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Relationship Between Self-Reported Lifestyle Habits, Social Support, and Physiological Factors Associated with Hypertension : A Biopsychosocial Investigation

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THE RELATIONSHIP BETWEEN SELF-REPORTED LIFESTYLE HABITS, SOCIAL SUPPORT, AND PHYSIOLOGICAL FACTORS ASSOCIATED WITH HYPERTENSION: A BIOPSYCHOSOCIAL INVESTIGATION

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Dissertation Approval

This is to certify that the thesis presented to us by Deborah A. Chiumento on the 28th day of May, 2008, in partial fulfillment of the requirements for the Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

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ABSTRACT

The relationship between hypertension and related biological, psychological, and social variables among patients diagnosed with hypertension was investigated utilizing the biopsychosocial model. Fifty-four participants from one outpatient private medical office were administered a demographic form, the Beck Anxiety Inventory (BAI), the Health Adherence Behavior Inventory (HABIT), the Inventory for Cognitive Distortions (ICD), and the Multidimensional Scale of Perceived Social Support (MSPSS). Results indicated that the participants' use of caffeine positively correlated with their high blood pressure readings. In addition, participants who reported having significant social support engaged in more health promoting behaviors. These findings were consistent with the hypotheses. Limitations of this research and directions for further research are discussed. These findings may have indications for primary care physicians, as they may better understand factors related to hypertension.

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CHAPTER 1

Introduction and Literature Review

Statement of the Problem

Hypertension is a serious medical condition that affects many people. It is estimated that hypertension affects almost 50 million people in the United States alone (Burt et al., 1995). Hypertension, or high blood pressure, is defined as having a systolic blood pressure (SBP) of 140 mm Hg or greater, having diastolic blood pressure (DBP) of 90 mm Hg or greater, or taking antihypertensive medication (Blumenthal, Sherwood, Gullette, Georgiades, & Tweedy, 2002). Systolic blood pressure, or SBP, is the upper number, and diastolic blood pressure, or DBP, is the lower number. SBP is the peak pressure in the arteries during the cardiac cycle. The DBP is the lowest pressure measured at the resting phase of the cardiac cycle. An individual's DBP increases only until about age 60, but SBP continues to increase with age (Campbell et al., 1999). The cardiac cycle is the sequence of events that occur as a heart works to pump blood through the body. Elevated blood pressure throughout life can lead to hypertension, also known as the "silent killer."

The exact etiology of hypertension has been speculated upon for many years and yet remains unknown. Hypertension is categorized as either primary (unknown etiology) or secondary (resulting from a number of causes) (DiTomasso, 2003). However, it can be concluded that a myriad of factors contributes to the onset of this condition. Genetic and environmental factors, specifically psychosocial factors such as stress, personality, and behavior, have been shown to play a role in the development of hypertension

(Schwartz, Pickering, & Landsbergis, 1996). These factors are referred to as risk factors of hypertension.

Hypertension is related to serious health problems such as diabetes and obesity. Coupling hypertension with these problems can result in morbidity. Worldwide, hypertension is the third leading risk factor contributing to death (Campbell et al., 1999). The statistics are rising and they are alarming; however, there is hope for controlling this condition. Medical treatments and management of psychosocial factors can ward off the onset of the condition or control it once a diagnosis is made. The focus here is to examine and assess the risk factors leading to onset and how changing or modifying these factors can manage the condition if already diagnosed.

The prevalence of hypertension is related to age, gender, and ethnicity (Blumenthal et al., 2002). The incidence of hypertension increases with age. In young adults, the diagnosis of hypertension is much greater in men than in women; however, this reverses at around 50 years old to a greater prevalence in women than in men (Burt et al., 1995). Hypertension is also seen more among the Black population as compared to Americans of European heritage (Hall, Brands, Dixon, & Smith, 1997).

Given the morbidity and mortality associated with hypertension (Hall et al., 1997), more research is needed to clarify the relationship between biopsychosocial factors and this serious disease. The biopsychosocial model provides a comprehensive approach to addressing important factors that may be related to hypertension. Understanding the relationship between lifestyle habits, social support, and biological factors in hypertension may, then, help to provide important information related to its assessment and treatment in three critical spheres of patient functioning. The

biopsychosocial model will prove to be a useful vehicle for providing valuable information in all domains of the patient's functioning. The biopsychosocial model of hypertension emphasizes assessment/treatment directed at the biological, psychological, and social factors of the individual. Most studies to date have examined individual variables representing on one or more of the factors within one realm. Research is needed to address the combination of factors within each realm and their relationship to hypertension.

Purpose of the Study

The purpose of this study was to examine the relationship between biological, psychological, and social factors and hypertension in an outpatient family practice sample of hypertensive patients. More specifically, the aims of this investigation were to examine the relationship between hypertension and (a) biological variables (specifically, weight, smoking behavior, and caffeine consumption), (b) hypertension and self-reported lifestyle habits (as measured by the HABIT), (c) psychological variables, such as distorted thinking style (as measured by the ICD) and anxiety level (as measured by the BAI), and (d) level of social support (as measured by the Multidimensional Scale of Perceived Social Support, Zimet, Dahem, Zimet, & Farley, 1988). In addition, this study examined the self-reported lifestyle habits of a group of hypertensive patients. The biopsychosocial model represents a comprehensive basis for delineating variables from a variety of important realms that comprehensively represent the patient. It is likely that a combination of these variables in any one individual may be predictive of the level of hypertension. It was hoped that the findings from this study would add to the existing

research on risk factors for hypertension and the management/modification of them. In addition, future considerations for ensuing research are discussed.

Rationale for the Study

The theory used for this study is the biopsychosocial model developed by George Engel and expanded by Cynthia Belar.

The term *biopsychosocial* stems from George Engel. In 1977, he wrote an article discussing the biopsychosocial model of disease entitled, "The Need for a New Medical Model: A Challenge for Biomedicine." This article was the first introduction of this model. The model is based on the interplay of the biological, the psychological, and the social aspects of a person's disease (Engel, 1977). Campbell and Rohrbaugh (2006, pp. 10-11), stated:

> In the biopsychosocial model, the biological system emphasizes the anatomical, structural, and molecular substrates of disease and their effects on the patient's biological functioning; the psychological system addresses the contributions of developmental factors, motivation, and personality on the patient's experiences of and reactions to illness; and the social system examines the cultural, environmental, and familial influences on the expression of, as well as the patient's experiences of, illness.

This system branched away from the traditional way of viewing health and illness and focused on incorporating and viewing biological, psychological, and social aspects of the person and how these factors influenced and/or maintained their illness. This new spin on viewing health and illness was met with some resistance in the medical community, as

the social and psychological aspects of a person's life were not previously considered or were minimized at best.

This model assesses functioning within the domains of behavior, emotions, affect, biological, psychological, and social support. Specifically, physiological, behavioral, and cognitive mechanisms may link to an individual's health, e.g., hypertension (Richman et al., 2005) and positive emotions may correspond with a healthy lifestyle. It is important to assess hypertensive patients on all domains of this model so as to accurately measure their functioning and risk and protective factors. For example, assessing hypertensive patients on the social domain, such as social support specifically, may yield clues to their support network, a well-known buffer to stress. Evidence suggests that individuals who have strong social supports typically manage their hypertension better than those without social support (Marzari et al., 2005).

