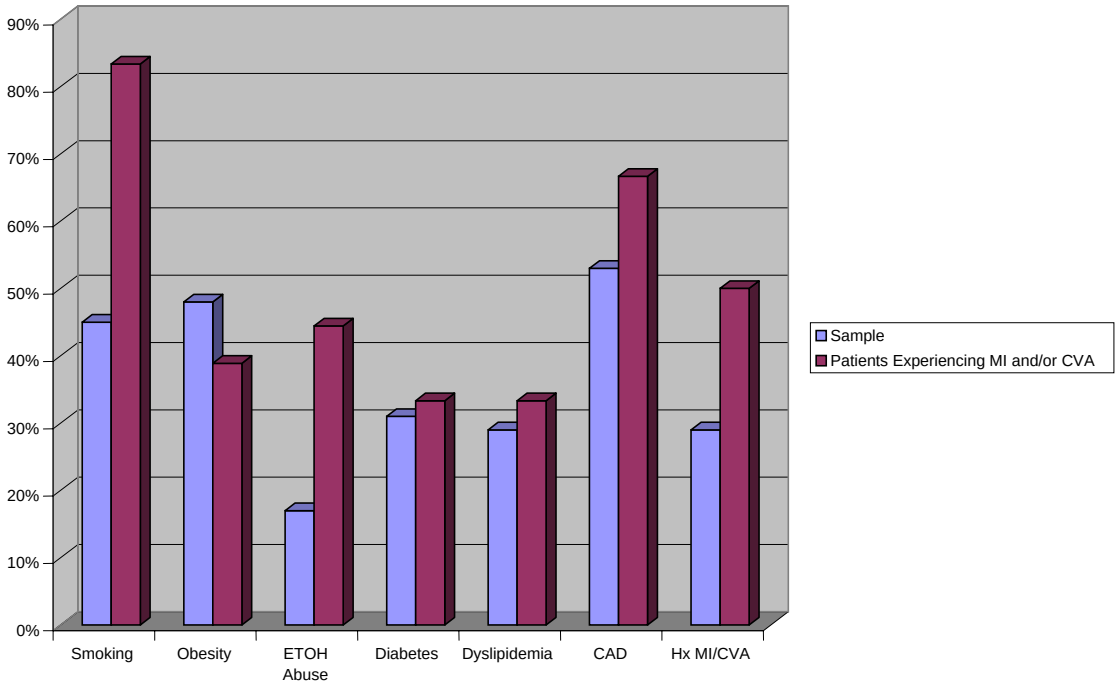
Analysis of demographic characteristics by the method of resampling with replacement revealed that the incidence of smoking (83.33% versus .05%), ETOH abuse (44.44% versus 4.13%), CAD (66.67% versus 17.63%), and a history of MI or stroke (50% versus 5.37%) was statistically higher among the subjects experiencing an MI or stroke as compared to the entire sample. The incidence of diabetes and dyslipidemia was noted to be slightly higher among those who suffered an MI or stroke, while the incidence of obesity in these subjects was found to be lower than that of the sample. Figure 3 illustrates a comparison of the extraneous variables noted between the sample population and those subjects experiencing at least one episode of MI or stroke.

DISCUSSION

Introduction

The primary purpose of the study was to explore the association between uncontrolled Stage I hypertension for periods less than two months and the incidence of MI or stroke, with the goal of adding information to the body of literature addressing hypertension. Data from this study suggest that in this sample: (a) there is a relationship between uncontrolled Stage I hypertension and the incidence of MI and stroke; (b) there is a correlation between the incidence of stroke and the length of time, measured in increments of one to eight weeks, one experiences uncontrolled Stage I hypertension; (c) there is no correlation between the incidence of MI and the length of time, measured in one to eight weeks, one experiences uncontrolled Stage I hypertension; (d) certain demographic characteristics correlate with the incidence of MI and stroke; and (e) certain disease processes and modifiable lifestyle choices correlate with the incidence of MI and stroke. These findings are significant because some support findings of previous studies

Figure 3. Comparison of the Occurrence of Extraneous Variables Between the Sample and Those Subjects Experiencing MI or Stroke



while others fill a gap in the literature, as they relate to the association of hypertension and MI or stroke and the importance for control of hypertension in decreasing the risk of suffering an MI or stroke.

