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A Comparison of Hypertension Management Perceptions, Knowledge, and Stage of Change Among Hospital Employees

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A COMPARISON OF HYPERTENSION MANAGEMENT PERCEPTIONS, KNOWLEDGE, AND STAGE OF CHANGE AMONG HOSPITAL EMPLOYEES

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This study explores employees' awareness and practice of HTN management concepts in order to encourage assessment for tailored interventions and add to the existing body of knowledge on which wellness program designers rely. Hypertensive employees can benefit from workplace wellness programs designed to help control high blood pressure. A dearth of research exists on the extent to which past history and other facets predict employees' likelihood of being at a high stage of regular physical activity, an important component of HTN management.

This study formulates a conceptual framework that addresses the development of tailored interventions. A quantitative methodology involving a cross-sectional design was used to explore the likelihood of employees being at a high stage of physical activity and experiencing related barriers to HTN management. A total of 181 employees from a community hospital were included in the final sample.

Findings from the study indicate that self-efficacy and type of past experience were statistically significant in predicting a high stage of physical activity. Additional findings demonstrate that self-awareness of HTN, level of education, and past experience of being physically active significantly affect an individual's HTN management knowledge level.

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CHAPTER ONE

INTRODUCTION

Too many Americans have uncontrolled high blood pressure. According to National Health and Nutrition Examination Survey (NHANES) estimates obtained from 2003 to 2010, 66.9 million Americans aged 18 and over had high blood pressure, also referred to as hypertension (HTN) (Valderrama, Gillespie, King, George, Hong, & Gregg, 2012). Unfortunately, fewer than half of these individuals had their high blood pressure under control during this same time period according to NHANES data. Hypertension defined by NHANES is having an average systolic blood pressure (SBP) greater than or equal to 140 mm Hg (millimeters of Mercury), or an average diastolic blood pressure (DBP) greater than or equal to 90 mm Hg, or current use of medication to lower blood pressure. Among the 66.9 million with HTN, it is estimated that 35.8 million Americans had high blood pressure that was not controlled or managed. Known barriers to health management in the United States include limited access to a provider, lack of health insurance, and lack of insurance to cover costs of medications (Hill & Sutton, 2000). Yet, among the more than 35 million whose high blood pressure was not controlled, 89.4% reported a regular health care source and more than 85% reported they had health insurance. Nearly half (44.8%) had uncontrolled HTN despite being aware of their condition and being treated with blood pressure lowering medication (Valderrama et al., 2012). According to the chronic care model, self-management is a key component of managing chronic disease (Clark, Becker, Janz, Lorig, Rakowski, & Anderson, 1991). The possibility exists that individuals diagnosed with HTN lack knowledge of methods besides medication adherence that promote managed blood pressure.

Problem Statement

Among wellness program developers and individuals responsible for wellness program selection, funding, and policy creation, little is understood about what individuals diagnosed with high blood pressure know about how to manage this condition and how they are managing it with regard to physical activity. For workplace wellness program designers an understanding of what an employee knows about controlling hypertension has significance. Equally important is understanding what an individual does with this knowledge with regard to physical activity. A dearth of literature exists regarding knowledge of HTN management and the stage of physical activity of worksite wellness participants diagnosed with hypertension. A worksite wellness participant for the purpose of this study is an employee who works in an organization and is enrolled in a wellness program offered by the organization to improve the health of its employees.

This study focused on employees of a community hospital in Western Pennsylvania (see Appendix A) and provides a comparison of levels of hypertension management knowledge and physical activity associated with participants diagnosed with high blood pressure to employees not diagnosed with HTN. This study further compared findings among employees enrolled in the worksite wellness program to those not enrolled. Results of this study add to the limited body of knowledge that currently exists on this issue.

Worksite wellness program employees were compared to those not in the wellness program in this study for several reasons. First, it seemed reasonable to presume that employees enrolled in a voluntary wellness program possessed interest in improving, attaining, or maintaining good health. Second, organizations seek to positively impact the

health of employees through wellness programs. This study offers an opportunity to better understand employees in the dimensions aforementioned. Results from this investigation contribute to a better understanding of worksite employees and the development of programs that mutually benefit employees and organizations seeking to positively affect those diagnosed with HTN. It is believed the results obtained from survey data collected will positively affect actions of wellness program designers and other stakeholders in the workplace.

HTN is commonly referred to as the silent killer with good reason. Uncontrolled HTN can lead to many problems including stroke, kidney disease, and cardiovascular disease – the number one killer of adult Americans ((U.S. Department of Health and Human Services (DHHS), National Institutes of Health (NIH), National Heart, Lung, and Blood Institute (NHLBI), National High Blood Pressure Education Program, 2003). It is important to assess management knowledge of individuals diagnosed with HTN to help them obtain effective control of blood pressure. When hypertension is controlled the individual's risk of poor health and or death as a result of this condition diminishes. Hypertension medications provide partial control of HTN. In addition to a medication regimen and other factors including decreased alcohol and sodium consumption, the practice of physical activity has received recognition as an effective component for managing HTN (Clark et al, 1991; Institute of Medicine, 2010). Another area of significance to seek to understand was the employee's perceptions related to blood pressure control matters. Little is known about the beliefs held by hypertensive employees regarding the ability to impact blood pressure through consistent physical activity.

Physical Activity and Stages of Change

There are several valid reasons for measuring physical activity of employees. First, it is a significant component of a HTN management lifestyle along with sodium restriction, weight loss or maintenance of a healthy weight, moderate alcohol consumption, and dietary changes (DHHS et al., 2003). Second, the degree of confidence an individual has in their ability to accomplish a task affects performance (Bandura, 1986). This degree, known as self-efficacy, has been measured previously in physical activity research and has measured higher in individuals who are more active compared to those less active (Marcus, Selby, Niaura, & Rossi, 1992; Parschau, Richert, Koring, Ernsting, Lippke, & Schwarzer, 2011; Simonavice & Wiggins, 2008). The employee's belief in their own ability to perform in relation to their stage of physical activity is an important consideration for proper design of HTN management interventions. Assessing the physical activity of employees and their self-efficacy to be physically active could add to the validity of prior related research findings.

Of significance, employees with HTN conceivably vary in their stage of physical activity. Assessment of stage of change for physical activity matters in order to identify appropriately effective interventions. The employee's level of physical activity was categorized into one of five possible stages of change, also referred to as stages of readiness (Marcus & Forsythe, 2009; Prochaska & Marcus, 1994; Prochaska & Velicer, 1997). The stage of change, or readiness, is a component of the transtheoretical model (TTM) (Prochaska & DiClemente, 1982). Within the framework of this model, the characteristic that distinguishes one stage of change subscale from another is the length

of time in months the employee has or has not been physically active according to national guidelines (Physical Activity Guidelines Advisory Committee, 2008).

The five stages of changes for physical activity are: precontemplation, contemplation, preparation, action, and maintenance (Prochaska & Marcus, 1994). Individuals in the precontemplation stage are those individuals who are not thinking about or planning on becoming physically active on a consistent basis. Perhaps a prior failed attempt at being physically active hinders them from wanting to try again according to Prochaska and Marcus (1994). Contemplators, those in the second stage of change for physical activity, are described in literature as those who are thinking about becoming physically active on a regular basis through exercise, increased yard work, and so forth but not anytime soon such as the next six months. Individuals in the preparation stage which is the third of five stages of change have made some changes to their life to support their plan to be physically active. Examples of changes include purchasing exercise gear or clothing, joining a fitness class or local gym, creating a walking plan, or performing other activity interventions. These individuals have been physically active sporadically or for less than six months. People in the action stage have been consistently active according to recommended guidelines for about six months. The maintenance stage of physical activity is made up of individuals who have been consistently physically active for six months or more. Consistency of physical activity is defined by national guidelines to be 150 minutes a week of moderate intensity activity such as a brisk walk, or 75 minutes a week of vigorous activity such as jogging (Physical Activity Guidelines Advisory Committee, 2008).

Purpose of Study

This cross-sectional research design provides insight into the understanding and physical activity management practices of employees aware they have hypertension. The study commenced with several actions. First, support for this proposed study was obtained from leadership of a community hospital in Western Pennsylvania. Second, using a nonprobability sampling method voluntary participation occurred among employees aged 18 and older. Response comparisons between enrolled worksite wellness members and employees not enrolled occurred as well as assessments of workers self-aware of having this chronic health condition and those not aware. Third, participants' knowledge of hypertension management was measured via self-administration of the Hypertension Evaluation of Lifestyle and Management Knowledge (HELM) 14 item questionnaire (Schapira, Fletcher, Hayes, Eastwood, Patterson, Ertl, & Whittle, 2012) (see Appendix B). The items of this scale address three domains of blood pressure management understanding: monitoring and setting goals, lifestyle and medication management, and general hypertension knowledge.