The biological component of the biopsychosocial model encompasses all things biologically related to the patient. This domain specifically assesses the age, sex, race, physical appearance, symptoms, health status, physical examination, vital signs, laboratory data, medications, drugs, psychophysiological data, constitutional factors, genetics, history of injury, disease, and surgery. A picture of the person is captured on this domain as it is unique to the individual being assessed. This is the creation of a biological description of the individual. Within this domain, genetics, medications, substances, and physical conditions are explored. Specific to this study, caffeine and nicotine use are measured on this domain.

The psychological component of the biopsychosocial model encompasses all things psychologically related to the patient. This domain assesses psychological aspects

of the patient, including history of psychological problems, psychological vulnerabilities, disruptions in psychological development from childhood, and identifying psychosocial stressors. This domain reflects a case conceptualization/formulation of the patient, including coping mechanisms. Cognitive aspects of the patient are assessed here as well, including thoughts, feelings, and behaviors related to the illness. A functional analysis of behavior could be placed on this domain to determine if any behaviors are serving a specific purpose or if reinforcement is involved with the behaviors. Specific to this study, distorted thinking and anxiety are measured on this domain.

The social component of the biopsychosocial model encompasses all things socially related to the patient. This domain assesses social aspects of the patient's life, including family, friends, significant others, social issues, education, work, housing, income, access to health care services, and legal problems. Especially important in this domain is the strength or lack thereof regarding close interpersonal relationships, i.e., the social support network. Engel's 1977 position paper on the development and utilization of the biopsychosocial model stemmed from his view of the inadequate medical model, which failed to factor in other important domains of the patient's life and functioning, such as social support.

Review of Related Research

In this section, the literature related to hypertension is reviewed. This research indicates that variables within separate domains influence one's blood pressure and subsequently may contribute to hypertension. The majority of this information is based on the biopsychosocial model.

Biopsychosocial Domains

Social Domain

Social support.

Social support plays a critical role in the development or prevention of hypertension. Social support refers to a network of individuals, e.g., family, friends, and neighbors, who are available for help in times of psychological, physical, or financial distress. Social support is a psychosocial factor that can be viewed as a buffer to development of hypertension. Research from Carels et al. (1998) indicates that the presence of social support and the perceived satisfaction with social support is associated with lower blood pressure. Individuals who have a social support network upon which they can depend in times of stress tend to have lower blood pressure and are better equipped to handle stress in a positive way. Individuals who do not have a social support network upon which they can depend tend to internalize their stress and cope negatively with the situation. This internalizing coping mechanism does not allow the individual to express the stress, and therefore they are left to deal with it alone. This can exacerbate a negative physiological reaction, such as an increase in blood pressure. Over time, this can develop into hypertension. For example, one way in which increased social support is beneficial against the development of coronary heart disease and hypertension is through the ability to reduce cardiovascular arousal associated with psychological stress (Carels, Blumenthal, & Sherwood, 1998). The threat of being alone is not present for those with social support networks, and they perceive their stressful situations as less threatening because of their network upon which they can depend. These individuals feel as if they "share" their stress with others and by this they are able to disseminate it.

Biological Domain

Caffeine.

Elevated blood pressure is a risk factor for the development of cardiovascular disease and may be exacerbated by regular consumption of coffee (caffeine) (Rakic, Burke, & Lawrence, 1999).

Caffeine is a drug that grows naturally in the leaves of plants. It is referred to as a drug because it is a central nervous system stimulant that causes arousal, alertness, and increased heart rate and wards off drowsiness temporarily. Over 90% of Americans consume caffeine products every day. Caffeine can be found in tea, coffee, cola, energy drinks, chocolate, and over-the-counter medications. In moderate amounts, caffeine can ward off drowsiness and increase mental alertness, but in higher doses caffeine can cause anxiety and jitters and can interfere with normal sleep patterns. Caffeine can be so highly addicting that withdrawal symptoms can be experienced in those that abruptly stop their caffeine consumption. The American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision *(DSM-IV-TR)* offers four caffeine-related disorders: *caffeine intoxication, caffeine-induced anxiety disorder, caffeine-induced sleep disorder,* and *caffeine-related disorder not otherwise specified.* Included in the *caffeine intoxication* category is a sign that relates to the physiological response of caffeine relating to hypertension: tachycardia or cardiac arrhythmia. Tachycardia occurs when the heart beats too quickly at rest. Tachycardia usually only occurs during exercise or physical exertion as a response, but this is considered physiologically normal. One can understand how caffeine intoxication can cause

tachycardia and the implications this may have on one's blood pressure and onset of hypertension.

Rakic et al. (1999) studied the effects of coffee on blood pressure (BP) in older men and women. Their findings are consistent with other research on caffeine intake and BP. Their study showed increased ambulatory BP in hypertensive patients drinking five cups of coffee per day compared to abstainers. They found a significant effect of coffee drinking relative to abstinence in hypertensive individuals, with a decrease in BP during abstinence and an increase during coffee drinking. Both ambulatory SBP and DBP were affected, both of which lowered when abstaining from coffee and increased when consuming coffee. It was also noted that switching to decaffeinated coffee equaled the same benefit as abstaining from coffee altogether. This study concluded that some restriction of regular coffee intake may be an effective way to prevent and/or manage hypertension and blood pressure.

Nicotine.

BP and heart rate increase during smoking, and these effects are specifically associated with nicotine (Journath et al., 2005). According to Cryer et al. (1976), smoking has been shown to induce an acute rise in BP in normotensive smokers. Sorensen et al. (2004) studied the effects of smoking on BP in hypertensive smokers and hypertensive nonsmokers. They found a significant difference in ambulatory SBP and DBP between smokers and nonsmokers. The hypertensive smokers BPs were significantly higher than the hypertensive nonsmokers'. Along with elevated BP was increased heart rate, both of which are risk factors for cardiovascular disease, specifically hypertension.

A study conducted by Journath et al. (2005) examined whether hypertensive smokers have a worse cardiovascular risk profile than nonsmokers and the reasons why. Their findings suggest that hypertensive smokers do exhibit a worse cardiovascular risk profile, including higher SBP and DBP than nonsmokers. One of their reasons is that smoking (nicotine intake) may negatively interact with the pharmacological actions of antihypertensive medications, making them less potent. Another reason, psychological in nature, is that smokers may differ from nonsmokers in general attitude, behavior, and personality, which may impact blood pressure. By this, the researchers argue that smokers may be less compliant with drug treatment. They recommend smoking cessation for hypertensive and normotensive patients.

Psychological Domain

While anger/hostility expression and personality style have been viewed as factors in hypertension, other psychological factors were selected that were likely to be relevant to hypertension, such as distorted thinking (as measured by the ICD) and anxiety (as measured by the BAI).

Anxiety.

Anxiety is a common symptom experienced by all individuals in response to stress. According to the National Institute of Mental Health (NIMH), anxiety is a normal reaction to stress, and it helps us cope with everyday situations by helping us get through the workday, a test, or other events. We all experience various levels of stress in our daily lives in response to each of our unique stressful situations into which we come in contact.