Research Question 1.

What percentage of home health patients with a diagnosis of hypertension, who experience uncontrolled Stage I hypertension for less than two months, develop MI or stroke during that time?

Numerous studies (American Heart Association, 2003; Burt et al, 1995; Centers for Disease Control and Prevention, 2002; Wilson et al, 1998) recognize hypertension as one of the major risk factors in the development of MI and stroke. Hypertension is considered a modifiable risk factor, in that it can be controlled in most cases (Staessen, Wang & Thijs, 2003). A report published by the Centers for Disease Control and Prevention in 2002 found that hypertension was inadequately controlled in 50 to 60 percent of patients diagnosed with the condition (CDC, 2002), and the latest report by the Joint Committee on prevention, detection, evaluation, and treatment of high blood pressure (JNC 7 report) reads that even modest increases in blood pressure of 140/90 -149/99mm Hg (Stage I hypertension) significantly increase one's risk for experiencing an MI or stroke (Chobanian et al, 2003).

The researcher utilized data from this study to compare the incidents of MI and stroke between subjects in the sample, who maintained control of their blood pressure to levels under 140/90 mm Hg and those subjects who experienced one of more incidents of uncontrolled Stage I hypertension for a period of one year. Findings from this data demonstrated that of the patients who experienced one of more incidents of uncontrolled Stage I hypertension, 12.68% suffered a stroke and 9.86% suffered an MI for a cumulative occurrence rate of 22.54% or almost 1 in 4

chance of experiencing an MI or stroke. Patients who maintained control of their hypertension to levels under 140/90 mmHg experienced a group rate of 0.00% for stroke and 3.45% for MI for a cumulative occurrence rate of 3.45%.

The findings demonstrate a significant increase in the rate of MI and stroke among those subjects experiencing one or more episodes of uncontrolled Stage I hypertension as compared to subjects maintaining control of their blood pressure to levels below 140/90 mm Hg, and are significant in that they appear to add support to the body of literature concerning the association of hypertension and the incidence of MI and stroke. The findings appear to support the hypothesis of the JNC 7 report, which states that small increases in blood pressure above the range of 120/80 mm Hg greatly increase the risk of MI and stroke.

Research Question 2.

What differences exist in the incidence of MI or stroke exist between home health patients with a diagnosis of hypertension who receive daily monitoring of their blood pressure as compared to home health patients with a diagnosis of hypertension who receive bi-monthly or less frequent monitoring of blood pressure?

The researcher addressed the issue of not having a sufficient number of subjects receiving bi-monthly or less frequent monitoring of blood pressure in the accessible population to perform a statistically valid comparison between the incidence of MI or stroke in home health patients with a diagnosis of hypertension receiving daily monitoring of blood pressure as opposed to those patients receiving bi-monthly or less frequent monitoring. The researcher feels that this subject deserves closer inspection, given that data from the study appears to suggest an association between the length of time subjects experienced uncontrolled Stage I hypertension and their experiencing a stroke. The researcher recognizes that lack of a control group containing

an appropriate number of subjects needed to perform this comparison was one of the limitations of this study and addresses the issue in the limitations of the study.

Research Question 3.

Does an association exist between the incidence of MI or stroke and the length of time, measured in increments of one to eight weeks, uncontrolled hypertension is experienced among home health patients?