Participant's physical activity stage was investigated as well. Surveyors completed a four-item stage of change for physical activity scale (Marcus & Forsyth, 2009) (see Appendix C). The employee's stage of change measure determined a change category of precontemplation, contemplation, preparation, action, or maintenance for physical activity. Finally, this research provided a comparison of HTN management knowledge and the physical activity stage among participants aware of having hypertension in relation to participants lacking awareness. Potential differences in

responses among groups underwent further statistical analysis to better understand the extent of those differences relative to participant characteristics and perceptions.

In this study participants considered hypertensive met any or all of four criteria: 1) self-awareness of having high blood pressure, 2) a history of being told by a physician they have hypertension, 3) currently taking medication(s) to treat hypertension, 4) documentation of two consecutive blood pressure readings of 140/90 mm Hg or higher by worksite wellness program staff using standardized methods of blood pressure measurement (Schapira et al., 2012).

Results of this study will help wellness management wisely select interventions that will help employees achieve and maintain controlled blood pressure. Productivity cost research of expenditures in the late 1990s revealed that hypertension had the highest economic burden of illness for businesses at $392 per eligible employee (Goetzel, Long, Ozminkowski, Hawkins, Wang, & Lynch, 2004). This study can help leadership curb expenditures associated with the hypertensive employee. Cost savings may be experienced through funding blood pressure control programs that effectively address HTN knowledge, beliefs, and behaviors specific to hypertensive employees and the entire employee population. Research has shown that tailored behavior change interventions are more effective compared to nontailored programs (Chapman, 2004; Marcus & Forsyth, 2009; Marcus & Owen, 1992).

Research Question

This study posed the following research questions: Among employees in a worksite does self-awareness of HTN and participation in a wellness program relate to degree of hypertension management knowledge? What is the stage of change for physical

activity among employees with hypertension compared to those who do not have hypertension? Does a relationship exist between employees' hypertension management knowledge and their level of physical activity? Does a relationship exist between an individual's stage of change and self-efficacy and past history of success or failure in behavior change attempts?

Hypothesis One: Among employees in a community hospital, individuals self-aware of having hypertension demonstrate a different degree of knowledge of managing hypertension compared to employees who do not have hypertension.

Hypothesis Two: Among employees in a community hospital, individuals self-aware of having hypertension are at a higher stage of change for physical activity compared to employees who do not have hypertension.

Hypothesis Three: Individuals at higher stages of change for physical activity have higher levels of self-efficacy.

Significance of Study

Answering the research questions associated with the hypotheses offers insight into managing hypertension within an organizational wellness program by revealing an understanding of employee's health related knowledge and behaviors. This study specifically focused on assessing the management knowledge, physical activity level, and related variables of the hypertensive employee. This focus benefits worksite wellness program developers and other stakeholders such as wellness participants, program vendors, designers, members in organizations who construct policies affecting wellness programs, and those who approve funding for wellness programs. This study also helps recruit employees for participation in wellness programs at the worksite.

Understanding the Employee

"Engaging employees is key to program success" (National Institute of Health Care Management, 2011, p. 3). According to national research of employers with more than 50 employees, approximately half offer worksite wellness initiatives of some type to their workforce (Mattke, Liu, Caloyeras, Huang, Van Busum, Khodyakov, & Shier, 2013). Rates of participation in behavior change interventions such as lifestyle management and disease management, range from only 7% to 21%.

Based on reports by employers, approximately 46% of employees in these locations complete health screenings offered. Among those worksites that conduct health screenings blood pressure is the most widely screened parameter (95%). It is followed in descending order by blood glucose, cholesterol/lipids, BMI/body fat, cancer screening, tobacco use, and stress (Mattke et al, 2013). The most common lifestyle management interventions offered include stress management, alcohol/drug abuse, nutrition/weight, fitness, smoking cessation, and health education. It is important to understand from a HTN program design standpoint employee perspectives relative to this chronic condition.

Wellness program developers need to understand what employees with HTN and other disorders understand about managing their condition. A common practice of worksite wellness programs is to select programs based in part on risk factors of employees such as smoking, obesity, and stress. Arguably, knowledge alone of hypertension as a risk factor for cardiovascular disease, stroke, and death is not enough to meet the wellness needs of employees. Targeting the risk factor instead of targeting the employee with the risk factor can lead to less than optimal results for the employee, the wellness program, and the organization. The hypertensive employee may need to be first

educated or persuaded about the danger of uncontrolled HTN, then patiently guided through appropriate behavior change interventions. The employee might not realize uncontrolled HTN is a risk factor for other ailments including blindness or kidney failure (DHHS et al., 2003). Wellness developers should be aware of: 1) What hypertensive employees already know and believe about the risk factor, 2) What changes such as physical activity, are already in place to manage the condition, and 3) Barriers that exist against awareness and behavior change within and around the employee. By focusing on specific risk factors only, wellness program leaders could easily overestimate the understanding and attitudes held by employees.

Additionally, such an incomplete focus could lead a wellness advocate to overestimate or underestimate independent management practices already being performed by the employee. Results of this study raise wellness program advocates' awareness of employee perceptions in relation to uncontrolled hypertension and similar chronic health conditions.

An employee's belief in his or her ability to accomplish a wellness goal significantly affects performance. Cross sectional research data on various populations has reflected that individuals at higher stages of change for physical activity such as action and maintenance had higher self-efficacy scores than individuals at lower stages such as precontemplation, contemplation, and preparation (Marcus et al., 1992; Parschau et al., 2011; Simonavice & Wiggins, 2008). Employees who could conceivably benefit from a wellness program may not be ready to join or complete an intervention due to low self-efficacy.

Research among different populations shows that within the first 90 to 180 days nearly half will stop participating in the exercise program they joined (Carmody, Senner, Manilow, & Malarazzo, 1980). As individuals move along the TTM's five stages of change for physical activity setbacks may occur (Prochaska & Marcus, 1994). Falling below a behavior change goal is common for those seeking to terminate a problem behavior such as using too much sodium in meals or to acquire a positive behavior such as being physically active. Slipping back to an earlier stage can and does occur at the contemplation, preparation, action, and maintenance stages. Some individuals will remain in a precontemplation stage of activity because they are hindered by past failures to change (Prochaska & Marcus, 1994). The most influential source that feeds individuals' self-efficacy is past history (outcomes) in an area such as physical activity (Bandura, 1986). Developers who assess and address matters of self-efficacy and past experience may notice lower dropout rates of behavior change program participants.

The employee's stage of change is an important component to consider when designing programs to improve cardiovascular health (Carnethon, Whitsel, Franklin, Kris-Etherton, Milani, Pratt, & Wagner, 2009). The results of this study encourage stakeholders to consider employees' stage of change as well as stage-specific factors that may strengthen program design. Stage specific practices recognized as helpful at specific stages for individuals trying to change physical activity include helping relationships, self-reevaluation, and consciousness raising (Marcus et al., 1992).

There is a paucity of research on what individuals know about how to manage the chronic condition of uncontrolled high blood pressure. An assessment of physical activity practices identified that a large proportion of individuals barely participate in exercise

and many have no interest in beginning to exercise (Stephens, 1987). Conceivably, employees aware of having HTN do not know the benefit of physical activity as a way to lower blood pressure.

Nearly half of Americans surveyed in 2011 indicated they do not meet recommendations for physical activity (United States Department of Health and Human Services, 2012), even though physical activity reduces risks for many of the chronic illnesses affecting Americans including heart disease. Using national physical activity guidelines (Physical Activity Advisory Committee, 2008) as a benchmark in this study, employees involved in moderate intensity for 150 minutes/week activity or vigorous-intensity activity for 75 minutes/week fell into action and maintenance stages of change, depending on how many months the behavior had been occurring. Individuals at precontemplation, contemplation, and preparation stages performed less than guidelines suggest. Findings of this research prove beneficial for programmers seeking to identify the most appropriate wellness programs to offer to the right employees at the right time.