Anxiety can sometimes become very overwhelming, feel dreadful, and may be irrational for some individuals. When this type of anxiety interferes with everyday functioning, it can come to represent something other than the normal reaction to stress. Diagnoses involving anxiety disorders include generalized anxiety disorder, obsessive-compulsive disorder, panic disorder, posttraumatic stress disorder, and social phobia (or social anxiety disorder). Treatment options exist for those individuals diagnosed with one of these anxiety disorders. However, if left untreated, anxiety symptoms can cause a host of health-related problems, including cardiovascular problems, specifically hypertension.

Research indicates that anxiety appears to be more common in patients with cardiovascular disorders than in the general population (Rozanski, Blumenthal, & Kaplan, 1999). These cardiovascular disorders include coronary artery disease, hypertension, and chronic obstructive pulmonary disorder, which in turn can lead to stroke and heart attack (myocardial infarction), which can lead to death. According to Wei and Wang (2006), patients with anxiety may have an increased incidence of cardiovascular disease, such as hypertension.

However, it is difficult to ascertain whether anxiety symptoms make blood pressure worse or if blood pressure makes anxiety symptoms worse for hypertensive patients. Wei and Wang (2006) have postulated that individuals with anxiety disorders are prone to unhealthy lifestyle behaviors such as smoking, which may adversely influence the medication for hypertension. Because anxiety is such a common problem in this population, anxiety should be assessed in these individuals and monitored/managed as well.

Distorted thinking.

Distorted thinking is defined as a thinking process that distorts one's reality. This type of thinking leads to cognitive distortions that one comes to believe and incorporate into everyday living. The effects of distorted thinking are usually negatively associated with one's view of a specific situation. There are many terms used to describe cognitive distortions, e.g., mind reading, catastrophizing, overgeneralization, and fortune telling, just to name a few (Burns, 1999).

Uhl (2007) examined the relationship between cognitive distortions and their effect on psychological and behavioral factors relating to one's view of one's health problems. The study examined 150 heterogeneous participants from an adult family medical practice. Results indicated that the more an individual engages in cognitive distortions, the more likely they are to engage in negative psychological and health risk behaviors. One of the instruments utilized in this study was the Inventory of Cognitive Distortions (ICD), a brief questionnaire. Lower scores on the ICD were correlated with individuals not having problems with smoking, caffeine, drugs, or eating behaviors. Higher scores on the ICD were correlated with individuals who had problems with these behaviors. The study indicated that physicians need to better assess the psychological wellbeing of their patients in order to give comprehensive care (Uhl, 2007).

The biopsychosocial model is an integrative and interrelated model of viewing health and illness as it relates to the unique individual. It is a comprehensive theory that addresses all of the three important components of patient functioning and their interrelationship. This model also provides the opportunity to address all major facets of the client as they relate to the presenting problem.

Research Hypotheses

The following research hypotheses were posited:

H_1: Biological: There will be a significant, positive correlation between weight, as measured in pounds, and systolic and diastolic blood pressure, as measured in millimeters of mercury.

H_2: Biological: There will be a significant, positive correlation between level of smoking, as measured in cigarettes smoked per day, and per week, and systolic and diastolic blood pressure, as measured in millimeters of mercury.

H_3: Biological: There will be a significant, positive correlation between level of caffeine consumption, as measured by number of caffeinated beverages consumed per day and per week, and systolic and diastolic blood pressure, as measured in millimeters of mercury.

H_4: Psychological: There will be a significant, positive correlation between BAI total scores and systolic and diastolic blood pressure, as measured in millimeters of mercury.

H_5: Psychological: There will be a significant, positive correlation between ICD total scores and systolic and diastolic blood pressure, as measured in millimeters of mercury.

H_6: Social: There will be a significant, negative correlation between HABIT total scores and hypertension.

CHAPTER 2

Method

Participants

Study participants were volunteers from Dr. Robert Mazzuca's private family practice office in Atco, New Jersey. A total of 54 adult outpatients presenting for scheduled appointments with the physician participated in the study. These patients were previously diagnosed with hypertension and were currently taking prescribed hypertension medication. Participation was voluntary for this study. All participants remained anonymous. Basic, nonidentifying, demographic information was gathered, in addition to the four questionnaires. Demographic information included height, weight, age, gender, race, and nicotine, alcohol, and caffeine use. In addition, the patients' systolic and diastolic blood pressure readings were recorded from the day of the scheduled appointment.

Participant Inclusion Criteria

Participants for this research study were required to meet predetermined conditions in order to be included in the study. They had to be between 18 and 65 years of age, be able to read and comprehend English at the eighth grade level, be under the care of Dr. Mazzuca, currently prescribed and taking hypertension medication, have no intellectual impairment (mental retardation), and suffer from no severe forms of psychopathology, including psychotic disorders, dementia, bipolar disorder, or schizophrenia.

Participant Exclusion Criteria

Excluded were patients who were below the age of 18 or over the age of 65, had less than an eighth grade level of education, or suffered from intellectual impairment or severe forms of psychopathology.

Participant Recruitment

Information about this research study was posted in the waiting room and examination rooms in Dr. Mazzuca's office. A large poster describing the study was displayed in the waiting room, and patients were encouraged to inquire with the staff and/or physician if they were interested in participating. Smaller versions of the poster were displayed in each of the three examination rooms. In addition, both the physician and staff approached patients who were eligible to participate in the study. Patients who were interested and eligible to participate were presented with a packet containing the following: brief, nonidentifying demographic questionnaire (Appendix), Beck Anxiety Inventory, Multidimensional Scale of Perceived Social Support, Health Adherence Behavior Inventory, and Inventory of Cognitive Distortions. Completion time was estimated to be approximately 20 to 30 minutes.

Measures

Study materials consisted of the HABIT (DiTomasso, 1997), the ICD (Yurica & DiTomasso, 2001), the BAI (Beck, Epstein, Brown & Steer, 1988), and the MSPSS (Zimet et al., 1988).

Health Adherence Behavior Inventory

The Health Adherence Behavior Inventory (HABIT) was developed by DiTomasso (1997). This dichotomous questionnaire consists of 50 items and was developed for use in primary care settings (Parke, 2004). The statements are meant to measure real life "habits" of people, e.g., "I try to avoid being around people who are smoking near me," "I eat my meals while doing other things," "I don't chew tobacco." These statements require the individual to answer true or false, depending on their own lifestyle behaviors. Three items are reverse scored, and they are framed in a negative manner, e.g., "People tell me that I am a couch potato."

HABIT reliability

As a relatively new instrument studies related to the reliability of the HABIT have yet to be undertaken.

HABIT validity

DiTomasso and Parke (2002) demonstrated the construct and content validity of the HABIT to be preliminarily established. There was a significant correlation found at the 0.01 level.

Inventory of Cognitive Distortions

The Inventory of Cognitive Distortions (ICD) was developed by DiTomasso and Yurica (2001). The ICD is a 69-item self-report inventory, which is comprised of short statements reflecting 11 factor-analyzed cognitive distortions. These items are scored on

a five-point Likert scale ranging from 1 (Never) to 5 (Always). Total possible ICD scores range from 69 to 345. Elevated scores indicate more frequent cognitive distortions, and lower scores indicate less frequent cognitive distortions. This inventory aims to capture specific cognitive distortions individuals may have. Cognitive distortions were first examined by Beck and reflect errors in rational thought processes.