A review of the literature concerning the association of hypertension and the incidence of MI and stroke reveals an abundance of information covering various aspects of hypertension and how those aspects contribute to the overall impact of hypertension as a major contributory factor for MI and stroke. Research has been conducted and studies published exploring the severity of hypertension (Chobanian et al, 2003), the factors influencing hypertension (Roberts, 2004; Vasan et al, 2001; White, 2001), and the affects of uncontrolled hypertension experienced over long (greater than one year) periods of time (Levy et al, 2002). The findings from these reports have greatly influenced perception among both health care professionals and the general public of the role hypertension plays in the development of MI and stroke and guided the revision of treatment guidelines and modalities (Chobanian et al, 2003). Whereas a patient presenting five years ago with a blood pressure reading of 140/90 mm Hg would have been advised by his or her primary care provider to make lifestyle changes (i.e., decrease weight, increase exercise, decrease intake of salt, stop smoking, etc.), that same patient today would probably be started on one or more anti-hypertensive medications (especially if he or she is considered to be at increased risk for MI or stroke) in an effort to achieve a reading of less than 120/80 mm Hg.

There is a deficit, however, concerning the length of time one experiences uncontrolled hypertension for periods of less than two months and the incidence of MI and stroke. Many

people rely on a primary health care provider as the only source for monitoring of their blood pressure. People diagnosed with hypertension may only visit this provider every one to three months for management of the condition, so the potential exists for these people to experience uncontrolled hypertension during the time between visits. MI and stroke are two of the leading causes of death and disability among Americans (American Heart Association, 2003), and hypertension is one of the major risk factors for experiencing MI and stroke (Chobanian et al, 2003). The researcher felt that this was sufficient reason to study the association of uncontrolled hypertension for less than two months and the incidence of MI and stroke.

The researcher utilized the process of simple random sampling to obtain a sample consisting of 100 medical records from a total of 796 charts of patients followed by Interim HomeHealth™. Each record met the inclusion criteria of: (a) spanning the time period from May 1, 2003 to May 1, 2004, and (b) belonging to a patient with a diagnosis of hypertension during the entire time period. The seventh report of the Joint Commission on prevention, detection, evaluation, and treatment of high blood pressure (Chobanian et al, 2003) found that uncontrolled Stage I hypertension, defined as a blood pressure between 140/90 and 159/99 mm Hg, constitutes a four-fold increase in one's risk of suffering an MI or stroke and is also the prevalent level of hypertension among the populace of the United States, so the researcher chose to use this classification of hypertension in the study.

Each medical record was carefully reviewed, and the incidents of uncontrolled Stage I hypertension lasting in increments of one week from less than one week to eight weeks, MI and stroke occurring during May 1, 2003 to May 1, 2004 were entered into an Excel™ file. This data was entered into the SAS (version 8.1, 2000) statistical program, where the chi-square statistic

was used to test the null hypothesis on the association between uncontrolled Stage I hypertension for a period of less than two months and the incidence of MI or stroke.

Based on the findings that the association between uncontrolled Stage I hypertension for periods of less than two months and the incidence of MI are not supported, there does appear to be a significant trend between uncontrolled Stage I hypertension experienced for less than two months and the incidence of stroke in this sample. The findings appear to indicate that the longer uncontrolled Stage I hypertension is experienced, measured in increments from one to eight weeks, the greater the risk for suffering a stroke. These findings are significant because they suggest that subjects experiencing Stage I hypertension for less than two months had an increased risk of suffering a stroke. People who rely solely on blood pressure measurements taken during the visit to a primary health care provider, could be at increased risk for suffering a stroke if the visit frequency is greater than every 2 months, as these people could experience uncontrolled Stage I hypertension between visits. Since Stage I hypertension frequently is asymptomatic, without monitoring, the person might be unaware that he or she is experiencing it.
Research Question 4.

What demographic characteristics, such as age, gender, race and socioeconomic status correlate with the incidence of MI or stroke among home health patients with a diagnosis of hypertension that experience uncontrolled Stage I hypertension for less than two months?

Based on the correlations between demographic characteristics and the incidence of MI or stroke, there is a significant trend towards an increase in the incidence of MI or stroke among males, people over the age of 69, African Americans, and Native Americans. These findings are substantiated by the results of studies performed by the American Heart Association (2003), Cooper-DeHoff, Bristol & Pepine (2003), Lichtman et al (2002), and Wilson et al (1998), which

identified demographic risk factors for MI and stroke as being male, over age 59 (especially over age 69), or being African American or Native American. These risk factors are all considered to be non-modifiable, since one cannot change them. These findings are significant because people who have any or all of the non-modifiable risk factors for MI or stroke need to identify and address any modifiable risk factors, including hypertension, in an effort to decrease their risk of suffering an MI or stroke.