The Employee and Hypertension Management Knowledge

Among employees diagnosed with HTN, knowledge about managing the condition varies. Programs that adapt to meet the changing needs of employees are essential for wellness program success and health of participants (Arena, et al., 2013). Some employees may be very familiar with the importance of maintaining therapeutic regimens. Others may recognize that sodium intake should be limited to achieve and maintain blood pressure control of SBP less than140 mm Hg and DBP less than 90 mm Hg. Some may know what should be done for effective management of HTN but not how

to achieve success in this domain. Identification of knowledge needs of employees by wellness program leadership can greatly enhance program effectiveness.

Designing for Future Gains

The Affordable Care Act allows employers to offer greater incentives to employees who participate in activities that promote health and improve specific health factors such as hypertension (National Archives and Records Administration, 2013). More research is needed on how to increase employee participation in wellness programs (Carnethon et al., 2009). Designing programs to more closely match employee needs may increase employee participation. This study assessed employee knowledge of hypertension in general, lifestyle and medication management, monitoring and setting goals, and physical activity behaviors. Stakeholders who want to consider workplace wellness opportunities targeting employees with HTN benefit from the findings of this research.

Assessing individual's HTN knowledge and related behavior may help bridge the known gap of finding ways to get more employees with conditions like hypertension to participate in wellness programs (Carnethon et al., 2009). An employee may lack incentive to participate in a wellness program intervention that does not address a particular interest or need. This research makes clear the importance of identifying the needs and interests of specific employee populations to obtain higher levels of employee participation.

Several reasons have been given for the importance of this study. Next, assumptions are discussed which influence how and why this research project was

conducted. Following this, definitions of terms, limitations, and delimitations round out the first chapter.

Assumptions

The previous discussion presents several reasons supporting the importance of this study. Next, assumptions associated with this research project are discussed. Definitions of terms, limitations, and delimitations are presented in the final sections of this chapter.

The first assumption rests with the idea that the employee in an organization represents the most important stakeholder. A wellness program developer's understanding of what employees need and want in terms of wellness along with the ability to fill those needs forms a central locus for wellness program effectiveness.

A great deal of work goes into wellness program development including but not limited to screenings, selection and design of interventions, policy development, and use of resources including funding. These efforts are necessary to meet the needs of the employee and to create a program of maximum benefit to the employee as a member of an organization. Designers of programs must therefore regard what the employee knows and does regarding HTN management for appropriate program design. It was assumed sufficient data from this important stakeholder could be obtained to inform the research questions.

It is further assumed that persons with HTN who chose to participate in a wellness program did not all possess the same level of knowledge about HTN management, but that these variations would be assessed and differentiated.

Finally, individuals with systolic blood pressure levels between 120 and 139 mm Hg or diastolic blood pressures between 80 and 89 mm Hg are referred to in the medical community as being prehypertensive (DHHS et al., 2003; Institute of Medicine, 2010; Luehr, Woolley, Burke, Dohmen, Hayes, Johnson, Kerandi, Margolis . . . & Schoenleber, 2012;). Limited research has been conducted to determine if prehypertensive individuals should be treated to prevent risk of uncontrolled blood pressure (Moser, 2006). This study focused on employees who had and/or were managing blood pressure levels of 140/90 mm Hg or above in line with the *Healthy People 2020* goal of increasing the number of individuals with hypertension whose blood pressure was controlled (Department of Health and Human Services, 2013). Next, I provide definitions of selected terminology to be viewed within this document.

Definitions of Terms

The definitions of some key terms occurring throughout this dissertation are provided explaining the way the terms are used and to be understood for the purposes of this study.

Hypertension (HTN) management: Involves combined behaviors to achieve a systolic blood pressure less than 140 mm Hg and a diastolic blood pressure less than 90 mm Hg. Efforts include medication adherence, regular physical activity, moderate alcohol consumption which is no more than two glasses of wine daily for men and one glass of wine daily for women, increased consumption of vegetables and fruits, and decreased intake of sodium and dietary fats (DHHS et al., 2003).

Interventions: Tailored and organized efforts to support and encourage HTN management achievement and adherence.

Physical activity/Regular physical activity: Moderate-intensity activity of 150 minutes/week (2.5 hours/week) or vigorous-intensity activity of 75 minutes/week (1 hour/week) for a minimum of 10 minutes at a time per physical activity recommendations (Physical Activity Guidelines Advisory Committee, 2008). Examples are yard work, brisk walking, cycling, jogging, and swimming.

Self-efficacy: A person's belief that behavior change is possible as a direct result of their actions to bring about the change (Bandura, 1997). Self-efficacy for physical activity behavior change was measured in this study.

Stakeholders: Individuals, groups, and or organizational supports responsible for wellness program advocacy, design, development, selection, funding, policy development or implementation, employees, and others with a common interest in HTN management.

Methods and Research Limitations

Sampling Method

Descriptive research is a proper first step in understanding specific aspects of a group such as the employees in the workplace (Thomas, Strickland, DiClemente, Higgins, & Haber, 2012). The stage of physical activity and knowledge of employee volunteers at a community hospital in Western Pennsylvania are described using quantitative methods. Employees were invited to participate using a nonprobability sampling method. Results were valid to the current organization as all employees were requested to participate in this study. The majority of employees at the survey site were Caucasian. A less than desirable number of responses were obtained from the samples. Research discoveries drawn from the data were not generalized to the overall employee population of the organization. Only a small number of employees completed the survey, the results suffered from a selection problem and threatened the internal validity of the

study. To address this, periodic reminders were sent to employees and thereby increased response rates.

Design

This study was cross-sectional in design. A major weakness of cross-sectional designs is that developmental changes (i.e., stages) experienced by individuals are not observed (Monette, Sullivan, & DeJong, 2005). For example, cause and effect of variables assessed could not be demonstrated. Nor were observation of participants' progression from one stage of physical activity to another made. To maximize this study's effectiveness intervening variables were assessed and statistically held constant. This researcher hoped to be able to explain the relationship between dependent and independent variables and more adequately address the research questions.

The moment in time when participants completed the survey may have affected their responses. The target population lives in a region of the country that experiences significant climate changes. Undesirable conditions such as cold, rain, and heat may have curtailed an otherwise regular pattern of moderate intensity activity. To balance these challenges participants were asked to consider their activity over the previous six months, which included times of favorable and unfavorable weather conditions. A test-retest process six months apart would have added to the validity of responses but this process proved more costly and time consuming for the researcher and available research budget.

Survey Method

The questionnaire survey as a method to collect data has strengths and weaknesses. While economical and consistent in uniformity, the participant answered questions by choosing a response already provided. A predetermined response option

could mislead a respondent or indicate more or less than the respondent intends to reveal. In its pure quantitative form, this method does not allow for clarifying questions to be asked or comments to be added. Fortunately, survey questions from the TTM's stage of change scale were found to have good reliability and validity among worksite employees.

Questionnaire submitted for data collection but incomplete negatively impacted the ability to understand the individual's HTN management knowledge and stage of change. Options for missing data were carefully considered.

Self-Report Limitations

There are several recognized limitations of self-report measurements. The technique relies on the individual's ability to recall (Dishman, Washburn, & Schoeller, 2001). This survey asked individuals to consider the past six months of physical activity. Self-report survey results provided valuable cost-effective data. However, the data were based on what people said they did, not necessarily on what they actually did.

Reviews by other researchers show that in physical activity assessments, self-reporters have underestimated and overestimated moderate- and vigorous-intensity levels when compared to objective methods such as heart rate monitors, accelerometers, and pedometers (Prince, Adamo, Hamel, Hardt, Gorber, & Tremblay, 2008; Sallis & Saelens, 2000). Dishman et al. (2001) summarized there is no physical activity assessment method that meets criteria of being practical, reliable, and valid, not interfering with usual activity, and can capture all the dimensions of physical activity. Understanding motivation to be physically active requires other specific measures that must be understood. Sallis and Saelens (2000) recommend a common understanding of terms which could seem ambiguous such as moderate intensity, leisure time, and physical

activity. Examples of moderate activity were provided, helping participants understand all aspects of the survey.

Despite its limitations, self-report is the predominant method of measuring physical activity in public health (Prince et al., 2008). It is the most cost-effective and most practical method for use in population based studies and provides specific information about populations (Dishman et al., 2001). Compared to other assessment methods, self-report is less burdensome to participants and produces minimal interference with their usual habits. Self-report instruments have shown good reliability and validity in documenting leisure time activity for men and women (Haskell, 2012).

Delimitations of the Research

This nonprobability sample assessing employee's knowledge about HTN management was conducted among workers in a community hospital. It was possible that a large number of respondents provided regular care to hypertensive patients and may have had additional knowledge of hypertension management from those experiences. Results obtained may have been dissimilar to responses obtained from participants not employed in an acute health care facility. The physical activity guidelines used in this research were those recommended for controlling high blood pressure.