There have been a number of dissertations providing support for the ICD. Yurica's dissertation focused on examining the psychometric development of a 69-item scale designed to measure thinking errors (ICD). Initially, 17 cognitive distortions were identified and operationally defined, with a corresponding list of 120 items to reflect these distortions drawn from a literature review. Both the cognitive distortions and the 120 reflective items were judged for accuracy, and were placed in cognitive distortion categories only when 100% agreement was reached from the judges. The ICD was then administered to a control group and a psychiatric group along with other measures. The ICD separated the psychiatric outpatient sample from the control group sample. According to Yurica (2002), the research findings proved the ICD to possess good psychometric properties.

Rosenfield (2002) investigated the ICD as it relates to Axis I and Axis II disorders. He found that cognitive distortions could be identified, examined, and correlated with a psychological disorder, hence recommending the ICD as an assessment measure. He found the ICD to be a useful instrument in an adult outpatient sample. His research indicated that the ICD could be useful in providing baseline measures of cognitive distortions and guide in the assessment, treatment, and follow-up of individuals with a psychological disorder on Axis I or Axis II.

ICD reliability

Uhl (2007, pp. 54)

The test-retest reliability of the total ICD score is excellent. The test-retest reliability coefficient during the initial validation study was .998 ($n = 28$, $p < .001$) (Yurica, 2002 & Uhl, 2007).

ICD validity

Uhl (2007, pp. 54-55) reported:

During the initial validation study, Yurica (2002) also demonstrated Total ICD score has excellent criterion validity. Total ICD scores differentiated clinical outpatients from non-patient controls ($F = 15.2$, $df = 169$, $p < .0001$). Concurrent validity was also good, Total ICD scores correlated positively and significantly with other well known and widely accepted measures of psychopathology, such as depression, the BDI-II ($r = .70$, $N = 161$, $p < .0001$); anxiety, the BAI ($r = .59$, $N = 161$, $p < .0001$), and dysfunctional attitudes, the DAS ($r = 70$, $N = 159$, $p < .0001$). The ICD is a brief self-report inventory of key cognitive processes demonstrated to have good psychometric properties (Yurica, 2002). Yurica and DiTomasso used mental health patients and a comparative normal group in their development and validation of the ICD (Yurica, 2002). Providing further validation for the ICD has implications that are beneficial both to practice and to research in a number of important respects.

Beck Anxiety Inventory

The Beck Anxiety Inventory (BAI) is a 21-item inventory intended to discriminate anxiety from depression. This inventory yields a total score and takes about 5 to 10 minutes to complete. The items describe specific anxiety symptoms and individuals are asked to rate on a 4-point scale (0-3) how much each symptom has been bothering them in the past week, up to and including today. Scores on the BAI range from 0 to 63, with lower scores reflecting less endorsed severity of anxiety symptoms and higher scores indicating more severe anxiety symptoms (Beck et al., 1988). This inventory has been validated in older adolescent and adult populations.

BAI reliability

The test-retest reliability of the BAI total score has been proven by both Beck et al. (1988) and Wilson (1999). Good internal consistency has been found, as well.

BAI validity

The validity of the BAI has been proven to be excellent according to Beck et. al. (1988).

Multidimensional Scale of Perceived Social Support (MSPSS)

The Multidimensional Scale of Perceived Social Support (MSPSS) is a validated 12-item instrument designed to assess perceptions about support from family, friends, and a significant other. This scale was developed by Zimet, Dahem, Zimet, and Farley in

1988. The items are divided into factor groups relating to the source of support, with scores ranging from 1 to 7 on a Likert scale. High scores indicate high levels of perceived support and low scores indicate low levels of perceived support. This scale was studied and validated using adolescent and adult outpatient populations (Zimet et al., 1988). Social support is believed to contribute a moderating influence between stressful life events and depression.

MSPSS reliability

Initial MSPSS reliability was demonstrated, with good internal reliability and good stability. The sample size was 275, with coefficient alphas for the subscales and scale as a whole ranging from .85 to .91 and test-retest values ranging from .72 to .85 (Zimet et al., 1988).

MSPSS validity

Adequate MSPSS content validity was demonstrated by Zimet et al., (1988) as well.

Procedure

The investigator asked medical patients from Dr. Robert F. Mazzuca's family practice in Atco, New Jersey to participate in a study of the relationship between hypertension and associated risk factors. Coinvestigators (the office staff) were available during the research period and were trained to assist the investigator with this study. When a medical patient was asked if he or she would like to participate in the study and

expressed interest, he or she was evaluated with regard to the inclusion criteria. When a patient met the criteria, he or she was given a packet containing the following:

1. Brief Demographic Questionnaire (Appendix)
2. The Health Adherence Behavior Inventory
3. The Inventory of Cognitive Distortions
4. Beck Anxiety Inventory
5. Multidimensional Scale of Perceived Social Support

Before allowing the participant to begin the questionnaire packet, the staff confirmed that he or she understood the nature of the study and answered any questions. Participants returned the fully completed packets to the staff or physician. All questionnaire packets were completed in the office anonymously. No packets were allowed to leave the office.

Upon completion of the packet, all data were entered into the Statistical Program for the Social Sciences (SPSS), Version 15.0. In addition, SPSS software was used to perform the statistical analysis of the data. It took approximately 15 weeks to collect the 54 participant packets.

CHAPTER 3

Results

Pearson product-moment correlations were used to test all the hypotheses. A multivariate analysis of variance (MANOVA) was used to examine the relationship between self-reported health adherence behaviors, alcohol consumption, and gender and systolic and diastolic blood pressure. Demographic characteristics of the sample as well as the findings are presented and examined. Additional findings are discussed.

Descriptive Results

It took approximately 15 weeks to collect the 54 participant sample questionnaires. No participants dropped out of the study and all completed the entire questionnaire packet.

Age

Participants ranged in age from 36 to 65 years of age, with a mean age of 55.70 (SD = 8.21).

Gender

The sample was comprised of 55.6 % of males and 44.4% females. The gender distribution for the total sample is shown in Table 1.

Table 1.

Frequency Distribution for Gender

Gender	Frequency	Percent
Male	30	55.6
Female	24	44.4
Total	54	100.0

Weight

The average participant in the sample weighed 200.85 pounds, with a standard deviation of 52.57. The weight range was 107 to 401 pounds.

Height

The average participant in the sample was 67.04 inches tall, with a range of 49 to 73 inches.

Race

The distribution of race reveals that the overwhelming majority of participants were White. Almost 93% were White, while the remaining 7% were equally distributed among across American Indians, Blacks, Asians/Pacific Islanders, and Hispanics or Latinos. Race was distributed as shown in Table 2.

Table 2.

Frequency Distribution for Race

Race	Frequency	Percent
American Indian or Alaskan Native	1	1.9
Black	1	1.9
White	50	92.6
Asian or Pacific Islander	1	1.9
Hispanic or Latino	1	1.9

Systolic and Diastolic Blood Pressure

The systolic and diastolic blood pressure readings for the participants in the study are shown in Table 3. In addition, the BAI, HABIT, and ICD total scores are represented, along with the subscales of the MSPSS.