Extraneous Variables

Review of the incidence of extraneous variables demonstrated by the sample as compared to that found in the subjects suffering an MI or stroke reveals a significant trend toward an association of smoking, ETOH abuse, CAD, and a history of MI or stroke with an increased risk of suffering an MI or stroke. The data from the study revealed that of all subjects who suffered an MI or stroke, 83.33% smoked cigarettes, 44.44% had a history of ETOH abuse, 66.67% were diagnosed with CAD, and 50% had a history of suffering from a previous MI or stroke. The incidence of diabetes and dyslipidemia was noted to be slightly higher among the subjects suffering an MI or stroke as compared to the rate exhibited in the sample. These findings were not surprising, since studies by Gorman (2003), Jokisalo, Kumpusalo, Enlund & Talala (2001), Pearson & Lewis (1998), and Wilson et al (1998) concluded that modifiable risk factors for suffering an MI or stroke included diabetes, smoking, ETOH abuse, CAD, and having a previous history of MI or stroke.

A surprising finding from the study was that the rate of obesity among the subjects who suffered an MI or stroke was actually less (38.89%) than that of the sample (48%). The American Heart Association (2003) and the Centers for Disease Control and Prevention (2002) both list obesity as a major risk factor for MI and stroke. The researcher speculates that the

anomaly related to the incidence of obesity exhibited in the study could have been a result of the relatively small number of subjects (17) suffering an MI or stroke in the study, and feels that given a larger sample, the rate of obesity would more closely approximate the findings in previous studies.

Data related to the correlation of the extraneous variables of smoking, ETOH abuse, CAD, previous history of MI or stroke, and to a lesser extent, that of having diabetes or dyslipidemia and the increased risk of suffering an MI or stroke supports the findings of previous studies that identify these variables as major modifiable risk factors for MI and stroke. People exhibiting any of these variables, especially in the presence of hypertension or any of the non-modifiable risk factors (i.e., male, over age 59, African American, Native American), are potentially at increased risk for suffering an MI or stroke.

Limitations of the Study

Several limitations can be noted in this study. First, the small sample size, limited to patients receiving home care services from one agency in southeastern North Carolina, does not permit generalization of the findings to a larger population. Second, the extremely small percentage of subjects diagnosed with hypertension who receive less than daily monitoring of their blood pressure does not permit valid comparison of their incidence of MI or stroke against that of home health patients who receive daily monitoring of their blood pressure. Third, the findings indicate an association between uncontrolled Stage I hypertension for less than two months and the incidence of stroke among the sample, but there is no evidence of follow-up by the researcher on this information (i.e., predictive analysis).

Suggestions for future research would be to include patients of various home care agencies in all areas of the United States and recruit subjects randomly from the community to

offer a greater chance for generalization of the findings to a broader population. This would also increase the likelihood of having enough people receiving bi-monthly or less frequent monitoring of blood pressure in the sample to make a valid comparison of any association between the frequency of blood pressure monitoring and the incidence of MI or stroke among people with a diagnosis of hypertension. Many home care agencies utilize electronic records, so one may review data contained in those records via the Internet. This would make it feasible for a researcher to review the charts of patients from all areas of the country while remaining in one location. The researcher did not pursue further application of the findings, since the primary purpose of the project was to study the association between uncontrolled Stage I hypertension for less than two months and the incidence of MI or stroke. The researcher feels the finding suggestive of an association between Stage I hypertension for less than two months and the incidence of stroke among the sample population merits further study and anticipates being able to perform a study within the year that focuses on the predictive value of the association of uncontrolled Stage I hypertension for less than two months and the incidence of stroke.