HTN management entails lifestyle actions including dietary habits, knowledge of blood pressure goals, and medication adherence. The researcher delimited this study to examination of employee's knowledge of diet, blood pressure goals, medication adherence, and physical activity. This study was delimited to examination of employees' physical activity behavior. In terms of internal validity, it should not be presumed that an individual's stage of change for physical activity was the same in other HTN

management behaviors including dietary practices, medication adherence, or other lifestyle behaviors such as smoking and stress management. To research these additional parameters of HTN management behavior was beyond the resources and capability of this sole researcher at this time.

The majority of employees at the community hospital were Caucasian. Many were female. Survey site was part of an urban cluster. Findings of a different population of employees could render different results. It is unknown if administration practices, policies, community, and environment influenced an employee's HTN management knowledge and physical activity. These components were not measured in this study.

Summary

This study sought to understand volunteer employees in a community hospital setting. It is unknown if the findings of the group reflect the population of employees in other organizations.

This study was conducted to compare HTN management knowledge among persons aware of having HTN compared to those who had no awareness of being hypertensive, and then to compare their stage of change for physical activity according to national recommendations. Through self-administered self-reporting of participants, the researcher used the HELM and Stage of Change scales to assess participant's knowledge, and stage of change respectively at the time the survey was completed.

The Literature Review in the next chapter provides major theoretical perspectives on behavior change of the hypertensive individual that a wellness program director may wish to consider in workplace wellness program design. Chapter Two describes factors associated with HTN management that are relevant to hypertensive employees with a

focus on physical activity. It also provides a historical background of workplace wellness programs in the United States and provides more detail concerning the stage of change scale of the TTM. A synopsis of relevant HTN management research conducted among employees in the United States is provided. The chapter concludes with a conceptual framework synthesizing the literature findings and contextually locating the current investigation.

CHAPTER TWO

LITERATURE REVIEW

Chapter Overview

This chapter explains HTN management and presents related challenges identified in the research literature. In addition, theoretical concepts upon which this study was framed are discussed. How the worksite can help employees manage HTN is also shared. Worksite wellness programs are recognized as a strong influence in cardiovascular health. Current literature that highlights the importance of appropriate design by developers of worksite wellness programs is presented. Tailored design is based on HTN management knowledge assessment, beliefs and perceptions about HTN, stage of change assessment for physical activity, and other factors. The researcher is interested in developing programs for the worksite where the design supports HTN management. Therefore, the purview of this chapter is tailored wellness program design for employees with HTN.

Hypertension Management via Individual Agent

For the majority of Americans with hypertension there is no known cause for this chronic condition (Carretero & Oparil, 2000). While a small percentage develop HTN from kidney problems, tumors, medications, and some genetic predispositions a specific cause cannot be recognized for about 90% to 95% of those with HTN. There is a clear association of lifestyle factors related to the occurrence of HTN. Management of these factors by those living with HTN is extremely important because of the serious health problems that can occur when HTN is not controlled (DHHS et al., 2003).

HTN is the most common and most important risk factor for cardiovascular disease. Other health problems that can stem from uncontrolled HTN include blindness, stroke, kidney failure, and death (DHHS et al., 2003). The most common cause of death in hypertensive patients is coronary heart disease (Freis, 1995). With HTN, these problems occur with little or no warning. "Adoption of healthy lifestyles by all persons is critical for the prevention of high BP and is an indispensable part of the management of those with hypertension" (DHHS et al., 2003, p. 7).

For people with HTN and their associated family, co-workers, and employers, problems caused by this condition can negatively impact quality of life, morale, productivity, and economic status. These and other reasons are why efforts to control HTN are so important despite being poorly successful. In addition to a medication regime, there is strong consistent evidence that alteration of the lifestyle factors that attributed to the development of HTN can also lead to its control (Appel, 2003; DHHS et al., 2003). Managed HTN lowers an individual's risk for developing serious complications of uncontrolled high blood pressure (Appel, 2003; DHHS et al., 2003).

An individual's high blood pressure is considered managed or controlled when the systolic blood pressure (number above the line of a blood pressure reading) is below 140 mm Hg and the diastolic blood pressure (number below the line of a blood pressure reading) is below 90 mm Hg (DHHS et al., 2003). Individuals implement evidence-based lifestyle changes to achieve high blood pressure control (Appel, 2003). Evidence-based recommendations for high blood pressure management are weight reduction (DHHS et al., 2003; Fortenberry, Ricks, & Kovach, 2013) or maintenance of a healthy weight, consumption of many fruits and vegetables (Sachs, et al., 2001), eating low fat foods, and

foods low in saturated and total fats, sodium reduction (Alderman & Cohen, 2002), physical activity (Pescatello, Franklin, Fagard, Farquhar, Kelley, & Ray, 2004), and moderate alcohol consumption (DHHS et al., 2003; Luehr, et al, 2012).

A physician may place a patient on a regimen of one or more antihypertensive medications to help obtain high blood pressure control (DHHS et al., 2003; Kotchen, 2011). A person's modifications of lifestyle habits can lower high blood pressures equivalent to the therapeutic effect of one antihypertensive medication (Luehr et al., 2012). Some individuals will experience greater reductions in blood pressure than others from lifestyle modification (DHHS et al., 2003).

Managing Hypertension via Cognitive and Other Personal Factors

It is important for an individual with HTN to be aware of the condition and to know about principles of HTN management (Institute of Medicine, 2010). Equally important is what actions or self-care measures are being carried out day-to-day to obtain and maintain a blood pressure that is less than 140/90 mm Hg. For people with HTN a blood pressure that is less than 140/90 mm is the goal through medication adherence and lifestyle changes but this is not easily achieved. Several of the following theories point out the pivotal role time individual has in bringing about his or her own effective change in behavior.

Social Cognitive Theory

"A patient-centered strategy to achieve [BP less than 140/90 mm Hg] and an estimate of the time needed to reach goal are important" (DHHS et al., 2003, p. 20). Social Cognitive Theory (SCT), also referred to as social learning theory, recognizes the individual in whom behavior change is to take place as the most influential agent in

efforts to change behavior (Bandura, 1986; Bandura, 2004, Bloom, 1996). The extensive conceptual framework of SCT is well recognized for its concept of self-efficacy: a person's belief that change is possible as a direct result of their actions to bring about the change. Bandura (1997) noted that cardiac patients with low confidence in their ability to control their health habits are sporadic adopters and poor adherers to exercise regimens. Individuals who barely believe their efforts will bring about change perform poorly and risk not changing at all. The reverse is true: individuals with higher self-efficacy experience more success. This is analogous to the well-known fictitious children's story (Piper, 1961) in which a little blue engine who thought she could accomplish the challenging task of pulling a long train over a high mountain did just that because she believed in her ability to make a difference.

Any program design to influence health behavior such as a HTN management program should include a tailored component that assesses and increases the individual's confidence in their abilities to impact their own health (Bandura, 1997). Research comparing individual's stage of change to level of self-efficacy found that individuals at higher stages of change had higher levels of self-efficacy than those at lower stages (Marcus & Owen, 1992; Marcus et al., 1992; Parschau et al., 2011; Simonavice & Wiggins, 2008). Effective program design for those in a precontemplative, contemplative, or preparation stage of behavior change should have more actions tailored to influence self-efficacy.

The most influential source that feeds individuals' self-efficacy is past history (outcomes) in a given area that reflects the degree of success an individual has experienced (Bandura, 1986). Past successes increase self-efficacy while repeat past

failures decrease self-efficacy. If failure to accomplish a task occurred early in the attempt and was not due to outside influence or lack of effort, this failure is especially detrimental to the individual's belief their efforts can bring about change. Over time, as a person who attempts tasks experiences more and more success in their efforts, self-efficacy is less likely to be greatly influenced by occasional failures.

An individual can be misled by their own past experiences when they are used to determine current self-ability to accomplish a completely new unrelated endeavor. Also, an individual who has high self-efficacy and success in accomplishing tasks in one area (e.g., ability to limit sodium in foods or lose weight) may have low confidence in their ability to accomplish a task in another area such as maintaining a daily exercise routine or limiting alcohol consumption (Marcus & Forsyth, 2009).