Table 3.

Frequency Distribution for Blood Pressure and Biopsychosocial Instrument Scores

Variable	Minimum	Maximum	Mean	*SD*
SBP	110.00	186.00	138.2	14.8
DBP	60.00	117.00	82.5	10.0
BAI Total	.00	31.00	6.4	6.4
SsSO1	1.00	7.00	5.5	1.5
SsSO2	1.00	7.00	5.6	1.6
SsSO3	2.00	7.00	5.6	1.5
SsSO4	1.00	7.00	5.5	1.6
SsFAM1	1.00	7.00	5.8	1.4
SsFAM2	1.00	7.00	5.7	1.5
SsFAM3	1.00	7.00	5.3	1.6
SsFAM4	1.00	7.00	5.2	1.6
SsFRI1	1.00	7.00	5.1	1.3
SsFRI2	1.00	7.00	5.3	1.4
SsFRI3	1.00	7.00	5.3	1.4
SsFRI4	1.00	7.00	5.1	1.5
HABIT Total	13.00	45.00	29.4	7.7
ICD Total	96.00	282.00	162.3	40.7

The average participant in the study was in stage 1 hypertension (systolic blood pressure range between 140 and 159 and/or diastolic blood pressure range between 90 and 99).

It is to be noted that the average level of anxiety, reported as BAI total score, is 6.4, which is not considered clinically anxious.

The HABIT total score average is 29.41 (on a 50-point scale). This indicates that the average respondent engages in 29 out of a possible 50 health adherence behaviors.

The ICD total score average is 162 (range of 69 to 345). This indicates that there is a low occurrence of distorted thinking. This finding correlates with the low average anxiety score on the BAI.

Descriptive Statistics for Self-Reported Health Risk Behaviors

Nicotine Use

Nearly 78% of the sample reported being nonsmokers, as shown in Table 4. Of those who reported smoking, the average ranged from 2 cigarettes per day to one half pack per day, with almost 4% smoking about one half pack per day.

Table 4.

Frequency Distribution for Nicotine

Cigarette Use	Frequency	Percent
Nonsmoker	42	77.8
Smoker	12	22.2

Alcohol Consumption

Nearly 56% of the respondents reported they consumed alcohol, as presented in Table 5. Of those who reported consuming alcohol, about 21% reported consuming 2 drinks per day, with significant variability in reported number of drinks consumed per week. The range of drinks consumed per week was one half drink to 20 drinks. The modal score was 3 drinks per week.

Table 5.

Frequency Distribution for Alcohol Consumption

Alcohol	Frequency	Percent
No alcohol	22	40.7
Alcohol	30	55.6

Caffeine Consumption

As shown in Table 6, 85.2% of the respondents reported consuming caffeinated beverages on a daily basis.

Table 6.

Frequency Distribution for Caffeine Consumption

Caffeine	Frequency	Percent
No caffeine	8	14.8
Caffeine	46	85.2

It is to be noted that of those who reported consuming caffeine, a range of 1 to 6 caffeinated beverages per day was reported, with about 60% consuming 1 to 2 per day. Also, a range of 2.5 to 35 beverages per week was reported. The modal response was 14.8 caffeinated beverages consumed per week.

Self-Reported Engagement in Health Adherence Behaviors

The frequency and percentage of self-reported engagement in health adherence behaviors as indicated on the HABIT are shown in Table 7.

Table 7a.

Frequency and Percentage of Engagement in Health Adherence Behaviors on the HABIT

Item	Frequency	Percent
1. I try to avoid being around people who are smoking near me	32	59.3
2. I try to sleep 8 hours each night	38	70.4
3. I avoid cigarette smoke	34	63.0
4. I avoid napping during the day if I can help it	30	55.6
5. I watch my calories pretty carefully	18	33.3
6. I eat my meals while doing other things	29	53.7
7. I test the smoke alarms in my house regularly	29	53.7
8. I lift weights	9	16.7
9. I obtain tests when instructed by my physician to do so	49	90.7
10. I take a logical approach to solving problems in my life	43	79.6
11. I practice formal relaxation or meditation exercises	6	11.1
12. I avoid fast food restaurants, when hungry	28	51.9
13. I avoid snacking between meals	9	16.7
14. I examine my skin for any unusual markings	34	63.0
15. I take the stairs rather than an elevator or escalator, whenever possible	17	31.5
16. When outside on sunny days for long periods, I wear sun screen	24	44.4
17. When driving in a car, I wear a seat belt	43	81.1
18. I take all medications as they are directed by my doctor	50	92.6
19. I eat enough fruits and vegetables	22	40.7

Table 7b.

Frequency and Percentage of Self-Reported Engagement on the HABIT (cont.)

Item	Frequency	Percent
20. I get enough emotional support when I am feeling too stressed	30	55.6
21. I limit the amount of caffeine I consume	28	51.9
22. I usually eat three meals a day	30	55.6
23. I exercise on a regular basis	13	24.1
24. I avoid excessive use of alcohol	46	85.2
25. I ask friends not to smoke in my presence	18	33.3
26. I don't chew tobacco	52	96.3
27. I limit the amount of sugar I consume	30	55.6
28. When I get a prescription from my physician, I fill it promptly	48	88.9
29. I drink low fat or skimmed milk	37	68.5
30. I examine my breasts or testicles for lumps	29	53.7
31. I get routine physical exams from my physician	44	81.5
32. I jog	6	11.1
33. I successfully cope with most stresses in my life	39	72.2
34. I keep the doctor's appointments I make	54	100.0
35. I follow the advice of physicians	46	85.2
36. I limit the amount of fat in my diet	26	48.1
37. I am able to keep a realistic view of the stresses in my life	44	81.5
38. I am on time for doctor appointments	52	96.3

Table 7c.

Frequency and Percentage of Self-Reported Engagement on the HABIT (cont.)

Item	Frequency	Percent
39. I take prescribed medication for the recommended period of time	51	94.4
40. I weigh myself on a regular basis	22	40.7
41. I prefer to walk rather than to drive places, when possible	15	27.8
42. In public places like restaurants I sit in nonsmoking areas	46	85.2
43. I try to eat low cholesterol foods as much as possible	35	64.8
44. I follow my doctor's advice on matters related to my health	44	81.5
45. I limit the amount of salt I use on my food	40	74.1
46. I am physically active	29	53.7
47. People tell me I am a "couch potato"	9	16.7
48. I don't take prescribed medicines for the recommended time	9	16.7
49. I go to bed at a regular time each night	36	66.7
50. I get enough rest each night	34	63.0