CONCLUSION

Implications for Clinical Practice

The findings from this study reveal that in the sample, the incidence of MI or stroke was much less (3.45%) among patients who did not experience any episodes of uncontrolled Stage I hypertension than that of patients in the sample who experienced at least one episode of Stage I hypertension lasting from one to eight weeks (22.54%). A review of the demographic characteristics and extraneous variables exhibited among subjects in the sample revealed a disproportionately high incidence of MI and stroke among males, people over the age of 69, African Americans, Native Americans, those subjects who smoked, abused alcohol, were

diagnosed with CAD, had a previous history of MI or stroke, and to a lesser extent, those subjects with a diagnosis of diabetes or dyslipidemia. All of these findings support the conclusions of previous studies, which emphasize the importance of recognizing and addressing conditions and behaviors associated with an increased risk of experiencing MI or stroke.

One finding that is not revealed in the previous literature, is that of the association of uncontrolled Stage I hypertension for less than two months and the incidence of stroke demonstrated among the sample. This is significant, as it appears to suggest that as the length of time subjects in the sample experienced uncontrolled Stage I hypertension increases (even for periods of time less than two months), so does their risk of suffering a stroke.

Findings from this study suggest that healthcare practitioners working with patients who have a diagnosis of hypertension must educate this population on the risk associated with experiencing Stage I hypertension for even relatively short (less than two months) periods of time and their suffering a stroke. The nurse practitioner should assist the patient in identifying factors associated with an increased risk of MI or stroke, and facilitate implementation of primary interventions aimed towards decreasing the number of modifiable risk factors demonstrated in each patient. The nurse practitioner should also aggressively treat hypertension to a level at or below 120/80 mm Hg in all patients, as suggested by Chobanian et al. (2003) and provide a venue whereby patients can receive monitoring of blood pressure at least monthly.

Implications for Research

Based on the data from this study and recognition of hypertension as a major risk factor in the development of MI and stroke (American Heart Association, 2003; Centers for Disease Control and Prevention, 2002; Kario et al, 2003; Staessen, Wang, & Thijs, 2003; Vasan et al, 2001; Wilson et al, 1998), further exploration of the association between uncontrolled Stage I

hypertension for less than two months and the incidence of stroke is clearly needed. Further directions for research are to determine whether the association of uncontrolled Stage I hypertension for less than two months and the incidence of stroke among home health patients supported in the study can be duplicated using a different sample.

Suggestions for future research would be to include patients of home care agencies located in various regions of the United States, recruit subjects randomly from the community, and utilize a larger sample. This sampling approach would increase the chance for generalizability of the findings, and would also increase the chance for the comparison of the incidence of MI or stroke between patients with a diagnosis of hypertension who receive daily monitoring of their blood pressure and those patients with a diagnosis of hypertension who receive bi-monthly or less frequent monitor. It would also be advantageous to examine the association between uncontrolled Stage I hypertension for less than two months and the incidence of stroke demonstrated in this study, for predictive value.

Hypertension is a multi-faceted condition, which is a major risk factor in the development of MI and stroke (Wilson et al, 1998). Only through a thorough understanding of all aspects of hypertension, may one gain an appreciation of its impact and adjust treatment appropriately. The purpose of this study was to explore the relationship between uncontrolled Stage I hypertension and the incidence of MI or stroke and thus fill a void in the literature. The findings from the study suggest an association between uncontrolled Stage I hypertension and the incidence of stroke among the sample and warrant further research in this area.

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Appendix A

DATA COLLECTION TOOL
ASSOCIATION OF HTN AND INCIDENCE OF MI AND/OR STROKE
JOHN BEAVER, RN

Patient ID #	HTN/Weeks	MI	Stroke
001	1	0	0
001	1	0	0
002	1	0	0
002	2	0	0
002	1	0	0
003	1	0	0
003	2	0	0
003	1	0	0
004	1	0	0
004	1	0	0
005	1	0	0
006	4	1	0
006	1	0	0
006	2	0	0
006	1	0	0
006	1	0	0
007	1	0	0
007	0	0	0
008	1	0	0
008	1	0	0
009	1	0	0
010	1	0	0
011	1	0	0
011	1	0	0
011	2	0	1
012	1	0	0
012	1	0	0
012	1	0	0
012	3	0	0
013	1	0	0
014	4	0	0
014	2	0	0
014	1	0	0
014	2	0	0
014	1	0	0
015	6	0	0
015	1	0	0
016	5	0	0
016	1	0	0