Bandura identifies types of influences that can either enhance self-efficacy of the hypertensive employee in spite of negative past experiences or increase self-efficacy along with positive past experiences (Bandura, 1986). These include the ability to see someone such as a friend or wellness coach correctly model the appropriate behavior (vicarious capability); support from others such as a therapist, physician, program leader, or other supportive person encouraging the individual that their goal achievement is possible (verbal persuasion); and the individual's self-interpretation of their feelings as a sign that they will or will not be able to impact change (physiologic state). For example, an individual recognizes an inner excitement about starting a physical activity program and interprets this to mean their efforts will be rewarded with success. Conversely, an individual recognizes a sense of apprehension about the same plan and interprets this apprehension as a sign they will not be successful in the endeavor.

Self-efficacy is also influenced by age, gender, socioeconomic status, and other environmental factors. Wellness program design has historically been based on aspects such as insurer recommendations and health risk assessment findings not self-efficacy or past experiences (Linnan, Bowling, Childress, Lindsay, Blakey, Pronk, Wieker, & Royall, 2008; Mattke, 2013). Variables of this research study included self-efficacy, past experiences, age, gender, and education.

Cognitive perception of self is one of three agents SCT identifies as influential to changing behavior. A second agent of change is human behavior (Bandura, 1986), the performance of behaviors through planning and goal setting. Intervention designs to improve individual's physical activity behavior using the transtheoretical model (TTM)--also known as stage of change--have been effective (Fahrenwald, Atwood, Walker, Johnson, & Berg, 2004; Pinto, Friedman, Marcus, Kelley, Tennstedt, & Gillman, 2002). A cornerstone of the model lies in determining which stage of the model the individual is in: precontemplation, contemplation, preparation, action, or maintenance. It is widely understood (Marcus & Forsyth, 2009; Prochaska & DiClemente, 1984; Prochaska, & Marcus, 1994; Prochaska & Velicer, 1997) that individuals with the same conditions who require the same behavior change to improve can be at different stages of being ready to change. Worksite wellness designers and others can assess employees' stage to create appropriate, achievable, and realistic goals for target population.

In a research study of worksite participants those in the action stage of changing physical activity behavior found greater value in helping relationships than employees in precontemplation, contemplation, and preparation stages (Marcus et al., 1992). Ongoing research is needed on program design that will most significantly impact goals of

wellness programs in the workplace (Mattke et al., 2013). This underscores the value of assessing employee's stage of change, as this research study will do. This significant focus will hopefully inform tailored programs that improve the likelihood of success in behavior change endeavors for physical activity and other components of HTN management.

A factor that influences an individual's planning and goal setting and thus stage of change for physical activity is awareness of the need to change (Bandura, 1986). Unfortunately, there is a dearth of research on employees' awareness of HTN, their understanding of importance of managing the condition, and efforts in place to control it. This understanding would influence wellness program design. Results from the paucity of assessments of people with HTN suggest individuals' knowledge and practices vary and are inadequate to obtain and maintain control of HTN. Queried adults diagnosed with HTN in the U.S. (Oliveria, Chen, McCarthy, Davis, & Hill, 2005; Peters & Templin, 2008; Sanne, Muntner, Kawasaki, Hyre, & DeSalvo, 2008; Schapira et al., 2012) have limited awareness of facets that relate to control such as target blood pressure, complications of uncontrolled blood pressure, the importance of increasing fruit and vegetable consumption, and weight loss. In a study (Ayala, Neff, Croft, Keenan, Malarcher, Yduk, Bansil, & Mensah, 2005) of nearly 900 individuals who reported having HTN only 53% reported taking medication, 32% changed diet or eating habits, 41% decreased salt or sodium intake, and 14.7% reported exercising.

Additional factors affecting physical activity stage of change include having a plan detailing steps to take toward behavior change, acting on the plan, support systems, ability to avoid barriers, and resources to carry out a plan of behavior change (Bandura,

1986). Individuals are affected differently based on health factors, financial resources, personality, and perceptions of environmental controllability while experiencing the same environmental condition, for example, a hurricane or terrorist attack (Stokols, 1996). This study examined employees' knowledge of factors related to management of HTN and their stage of change for physical activity, an evidence based element of HTN management.

Assessment of employee's stage of change for physical activity can help program designers identify any patterns or correlations that may exist between individual's stage and degree of HTN management knowledge. Individuals in earlier stages of physical activity who demonstrate lower levels of HTN knowledge may benefit from programs designed to emphasize physical activity more. Conversely, if individuals with low scores in overall knowledge are at action and maintenance stages for physical activity this may indicate to a developer that some other self-care measure such as decreased sodium intake, moderate alcohol consumption, or weight loss should be focused on in design of interventions for HTN management.

What is not known is if individual's behavior change action, such as stage of physical activity, is correlated with individual's HTN management knowledge. This information was assessed in this study and will be useful to stakeholders who design worksite programs.

The third component of SCT is environment which is the setting necessary for the individual to accomplish the behavior change. Perception by researchers that social, organizational, and physical environments are important determinants of health began around the 1990s and continues to increase (Glanz & Bishop, 2010). Examples of

environment are competent technical partners, support systems, work schedules, gym, places to exercise, walking paths, and finances to purchase low sodium low fat foods.

Wellness Programs

The worksite wellness program addresses the environmental aspect of social cognitive theory. A primary reason for the implementation of wellness programs was to contain healthcare costs for employers (Conrad, 1987). The concept of wellness was generated in the 1960s within the United States as the concept of constant and deliberate efforts to remain healthy and obtain the highest potential for well-being (Shillingford & Mackin, 1991).

One major facet of the wellness movement came not from education or public health or medicine, but from those in corporate business (Gullotta & Bloom, 2000). According to Gullotta and Bloom (2003), the wellness idea grew out of employer concern for the increasing economic losses business suffered. Ongoing illnesses, along with the high costs of technology to diagnose, cure, and manage illness, and pharmacomanagement of disease grew expensive for employers. Amid national concerns over losses, experienced employers across the country began worksite wellness programs aimed at physical and emotional well-being for employees (Conrad, 1987; Shillingford & Mackin, 1991).

Since the 1960s, wellness programs have been incorporated by organizational leaders into many work-site policies (Conrad, 1987; Shillingford & Mackin, 1991). In 1985, heart attacks cost American industry 12.4 billion dollars in lost productivity from physical and emotional disability which included 132 million lost work days (Gullotta & Bloom, 2003). Productivity cost research of expenditures in the late 1990s revealed that

hypertension had the highest economic burden of illness for businesses at $392.00 per eligible employee (Goetzel et al., 2004).

Each of these factors: cognitive perception, environment, and behaviors for change have an effect on and are affected by the other two associated factors (reciprocal determinism). Figure one illustrates this concept.

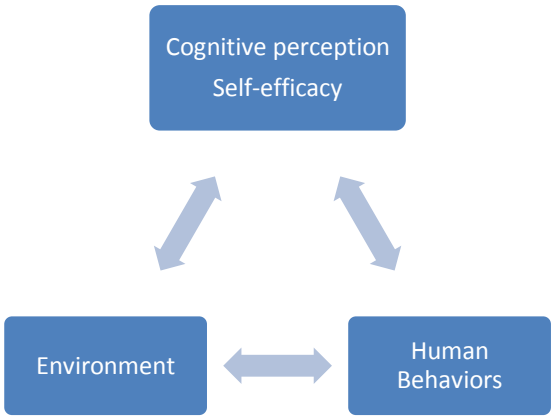

Figure 1. Reciprocal determinism. An individual's cognitive perception, human behaviors, and environment each affect and are affected by the other two components according to Bandura (1986).

Bandura (2004) suggests four major components for effective programs:

1. Information that informs of health risks and benefits of different lifestyle habits.
2. Development of social and self-management skills that will allow the transformation of informed concern into practices that yield effective prevention.
3. Development of a resilient sense of self-efficacy to support the exercise of control for when--not if--difficulties and setbacks occur.
4. Identification and development of social supports that espouse those behavior changes desired.

Self-Care Theory

Management of a health condition by the individual is consistent with Dorothea Orem's Self-Care Theory (Orem, 2003a; Orem, 2003b) in which she also realized as Bandura the individual is the focal point of behavior change in preventing ill health, and obtaining and maintaining proper health. Other factors revolve around the individual including learning from knowledgeable others (environment agent of SCT) and performing self-care tasks (behavior agent of SCT). Self-care is a human regulatory function carried out by individuals in an effort to bring about their own development and functioning. The individual performs day-to-day actions that will prevent, fix, or manage injury, disease, and their effects.