Some of these items are directly related to hypertension. Item 5, "I watch my calories pretty carefully," is notable when considering a patient diagnosed with hypertension. Two thirds of respondents indicated that they did not watch their caloric intake carefully. This can have an impact on hypertension because the higher one's caloric intake, the more likely one's weight will be higher. Being overweight is one risk factor for developing hypertension and making management of hypertension more

difficult. Item 11, "I practice formal relaxation or meditation exercises," is notable. An overwhelming 88.9% of respondents indicated that this statement was false. This means that the majority of these individuals did not practice any form of stress management. Stress is one risk factor that is directly linked to hypertension. Item 24, "I avoid excessive use of alcohol," is important to note. The majority of respondents (85.2%) indicated that they agreed with this statement. Item 40, "I weigh myself on a regular basis," was endorsed by only 40.7% of respondents. This means that the majority of respondents do not weigh themselves regularly. Research indicates that self-monitoring of weight through daily or weekly scale measurements can assist in keeping one's weight steady and controlled. As mentioned previously, consistent weight measurements and maintaining a weight commensurate with one's height is helpful in managing hypertension. Item 41, "I prefer to walk rather than drive to places, when possible," makes reference to exercise and physical activity level. Only 4 out of 10 respondents indicated that this statement was true. The more one engages in physical activity or exercise, the better the management of hypertension. Lower frequency of exercise is correlated with higher systolic and diastolic blood pressure readings. However, because of the wording of this statement, it is important to note the possibility that someone preferring to drive rather than walk may speak to the fact that there is a danger in walking (may live in an unsafe neighborhood) and may not be indicative of their true exercise or physical activity level. This answer may simply be a function of where an individual lives. Item 45, "I limit the amount of salt I use on my food," is directly related to hypertension. Nearly three fourths of respondents (74.1%) reported limiting their salt intake. Research indicates that individuals diagnosed with hypertension (as well as those

who are "borderline") should limit their sodium intake, because sodium raises both systolic and diastolic blood pressure. Item 47, "People tell me that I am a 'couch potato," is aimed to assess physical activity, or lack thereof. The vast majority of respondents (83.3%) indicated that this statement was false. This is important to note because the majority of individuals in this study were engaging in some type of physical activity and were not viewed by others as inactive. It is also interesting to note that every respondent indicated that to Item 34 "I keep the doctor's appointments I make" was true. In the following sections, the results for each hypothesis are presented.

Hypothesis 1 predicted that the greater the weight in pounds, the higher the systolic and diastolic blood pressure readings. To test hypothesis 1, a Pearson product - moment correlation was calculated. The respondents' self-reported weight in pounds and the obtained systolic and diastolic blood pressures were assessed. There was no observed relationship between weight and systolic blood pressure or diastolic blood pressure. However, of note, the correlation coefficient between weight and systolic blood pressure ($r(54) = .20, p = .07$) approached significance.

Hypothesis 2 predicted that the higher the incidence of self-reported smoking behaviors, the higher the readings of systolic and diastolic blood pressure. This hypothesis was not supported. The amount of smoking per day and per week and systolic and diastolic blood pressure were not found to be related. However, again, the correlation between number of cigarettes smoked per day and diastolic blood pressure approached significance ($r(52) = .20, p = .074$).

Hypothesis 3 predicted that the more caffeinated beverages consumed per day and per week, the higher the readings of systolic and diastolic blood pressure. The Pearson

product-moment correlation indicated there was a significant positive correlation between number of caffeinated beverages consumed per day and systolic blood pressure ($r(53) = .28, p = .02$). Approximately 8% of the variability in systolic blood pressure in this sample was attributable to differences in the number of caffeinated beverages consumed per day. There was also a significant positive correlation observed between the number of caffeinated beverages consumed per day and diastolic blood pressure ($r(53) = .35, p = .005$), suggesting that about 12.25% (squared coefficient of determination) of the variability in diastolic blood pressure was attributable to the differences in the number of caffeinated beverages consumed per day. The other 88% is due to multiple other reasons.

The number of caffeinated beverages consumed per week was correlated with systolic and diastolic blood pressure. There was a significant positive correlation between the number of caffeinated beverages consumed per week and systolic blood pressure ($r(46) = .32, p = .02$) and diastolic blood pressure ($r(46) = .31, p = .02$). In each of these cases, approximately 10% of the variability in systolic blood pressure and diastolic blood pressure was attributable in differences in the number of caffeinated beverages consumed on a weekly basis.

Hypothesis 4 predicted that the higher the BAI total score, the higher the readings of both systolic and diastolic blood pressure. The Pearson coefficient indicated correlation for the BAI total scores and systolic blood pressure ($r(54) = .22$ ($p = .06$); the BAI total scores and diastolic blood pressure was ($r(54) = .18$ ($p = .10$). The proposed relationship was not significant, but approached significance. It is important to note that this may be related to the power of the statistical test. It is possible that with more subjects, the relationship would be significant.

Hypothesis 5 predicted that the higher the ICD total scores, the higher the readings of both systolic and blood pressure. That is, the more distorted thinking one engages in, the higher one's blood pressure becomes and the higher the chance of developing hypertension. However, there was no observed relationship between ICD total scores and systolic blood pressure ($r(54) = .06, p = .32$) or ICD total scores and diastolic blood pressure ($r(54) = -.04, p = .40$).

Hypothesis 6 predicted that the higher the HABIT total scores, the lower the readings of both systolic and diastolic blood pressure. There was a significant negative correlation between the HABIT and hypertension, as indicated by the Pearson coefficient for total HABIT scores and systolic blood pressure ($r(51) = -.24, p = .04$) and total HABIT scores and diastolic blood pressure ($r(51) = -.35, p = .007$). About 6% of the variability in systolic blood pressure and 12.25% of variability in diastolic blood pressure were attributable to differences in self-reported adherence behaviors. It is important to note that the findings indicated that as adherence increases, blood pressure decreases.

Additional Findings

Care should be used in interpreting these additional findings. A further investigation of these relationships in an independent sample would be useful.

Systolic and Diastolic Blood Pressure

A significant positive correlation was found between systolic and diastolic blood pressure ($r(54) = .39, p = .002$). This finding indicates that as either of the blood pressure measurements increases or decreases, the other does as well.

Diastolic Blood Pressure and MSPSS Subscales

The relationship between social support and blood pressure is notable. A significant correlation was found between social support of significant others (items 3 and 4) and diastolic blood pressure. Social Support Significant Others item 3 ("I have a special person who is a real source of comfort to me") and diastolic blood pressure were correlated (r (53) = -.28, p = .02), as were Social Support Significant Others item 4 ("There is a special person in my life who cares about my feelings") and diastolic blood pressure (r(53) = -.28, p = .02). Social Support of Family item 3 ("I can talk about my problems with my family") was also negatively correlated with diastolic blood pressure (r(54) = -.25, p = .03). These findings indicate that the more perceived support an individual has from a significant other and/or family member, the lower their diastolic blood pressure readings.

HABIT Scores and MSPSS Subscales

HABIT total scores and Social Support of Significant Others item 3 were significantly correlated (r(50) = .28, p = .03), as were HABIT total scores and Social Support of Significant Others item 4 (r(50) = .29, p = .02). Similarly, there were significant correlations between HABIT total scores and Social Support of Family item 2 (r(51) = .28, p = .02), HABIT total scores and Social Support of Family item 3 (r (51) = .40, p = .002), and HABIT total scores and Social Support of Family item 4 (r(51) = .24, p = .047). These correlations between HABIT total scores and various support statements

indicate that the more support received (significant other, family), the easier it is to adhere to health-promoting behaviors.