Appendix B

DEMOGRAPHIC INFORMATION				
SAMPLE POPULATION / RESEARCH PROJECT				
JOHN BEAVER, RN				
Patient ID #	DOB	Gender	Payor	Race
001	8/7/40	F	MCAID	B
002	11/1/34	M	MCAID	PAKISTANI
003	7/16/27	F	MCAID	B
004	9/13/42	M	MCAID	W
005	1/20/15	F	MCAID	W
006	8/25/27	F	SELF	W
007	2/23/20	F	MCAID	B
008	5/7/30	F	MCAID	W
009	12/3/29	F	MCAID	I
010	1/31/41	F	MCAID	W
011	10/14/26	F	MCAID	B
012	1/20/44	F	MCAID	B
013	10/18/22	F	MCAID	I
014	3/8/17	F	MCAID	W
015	4/27/23	F	MCAID	I
016	4/1/31	M	MCAID	I
017	10/1/65	F	MCAID	B
018	12/14/62	F	MCAID	B
019	1/9/46	F	MCAID	B
020	3/3/40	M	MCAID	W
021	5/14/26	F	MCAID	W
022	1/15/49	F	MCAID	B
023	6/25/17	M	SELF	W
024	10/22/11	F	MCAID	B
025	10/24/27	M	MCAID	B
026	6/30/26	F	MCAID	W
027	5/20/21	F	MCAID	I
028	5/31/24	F	MCAID	B
029	3/17/28	F	MCAID	I
030	1/1/31	F	MCAID	B
031	9/24/13	F	MCAID	W
032	3/26/24	F	MCAID	I
033	8/1/49	M	MCAID	I
034	4/27/31	F	MCAID	I
035	2/20/26	F	MCAID	B
036	3/7/35	F	MCAID	I
037	2/4/20	F	MCAID	W
038	11/15/47	F	MCAID	B
039	7/14/42	F	MCAID	B
040	10/18/60	M	MCAID	B
041	8/26/15	F	MCAID	I
042	8/16/66	F	MCAID	W
043	5/28/22	F	MCAID	B
044	9/16/39	F	MCAID	B
045	9/18/48	F	MCAID	W
046	5/18/21	M	MCAID	I
047	6/14/39	F	MCAID	I
048	8/30/15	F	MCAID	I
049	1/2/24	F	MCAID	W
050	1/12/05	M	MCAID	B
051	2/22/29	F	MCAID	I
052	7/11/29	F	MCAID	B
053	3/29/21	F	MCAID	W
054	9/5/41	F	MCAID	B
055	2/2/22	F	MCAID	B
056	7/12/29	F	MCAID	B
057	1/14/32	F	MCAID	W
058	6/21/23	F	MCAID	I
059	10/17/19	F	MCAID	I