Self-care entails recognizing relationships between factors affecting health such as diet, stress, activity, and medication adherence (Orem, 2003a). This recognition is learned and added to what is already known. Self-care also requires changes in day-to-day activities in order to attain or maintain health. Additional components that affect self-

care are the individual's time (e.g., to exercise), resources (e.g., money for recommended food, place to exercise), and in some situations sacrifice of things and activities (Orem, 2003a).

Management of HTN by the individual is a self-care action. Activities of HTN management listed earlier include a low sodium and low fat diet, physical activity, and limited alcohol consumption. The purpose of a self-care measure or group of self-care measures is the achievement of an overall goal according to Orem (2003a; Orem, 2003b). Specific actions bring about a specific outcome. This is a major difference between wellness interventions for overall health (primary prevention), which many worksite wellness programs offer, and tailored interventions to limit or manage the effects of a specific ongoing problem such as HTN (secondary prevention).

A person with HTN who performs day-to-day self-care measures such as maintaining a healthy weight and consuming more fruit is working to obtain a blood pressure that is less than 140/90 mm Hg. The individual pursuing HTN management has an overarching goal--referred to by Orem (2003c) as a self-care requisite--of prevention of cardiovascular disease and stroke.

Orem (2003b, 2003c) posits individuals learn self-care through communications, interpersonal relations, and within social groups. Nurses and other knowledgeable health care professionals as sources of information can provide specific information based on the individual's needs of how to fulfill self-care requisites (Orem, 2003c). Importantly, learning needs are determined based on assessment. The individual's awareness, understanding, and knowledge of their altered health condition, how to improve it, and their ability to make the necessary changes, must be considered by interventionists to

ensure the right education and supports are provided to the right individual at the right time.

Self-care measures or actions are recommended health care practices that the individual must carry out (Orem, 2003b). Once individuals learn of their condition, for example HTN, and overcome barriers they will demonstrate responsibility by doing what they have to for good health. An implied ideal is that individuals will be responsible to do what is necessary to be as healthy as possible once they learn of their condition and once barriers such as low confidence, lack of knowledge, and resources are addressed. Individuals are not expected to dismiss the seriousness of their condition or fail to adhere to a medication regime.

Self-care theory postulates that self-care measures taught are based on the knowledge the individual has about their health issue (Orem, 2003c). The employee's knowledge about management of hypertension as a chronic condition regarding lifelong and lifestyle management informs development of tailored interventions. Omission of this initial assessment step could lead to interventions that are too basic or too advanced for the participant's level of understanding of the chronic condition which in this study is HTN.

Chronic Care Model

The Chronic Care Model (CCM) is a successful research based approach to improve outcomes of individuals with chronic illness such as HTN (Clark et al., 1991). Health care delivery in the United States is rooted in an acute care focus: quick and efficient response to patients' immediate problems by health professionals, quick identification of cause while ruling out other causes, and treatment of problem using

professional knowledge and skills (Wagner, Austin, Davis, Hindmarsh, Schaefer, & Bonomi, 2001). The patient's passive role is of no consequence in this form of health care delivery because self-management practices are not as vital in short-lived acute illness experiences. Unfortunately, this style of health care has ineffectively been applied to care of people with longstanding health conditions.

People with chronic health conditions can benefit from quick responses and identification of the causes of the illnesses. However, a chronic health condition requires more than treatment using professional knowledge and skills. It requires ongoing long-term sometimes lifelong collaborative management between primary health provider, support systems, and the individual (Von Korff, Gruman, Schaefer, Curry, & Wagner, 1997).

Individuals with chronic conditions have common challenges not typically experienced in acute illnesses (Wagner et al., 2001). These include emotional impact, dealing with lifestyle adjustments, complex medication regimens, and disability. Often individuals do not get the help needed to become effective self-managers.

Another challenge to the current milieu of health care lies in how HTN is perceived. HTN is not considered a disease. It is classified as a disorder that can lead to diseases like kidney failure, stroke, and heart failure. It is not an illness in the traditional sense: characterized by symptoms, and signs of discomfort with exacerbations and flare-ups that impact patient and family. Perceptions by some people with HTN are that it is not as serious as other chronic conditions like diabetes (Anthony, Valinsky, Inbar, Gabariel, & Varda, 2012).

The nature of HTN makes it an easy condition to dismiss. It has no classic signs and symptoms to indicate control or noncontrol other than the blood pressure measurement itself. Those with HTN do not experience prominent reminders if their condition is not controlled, as is the case with diabetes in which most with this diagnosis feel physically unwell if their treatment regimen is not adhered to. Some individuals dismiss the seriousness and risks of uncontrolled HTN (Hill & Sutton, 2000; Ogedegbe, 2008; Siegel, 2005). The lack of immediate or obvious consequence for unmanaged health conditions can be misleading to individuals with asymptomatic diseases (Miller, 1997).

Noncompliance with lifestyle modifications and medication regimens is common among those with HTN. Some patients have reported they stopped taking prescribed anti-hypertensive medications for various reasons: they had no symptoms of HTN, did not think therapy was necessary--assumed blood pressure was normal; unclear (Svensson, Kjellgren, Ahlner, & Saljo, 2000). This dismissal is an ongoing challenge for HTN awareness and management.

The primary focus of the CCM is on improving chronic illness management in office practices and hospital settings. In this model, the patient does not have a passive role as in acute care situations. Self-management is a key component of the CCM. Patients receive guidance that enables them to manage their health and health care in collaboration with physician and other health care resources in their communities (Coleman, Austin, Brach, & Wagner, 2009a). This goal makes the CCM significant to this research endeavor. Self-management in this model is defined as practices carried out

by clients with chronic conditions that reduce or slow down the impact of the condition on the individual's health. Self-management practices include:

1. Individuals need to have enough knowledge about their condition (e.g., HTN) to be able to make informed decisions about their care.
2. Individuals with a chronic health condition must practice behaviors aimed at management of the condition.
3. Individuals must apply those skills which will enable them to function psychosocially.

Individuals will not continue interventions if they are not seeing results (Coleman et al., 2009a). Individuals in society may be more likely to cooperate with the plan of improving health as expected if they are seeing positive results. A perspective such as this is appropriate with acute illness and health conditions that have prominent symptomatology. An individual can apply a cream to a skin rash or ulceration and over time experience results of decreased pain or improved appearance to skin. Clients undergoing treatment for depression can notice improvement in their mood and disposition as a result of adhering to recommended therapy.

People with HTN do not experience noticeable results of improved blood pressure from adherence to their recommended lifestyle changes other than the measurement of blood pressure itself. Additional recognized barriers (Hill & Sutton, 2000; Ogedegbe, 2008; Vawatear, Tong, Gemilyan, & Yoon, 2008) include difficulty taking medications as prescribed due to lack of understanding, language barriers, and lack of financial resources. Access to supportive people that HTN related problems could be

discussed with was another identified barrier along with sociodemographic factors: employment status, age, and education level (Hill & Sutton, 2000).

False assumptions and perceptions held by some with HTN and other health conditions, in which symptoms or warning signs of their condition are lacking illuminates the significance of this research study. Tailored design of interventions is necessary for this unique population whose attitudes if not addressed could negatively impact management of the chronic condition.

In addition to self-management, five additional elements of CCM and related goals (Coleman, Austin, Brach, & Wagner, 2009b) are: Decision support—to provide evidence based clinical care that is preferred by the patient; Delivery system design—a design that promotes the concept of self-management while delivering effective and efficient clinical care; Clinical information systems—data management of population and patient information that promotes excellent care; Health care organization—safe and superior care is brought about through a well-organized and supportive culture; Community resources—provide assistance helping patients obtain available community services. The CCM's community support component substantiates the value of worksite interventions programs.

Managing Hypertension via Behavior Agent

Transtheoretical Model

The Transtheoretical Model (TTM) also known as the Stages of Change model is an integrative model which seeks to understand and assist with intentions of individuals to change behaviors (DiClemente & Prochaska, 1998). The TTM is the result of Prochaska's efforts to integrate more than 300 cognitive, behavioral, experiential, and

humanistic existential theories of psychotherapy in existence in the 1970s (Prochaska, 1979). Careful analysis of 18 leading systems of psychotherapy revealed significant similarities among them.

The evolution of the model began with identification of processes of change used by therapists and others to facilitate behavior change. Although these theories were designed to address different clinical and behavioral problems Prochaska recognized several processes which frequently were essential components of problem solving practices of therapists to bring about change in their clients. The significance of the 10 processes of change is consistently supported empirically and therapeutically (Marcus et al., 1992; Marcus, Simkin, Rossi, & Pinto, 1996; Prochaska, Velicer, DiClemente, & Fava, 1988). Different processes (e.g., support from others) were used at different times or stages of behavior change endeavors.