ICD Total Scores and MSPSS Subscales

The subscales of the MSPSS and the ICD total scores indicated significant negative correlations. Social Support of Family item 2 ("I get the emotional help and support I need from my family") and ICD total scores were significantly negatively correlated ($r(54) = -.32, p = .008$), as were Social Support of Family item 4 ("My family is willing to help me make decisions") and ICD total scores ($r(54) = -.24, p = .043$). Social Support from Friends item 4 ("I can talk about my problems with my friends") and ICD total scores were significantly negatively correlated ($r(54) = -.32, p = .009$), as were Social Support of Friends item 3 ("I have friends with whom I can share my joys and sorrows") and ICD total scores ($r(54) = -.23, p = .05$). These findings indicate that the more distorted thinking one engages in, the less perceived support one has from family and friends. Conversely, the less distorted thinking that occurs, the more perceived support one has from family and friends.

Smoking Behavior

There was no significant relationship found between smokers and nonsmokers with regard to systolic blood pressure and/or diastolic blood pressure.

Alcohol.

A MANOVA was conducted using alcohol consumption (no vs. yes; self-reported drinking status) as the independent variable and systolic and diastolic blood pressure as the dependent variables. No significant difference was observed between these two groups (Wilks's Lambda = .984, $F(2, 49) = .391$, $p = .68$).

Gender.

A MANOVA was conducted using gender as the independent variable (male vs. female) and HABIT total and ICD total scores as the dependent variables. There was no significant difference observed between males and females on adherence and distorted thinking (Wilks's Lambda = .916, $F(2, 49) = 2.20$, $p = .122$).

CHAPTER 4

Discussion

Summary and Integration of Major Findings

The focus of this study was to determine the relationship between biological factors of weight, caffeine use, and nicotine use, as measured by a self-report questionnaire and the Health Adherence Behavior Inventory (HABIT); social factors such as support from family, friends, and significant others, as measured by the Multidimensional Scale of Perceived Social Support (MSPSS); and psychological factors of anxiety and distorted thinking, as measured by the Beck Anxiety Inventory (BAI) and the Inventory of Cognitive Distortions (ICD). The structure of this research is based on the biopsychosocial model of George Engel. This study produced some significant findings regarding these variables. The following summarizes these findings and discusses their implications for practice and further research.

Weight

The literature suggests that overweight individuals are more likely to have higher systolic and diastolic blood pressure, resulting in hypertension. However, this research did not support this finding. It is important to note that with more subjects, there is a possibility that significance would be observed.

According to the World Health Organization's Hypertension Guidelines (1999), weight loss is indicated as a lifestyle factor for the management of hypertension. Obesity is a significant risk factor for hypertension. Hall et al. (1993) reported that hypertension in obese individuals is diagnosed more than in nonobese individuals and that blood

pressure correlates with body weight. Research conducted by Toprak and Demir (2006) investigated the influence of weight loss in overweight patients diagnosed with hypertension. They found that a modest weight loss that was maintained over a long period of time lowered overall blood pressure.

Cognitive behavioral therapy (CBT) can be supplemental and useful for individuals wishing to lose excess weight. CBT as a model is helpful for patients who have difficulty with compliance with medical issues. Psychoeducation is an important part of this process and can help facilitate an individual's understanding of a health-related issue, such as obesity and hypertension, and subsequently increase their adherence to a medical regimen. Techniques are important for these individuals after the introductory portion of therapy. Self-monitoring one's thinking and behavior related to food and eating is pertinent. This can be accomplished through journaling specific thoughts about food and recording food portions and eating times/situations throughout the day. The goal is to have the individual notice negative patterns around these activities and work on identifying and changing them. Another technique that can be useful for individuals wishing to maintain a healthy weight is mindfulness. Mindfulness is a "practice [that] involves nonjudgmental acceptance such that cognitions, emotions, or body sensations that enter the individual's awareness are observed without being evaluated or judged" (Lee, Semple, Rosa, & Miller, 2008). This technique can be utilized for both relaxation and management of obesity and weight management by teaching individuals to acknowledge and accept their thoughts without judgment and by staying present in the moment.

Nicotine

Nicotine use and hypertension have been proven to be positively correlated, according to the literature. However, this study did not replicate these findings. It is important to note that if this study were to continue with the inclusion of more subjects, a possible correlation could be found.

Caffeine

Literature suggests that the higher the caffeine consumption reported, the higher both systolic and diastolic blood pressure measurements will be, possibly leading to hypertension. The findings of this research study showed a significant positive correlation between the amount of caffeinated beverages consumed per day and per week and systolic and diastolic blood pressure. This finding is consistent with the literature on caffeine and hypertension. This is an especially important target for intervention. Because caffeine and blood pressure are positively correlated, there should be considerable concern given to an individual's caffeine intake, as it relates to hypertension. James (1997) stated that caffeine is the most commonly used psychoactive substance in the United States, producing mild psychostimulant effects that are related to its widespread consumption. Childs and de Wit (2006) discovered that even acute, low doses of caffeine produced significant increases in blood pressure, as well as subjective and behavioral psychostimulatory effects such as arousal, wakefulness, and increased locomotor activation. Lovallo et al. (2000) investigated the effect of caffeine on blood pressure during mentally stressful tasks and during rest periods. Results indicated that caffeine raised both systolic and diastolic blood pressure in the participants during brief

mentally stressful tasks and during rest periods. These studies, as well as others, document both the widespread use of caffeine and the negative effects it can have on blood pressure. Physicians should be inclined to assess caffeine consumption and to monitor this while treating an individual with hypertension, as well as to offer education about the effects of caffeine.

Anxiety

Research on anxiety and elevated blood pressure and hypertension has shown a significant positive correlation. However, this study did not link anxiety with blood pressure. The average scores on the Beck Anxiety Inventory (BAI) were surprisingly low. However, if this study were to have continued and included more participants, there is a possibility that a significant correlation would be found. These subjects, for the most part, were not particularly anxious. Research by Wei and Wang (2006) examined the causal relationship between anxiety and hypertension. Results indicated that anxiety and hypertension were significantly correlated. However, this study did not ascertain whether anxiety produced hypertension or if poor control of hypertension exacerbated anxiety symptoms. This question remains to be answered, but still supports the notion that stress management is an important component of treatment of hypertension.

The role of stress management would be an important aspect to investigate while treating an individual diagnosed with hypertension. Although not correlated in this study, the literature suggests that stress can affect one's blood pressure, and therefore stress management should be an important aspect in the treatment of an individual diagnosed with hypertension. Research by Garcia-Vera, Sanz, and Labrador (2004) investigated

stress management training as a means of controlling blood pressure. The stress management training consisted of a hypertension information booklet, relaxation training (specifically progressive muscle relaxation), and problem-solving therapy. It is interesting to note that these three components are also components of cognitive behavioral therapy. Participants were randomly assigned to a wait list or to stress management training and results indicated that stress management is effective for reducing blood pressure when compared to a control group.

Distorted Thinking

Distorted thinking has shown to be correlated with behavioral risks. Uhl (2007) identified a correlation between psychological and behavioral health risk factors and distorted thinking. Although the correlation between distorted thinking and hypertension was not found in the present study, it is possible that it would have approached significance with more subjects.