Appendix C

EXTRANEOUS VARIABLES THAT CAN INCREASE RISK OF MI OR STROKE							
RESEARCH PROJECT							
JOHN BEAVER, RN							
Patient ID #	Smoking	Obesity	ETOH Abuse	Diabetes	Dyslipidemia	CAD	Hx MI/Stroke
1	Y	Y	N	Y	Y	Y	N
2	N	Y	N	Y	Y	Y	Y
3	N	N	N	N	N	N	N
4	Y	Y	N	Y	Y	N	N
5	N	N	N	N	N	N	N
6	Y	N	N	N	N	Y	Y
7	Y	Y	Y	Y	Y	Y	N
8	Y	Y	Y	N	N	Y	N
9	Y	N	N	Y	Y	Y	Y
10	Y	N	Y	N	N	N	N
11	N	Y	N	Y	Y	Y	N
12	Y	N	N	N	N	N	N
13	N	Y	N	Y	Y	Y	Y
14	N	N	N	N	N	N	N
15	Y	Y	Y	N	N	Y	Y
16	Y	N	N	Y	Y	Y	Y
17	N	Y	N	Y	Y	N	N
18	N	Y	N	Y	Y	Y	Y
19	Y	N	N	N	N	N	N
20	Y	N	Y	N	N	Y	Y
21	N	Y	N	Y	Y	Y	N
22	N	N	N	Y	N	Y	Y
23	Y	N	Y	N	N	Y	Y
24	N	N	N	N	N	Y	Y
25	N	N	Y	N	N	N	N
26	Y	Y	N	N	N	Y	N
27	Y	N	Y	N	N	N	N
28	N	N	N	Y	N	Y	N
29	N	N	N	N	N	N	N
30	N	N	N	Y	Y	Y	N
32	N	N	N	N	N	N	N
34	Y	N	N	N	N	Y	N
33	Y	Y	Y	Y	Y	Y	Y
36	N	Y	N	N	N	N	N
37	N	Y	N	N	N	N	N
38	Y	Y	N	N	N	Y	N
39	N	N	N	N	N	N	N
31	N	Y	N	Y	Y	Y	Y
40	N	Y	N	Y	Y	Y	N
44	Y	Y	Y	N	N	Y	Y
46	N	N	N	N	N	N	N
41	Y	Y	N	N	N	Y	N
42	N	N	N	N	N	N	N
43	N	Y	N	Y	Y	Y	N
45	Y	N	N	N	N	N	N
47	Y	N	Y	N	N	Y	Y
48	Y	Y	N	N	N	N	N
49	N	N	N	N	N	N	N
55	N	N	N	N	N	N	N
54	Y	N	Y	N	N	Y	Y
52	Y	Y	N	N	N	N	N
53	N	N	N	N	N	N	N
51	Y	N	N	N	N	N	N
59	N	Y	N	Y	Y	Y	N

Appendix D

May 31, 2004

To Whom It May Concern,

Interim Healthcare of the Eastern Carolinas does hereby grant access to all information contained in the charts of our clients to Mr. John David Beaver, RN and anyone appointed by Mr. Beaver to collect data relevant to the research project in which Mr. Beaver is associated. It is understood by Interim Healthcare of the Eastern Carolinas that other individuals, including members of the research team and faculty of the University of North Carolina at Wilmington will have access to the data collected, including demographic information (race, age, sex, method of payment for services), blood pressure measurements, medications, frequency of visits to physician(s)/emergency department/urgent care facilities, scheduled/unscheduled medical procedures and/or hospitalizations, and the incidence of myocardial infarction and/or stroke in the population being studied during the period of time from May 1, 2003 to May 1, 2004.

All charts utilized for the collection of data will be kept on the property of Interim Healthcare of the Eastern Carolina. Each patient will be identified using the assigned client identification number assigned by Interim Healthcare of the Eastern Carolinas, and no names, Medicaid/Medicare/Private Insurance policy numbers, or Social Security Numbers will be included in any of the data collected. All data collected from the charts of the patients will be kept under lock and key, when not being reviewed or utilized by members of the research project. Once all data is collected, analyzed and integrated into the body of the project, it is understood that all evidence of the raw data collected will be destroyed or erased. There will be no data available in the final research paper to identify any of the patients, whose information will be used.

It is the understanding of Interim Healthcare of the Eastern Carolinas that the data collected from the charts is to be used for the purpose of studying the correlation of time intervals of uncontrolled hypertension in home health clients and the incidence of myocardial infarction and/or stroke in this same population, and that this study will be used as the basis for Mr. Beaver's graduate research thesis paper at the University of North Carolina at Wilmington. If any further information or clarification of the consent given is needed, please feel free to contact me at (910) 642-7080, ext. 342.

Sincerely,

Phyllis B. Nealey, RN, Director of Integrity and Compliance
Interim Healthcare of the Eastern Carolinas