Stage 1: Precontemplation Stage--individual is either unwilling to change the problematic behavior (sedentary lifestyle, addiction, and so forth), or is unaware of the nature and extent of the problem or behavior needing to be changed.

Stage 2: Contemplation Stage--individual gives serious thought about changing; evaluates pros and cons of the behavior as well as of changing the behavior.

Stage 3: Preparation Stage--individual commits to a behavior change attempt that will occur in the near future from time decision is made, generally in the next six months.

Stage 4: Action Stage--a change plan is put in place; active coping is initiated; the actual behavior change is made with successful behavior change being implemented consistently for three to six months.

Stage 5: Maintenance Stage--behavior change has been successful for six months or longer consecutively; the selected behavior change has become integrated into the individual's lifestyle. The individual can exit from the TTM of behavior change once this integration occurs.

Figure 2 illustrates the stages of change. The bi-directional arrow indicates individuals can either progress to the next stage or regress to any earlier stage while attempting to change physical activity behavior. These possibilities are the reason that progress through stages of change is considered cyclical rather than linear. Failure of at least one attempt is common for those seeking to terminate a negative behavior or to acquire a positive behavior (Prochaska & Marcus, 1994).

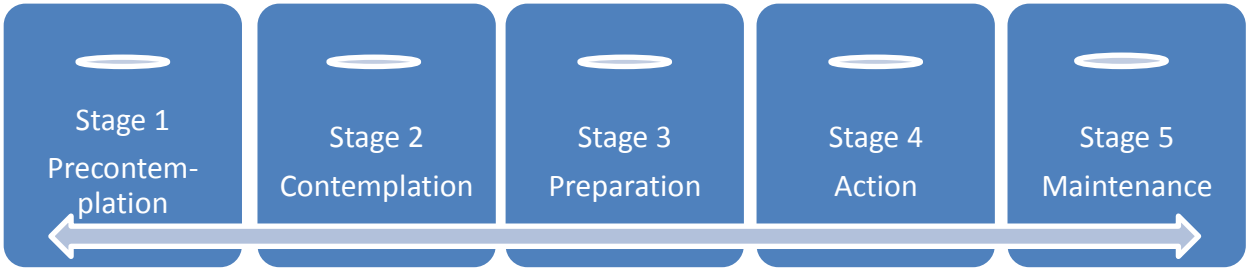

Figure 2. Five stages of change for physical activity behavior change.

Finally, the TTM recognized internal as well as external factors effect and are affected by behavioral change. Change in one behavior may complicate or be complicated by another area of an individual's life. More recent discussion and research using the TTM have not addressed this original concept. With the TTM of change, successful sustained behavior change is the goal. This change does not occur overnight. The TTM considers it normal human intentional change behavior to go through stages of change in a cyclical fashion. Focus on individuality in the process of change, which is

doing the right thing at the right time for each individual, has helped initiate and sustain change. Table 1 displays the tenets of the transtheoretical model.

Table 1

Transtheoretical Model of Change

Sequential Stages of Change	10 Processes of Change
1. Precontemplation 2. Contemplation 3. Preparation 4. Action Stage 5. Maintenance	• Consciousness Raising • Self-evaluation • Environmental Re-evaluation • Dramatic Relief • Social Liberation • Self-Liberation • Counterconditioning • Stimulus Control • Reinforcement Management • Helping Relationship

Note. DiClemente and Prochaska, 1998.

Physical activity is the behavior change agent of interest in this study even though evidence-based HTN management practices also entail medication adherence, decreased sodium intake, eating low fat foods, consuming more fruits and vegetables for nutritious benefits such as potassium and calcium, obtaining or maintaining a healthy weight, and moderate alcohol consumption (Appel, 2003; DHHS et al., 2003; Luehr et al., 2012). From an SCT perspective, having the right frame of mind and the resources and supports to change behavior are not enough. There are actions the individual must perform that will yield and sustain the goal blood pressure below 140/90 mm Hg. Self-care theory (Orem, 2003a; Orem 2003b), the TTM (Marcus & Forsyth, 2009), and self-management

concepts of the CCM each support the notion there are actions the hypertensive employee performs to change the condition or behavior.

A value of the TTM is that individuals with the same behavior needing to be changed are regarded individually based on where they are in their pursuit process. Assessment of employees' stage of change and tailoring of interventions will be more beneficial to participants and more effective than if physical activity interventions for employees with HTN were not unique to their stage.

One study relative to the value of assessment was conducted among employees in a large urban hospital. Assessment revealed that employees who were intending to exercise (i.e., those in precontemplation and preparation stages of change) were significantly more interested in worksite sponsored opportunities for exercise than those employees in action and maintenance stages who already had a regular routine of exercise ($p < .05$) (Phipps, Madison, Pomerantz, & Klein, 2010). An additional value of the TTM is that it supports stage of change assessment for multiple behaviors. Stage of change identified for one behavior (e.g., weight loss) does not mean an individual is at the same stage of change for another behavior (e.g., limiting sodium).

Evidence of the Need for Program Design Focused Research

Missed CDC Target for BP Control

A clinical prevention leading health indicator goal of *Healthy People 2020* is to increase the proportion of adults whose blood pressure is under control, which is <140/90 mm Hg (Department of Health and Human Services, 2013). The target percentage of individuals who obtain this goal is 61.2% by the year 2020. The most recent two year data from 2009-2010 indicates that those aged 65-74 had the highest

percent of controlled blood pressure (59.1). The age group with the lowest number of hypertensives managing the condition was 25-44 years (36%). This data highlights the serious need for control of high blood pressure among individuals. Tailored interventions can improve the percentage of hypertensive adults managing the condition when design is based on data obtained from assessment of employee knowledge.

Many Americans diagnosed with HTN do not have it controlled or managed (DHHS et al., 2003; Institute of Medicine, 2010; Luehr et al., 2012). A review (Valderrama et al., 2012) of NHANES data from 2003 to 2010 showed that among Americans with HTN most, 35.8 million (53.5%), did not have it under control. Nearly half of these individuals (44.8%) were aware of their diagnosis and were receiving medication for treatment. Of those whose HTN was not controlled more than 85% reported having a usual source of health care as well as health insurance. This suggests that for many Americans access and ability to afford medications may not be the primary reasons for uncontrolled HTN, though it is a problem for some (Hill & Sutton, 2000). It is conceivable that individuals in the workplace with HTN are among the population whose HTN is not managed. The worksite wellness program can help employees achieve health goals.

Physicians as Unreliable Management Resource

Research indicates that physicians for varied reasons are not a consistent reliable source of HTN management information for patients (Hill & Sutton, 2000). Reasons include limited time in the office to educate patients about lifestyle management practices to control HTN, lack of confidence in their abilities to change behavior of their patients, and lack of confidence in the effectiveness of lifestyle and behavioral counseling. One

survey of physicians revealed that few saw themselves as facilitators of lifestyle change (13%), but instead saw themselves more as facilitators of medication compliance (34%).

Among adults totaling more than 4,200 who completed a survey 20% reported being hypertensive (Ayala et al., 2005). Among those with high blood pressure, 75% reported being told by a health professional to exercise, less than 6% surveyed reported being told to decrease alcohol consumption, 21% were told to decrease salt or sodium or change diet habits. Advice about diet and salt ($p < 0.01$) decreased with increasing education of respondents and advice to exercise increased with education level. The prevalence of receiving advice for diet and salt changes from a healthcare provider was significantly higher ($p < 0.0001$) among respondents taking prescribed antihypertensive medication compared to those who were not taking medication prescribed by the healthcare provider.

Missed opportunities in wellness. More information on worksite wellness program design is needed. Results from a national survey of 730 non-governmental employers with 50 or more employees revealed only 22.9% offered a hypertension management program (Linnan et al., 2008). The most common worksite wellness programs offered were employee assistance programs offering mental health and counseling services and back injury programs. Employer respondents identified the primary reason for overall unsuccessful programs as lack of employee interest (63.5%). Forty-eight percent identified difficulty in getting high risk employees to take part in worksite programs. In an unrelated study, employers as respondents indicated 80% of them assess health risks of employees (Mattke et al., 2013). What is unknown is the

understanding the employee has relevant to his or her health risks such as how to prevent risks from worsening as problems, how to manage risks, or how to improve health.