Distorted thinking is characterized by specific negative ways of thinking that contribute to emotional dysfunction and stress. Various cognitive distortions have been named and defined by Beck (1976), Beck et al. (1979), Burns (1980, 1989, 1999), Freeman and DeWolf (1992), Freeman and Oster (1999), and Gilson and Freeman (1999). Although they are all different from each other, they are all self-defeating and aid in the self-deprecation of an individual, leading to psychological and/or behavioral malfunction. Rosenfield (2004) observed a correlation between distorted thinking and Axis I and Axis II diagnoses in his research. The culmination of this research has not only validated the assumption of distorted thinking as a risk factor for psychological

diagnoses, but has also indicated that this may generalize to health and medical diagnoses, such as hypertension. Because distorted thinking leads to malfunction of the psyche, there is a considerable amount of stress associated with this. The stress produced from distorted thinking impacts not only the psychological but also the biological functioning of an individual. The acknowledgement of the mind-body connection is critical to the understanding of the role of distorted thinking, risk factors, and stress. According to the American Psychological Association (2005), 80% of Americans have become more aware of how their mental health and emotions can affect their physical health. As the move towards this integration continues, both psychologists and physicians will advance to promote the health and maintenance of the psychological and physical well-being of patients.

Health Adherence Behaviors

Health adherence behaviors have been researched and indicated a negative correlation with blood pressure. That is, the higher one's health adherence behaviors, the lower the blood pressure. The present study confirmed this. In addition, both Uhl's (2007) and Parke's (2004) research have observed similar correlations. Uhl showed that distorted thinking is related to health risk behavioral patterns. Parke's work supported the relationship between nonadherence and blood pressure. She found that systolic blood pressure was significantly negatively correlated with the HABIT; the higher one's scores on the HABIT (i.e., the more adherence), the lower the blood pressure readings were.

It is important to note that adherence is essential for maintaining good health, especially as it relates to hypertension. Adhering to a medical regimen, good exercise

habits, healthful nutrition, and emotional support are key points for positively managing hypertension. An individual's adherence or nonadherence is important to explore and understand. It is the responsibility of both the psychologist and physician treating the patient to elicit their understanding of the disease/illness and inquire about the appropriate regimen that should be adhered to. Consideration should be given to patients who have difficulty with adherence. There may be significant barriers that attribute to nonadherence, such as lack of health insurance, low socioeconomic status and subsequent financial difficulties, poor education, and transportation difficulties. These barriers may make it difficult for some patients to keep physician appointments, afford healthful foods, travel in an unsafe neighborhood, etc.

Adherence is especially important for individuals diagnosed with hypertension. Because hypertension is referred to as the "silent killer," it is especially important to monitor blood pressure closely and accurately. Little or no signs or symptoms are likely to occur that would indicate the presence of hypertension. Because hypertension can lead to myocardial infarction, heart disease, or stroke, it is important that patients adhere to their regimen.

Social Support

Social support has been shown to be a buffer against stress. Uncontrolled stress is a risk factor for hypertension. This research observed a correlation between support from family, friends, and significant others, with better adherence and less distorted thinking. The notion is that the more supportive individuals one has in one's life, the better one is at controlling stress. Support can be viewed as an "outlet" for stress. This is important to

note because the more one keeps stressful emotions inward and to oneself, the more likely one is to suffer from these feelings, whereas if support is present, the more likely one would be to share their stressful experiences.

This is yet another important implication that psychologists and physicians should be aware of and assess while treating an individual diagnosed with hypertension. Assessing the level of social support from family, friends, significant others, coworkers, etc., can help the treating physician understand the patient's support network for stress relief. If a patient were to have little or no social supports, advocating for social support would be imperative. Offering resources to the patient would be key. Volunteer work, spiritual or religious affiliations, or specialty groups would all be starting points for gaining social support.

Clinical Implications of the Findings

These findings are important for both psychologists and primary care physicians. Physicians, although they have limited time, may be able to inquire about stress level and perceived social support. The literature suggests, as does this research, that social support can be a buffer against stress. Stress can also be viewed as a risk factor for hypertension. Assessing the level of perceived social support can be clinically significant for the treating physician.

It is also important to note that although weight and blood pressure were not correlated in this study, the research suggests that the two have a positive correlation. It would be important for physicians to address the issue of weight and weight maintenance

during patient visits. This variable is a known risk factor for hypertension, and gentle reminding from the treating physician would likely reinforce this.

Implications of the Findings

The summary of these findings is that biological, psychological, and social variables should be considered and viewed as both buffers and risk factors associated with hypertension. The results of this study revealed significant findings for two of the six hypotheses, with results for an additional two approaching significance. This study suggests that the proposed variables influence hypertension and builds on the existing literature in this area. It is imperative to note that these variables can be either buffers against or risk factors for hypertension.

These research findings are salient and applicable to both psychologists and physicians treating patients diagnosed with hypertension. It is imperative that physicians note these findings and address them periodically at maintenance visits. Psychologists treating these patients have knowledge of these factors and can easily incorporate these findings into therapy, especially with cognitive behavioral therapy, for example, utilizing relaxation techniques to manage stress or implementing a behavioral plan to manage nutrition.

Limitations of the Study

This study was limited by the small sample size ($N = 54$). Of the four hypotheses that did not reach significance, two were approaching significance and would have likely

reached significance if the sample size were larger. This research study could have potentially continued for a much longer period.

Four of the questionnaires and the demographics form were all self-report instruments. Due to the nature of self-report and the implications that this has for accurate testing, this is yet another limitation of this study. An individual's unique interpretation of an item, current mood state, and the tendency to not be truthful may affect responses on self-report questionnaires.

This study was also limited to a one-site only population. The population at this site may not be truly predictive of the population as a whole, as well as being unlikely to generalize to other sites or populations. The fact that study participants were volunteers may indicate they represent a smaller portion of the intended population.

Future Research

The current research has added to the literature on risk factors associated with hypertension, utilizing the biopsychosocial model. Incorporating both psychological and medical services into a unified model of patient care is becoming a promising area of research and clinical practice, the fusion of these two sciences' attempts to provide a holistic approach to treatment. It is imperative that this research be continued. It may be useful to examine other chronic diseases utilizing the biopsychosocial approach and focusing on outcomes from a medical and psychological perspective.

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APPENDIX

DEMOGRAPHIC QUESTIONNAIRE

Directions: Please place a check mark in the space that accurately describes you and provide the requested information.

Physical Information

Your Height: _____'_____"

Your Weight: _____ lbs.

Your Age: _____ yrs.

Your Gender: _____Male
_____Female

Please describe your race by selecting the most appropriate category below:

_____American Indian or Alaskan Native

_____ African American

_____Caucasian

_____Asian or Pacific Islander

_____Hispanic or Latino

_____Other or multiracial

Nicotine Use

Do you smoke? ___Yes ___No

If so, how many cigarettes per day?_____

Alcohol Use

Do you drink alcohol? ___Yes
___ No

If so, how many drinks per day?
___

Per week?_____

Caffeine Use

Do you drink caffeinated beverages? ___ Yes ___ No

If so, how many per day? ___

Per week?_____