In a systematic review of the effectiveness of worksite wellness programs it was found that programs that provided feedback information based on health risk assessment data showed no evidence that they were effective in changing employee behavior (Task Force, 2010). Programs which, based on employee health risk appraisal, provided both feedback and health education with or without an intervention have shown success in reducing blood pressure and are therefore recommended. What is not known is if these types of programs reduced systolic blood pressure only, diastolic blood pressure only, or both, and if the reductions were to a controlled level of less than 140/90 or only less than program participant's baseline. This information is relevant to the design of future programs for HTN management for worksite employees.

Use of incentives has increased percentages for wellness programs (Mattke et al., 2013). Among employers who offered incentives for lifestyle management interventions most were based on participation not completion. It is estimated that 7% of employers offer results-based incentives. Incentives could continue the cycle where employees sign up to participate in wellness interventions but fail to complete them.

Organizational support. Researchers and policy makers have given support (Arena, et al., 2013; Carnethon et al., 2009; Institute of Medicine, 2010; Mattke et al., 2013; National Archives and Records Administration, 2013; Pearson, 2011) for the use of wellness programs in worksites to positively impact the cardiovascular health of employees based on evidence. Approximately half of all employers with 50 employees or more in the United States offer some type of wellness program (Mattke et al., 2013).

Tailored design works. A consistent design principle in successful worksite health promotion programs is that they are tailored to meet the needs of the employee. Guidance on how to design programs based on interests and needs is at times lacking (Department of Health and Human Services, 2001). With regard to physical activity, stage-matched and other tailored interventions have been more successful in bringing about behavior change in individuals than non-tailored interventions (Chapman, 2004; Marcus & Forsyth, 2009).

Evidence based supports and processes (DiClemente & Prochaska, 1998) can be appropriately utilized to promote change in a particular behavior. In one workplace wellness program 539 employees with HTN participated in a tailored intervention to obtain better control of blood pressure (Jackson, Kohn-Parrott, Parker, Levins, Dyer, Hedalen, Frank, Bramer, Brandt, & Doyle, 2011). Participants' awareness and knowledge of HTN and lifestyle choices were assessed prior to interventions. At the end of the six-month intervention, blood pressure control among participants had improved from 52% to 62% ($p < 0.0001$). The majority of participants said they understood treatment options better at the end of the intervention.

Summary of Conceptual Framework

To bring about behavior change via tailored interventions of wellness programs the most important factor to consider is the hypertensive employee. Aspects of the individual that must be considered though not regularly measured in employee wellness programs include self-efficacy, past experiences, and employees' perceptions of vulnerability to serious illness when diagnosed with a chronic condition with neither symptoms at onset nor prominent reminders that encourage adherence. Employee

knowledge of HTN management is an important additional facet to consider. Assessment as a vital first step will enable wellness program designers to create effective interventions for those who desire to manage the condition. Social cognitive theory identifies three agents that affect behavior change: the individual and his cognitive perceptions, environment, and behavior (Bandura, 1986, 1997).

Self-Care Theory as its name suggests expects that the individual will act responsibly to prevent illness and maintain and obtain good health with assistance from others once baseline knowledge has been assessed (Orem, 2003a; Orem, 2003b). The knowledge individuals possess about factors affecting HTN management varies. So too does the information clients receive from health providers about behavioral and lifestyle changes. It is not safe to assume that an employee with HTN knows everything about how to obtain and maintain a blood pressure of less than 140/90 mm Hg. Self-care theory posits that individuals will perform the behaviors taught to them by knowledgeable health-care providers (Orem, 2003a; Orem, 2003b).

Within the CCM, one of the six elements to controlling chronic illness is self-management (Clark et al., 1991). The CCM favors self-management. The individual is empowered to manage his or her chronic health condition through day-to-day actions performed to reduce the impact of disease on health status.

Research suggests that workplace programs can impact change in physical activity for those in a precontemplative, contemplative, or preparation stage of physical activity via interventions tailored to influence self-efficacy (Bandura, 1986). These include modeling (vicarious capability), repeat encouragement (verbal persuasion), recalling past successes in changing (outcomes), and educating participants that feelings

related to succeeding can be misleading as they may lead an individual to underestimate or overestimate their ability to change their behavior (physiologic state). Building the employee's confidence in his or her ability to bring about behavior change through their own efforts will increase the likelihood of the employee cooperating and remaining with the intervention, especially if they do not have much history of past successful attempts to draw from.

The knowledge the employee possesses about factors relating to HTN management as a chronic health condition should also guide the design of interventions. Employers identified lack of employee interest as a major reason for wellness program failure (Linnan et al., 2008). An awareness of what the employee knows prevents design, creation and or selection of unnecessary interventions for a target population. The program developer with an awareness of participant's knowledge base can effectively direct worksite resources toward interventions that meet the needs of the hypertensive population.

A tenet of the CCM is: an individual needs to have enough knowledge about their condition in order to self-manage it (Clark et al., 1991). This implies teaching and learning must take place. By knowing where to start educating and encouraging the participant the program designer can offer an intervention that will actually help improve the condition of the hypertensive employee.

The conceptual framework of Figure 3 reflects for wellness program stakeholders that in order to improve blood pressure control among employees, assessment of the hypertensive employee is a significant first step to designing tailored interventions.

Theoretical support for the model is identified in parentheses following the aspect to be assessed in the employee.

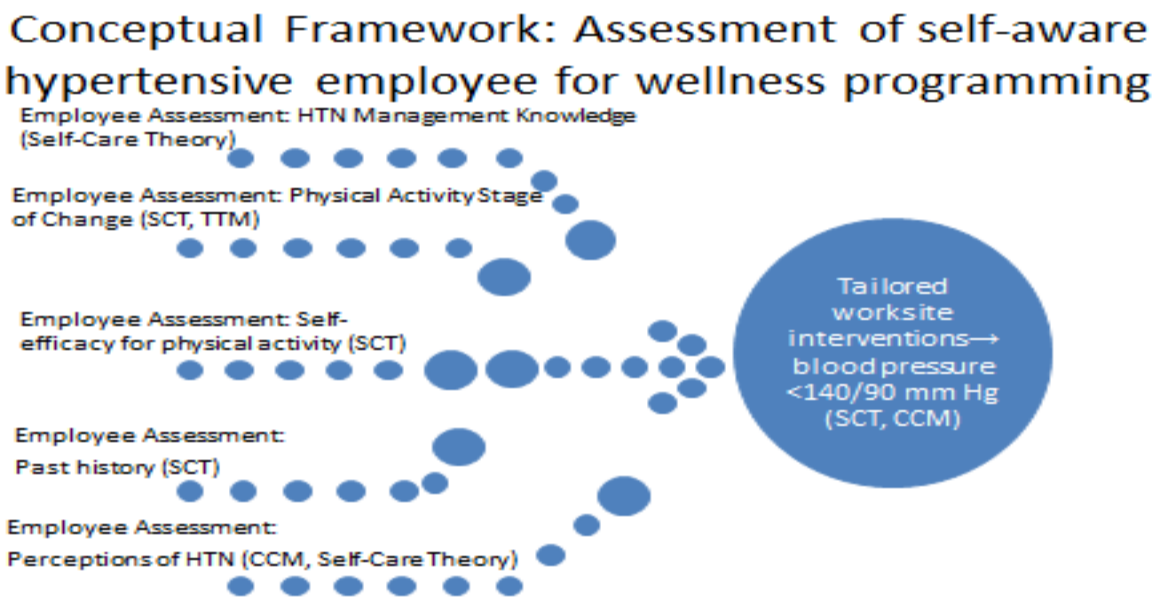

Figure 3. Conceptual framework.

Summary

This chapter reviewed the literature explaining the theoretical concepts upon which the proposed research is framed. The literature demonstrates the importance of assessment of participant's knowledge of HTN management, stage of change, and other facets relative to influencing the management of HTN. Thoughtfully tailored program design for worksite wellness programs can help bring about HTN management for employees. Chapter Three outlines the methodology applied in this investigation.

CHAPTER THREE

METHODOLOGY

Chapter Overview

Previous chapters illuminated the dearth of research that exists regarding the knowledge individuals with HTN possess about managing their condition. Discussion emphasized the importance of program designers' understanding of what a wellness employee knows about managing HTN including behaviors necessary to achieve control. Theoretical perspectives were highlighted that support individual's self-management of HTN with resources and supports to perform appropriate behaviors. This chapter describes the significance of the study, what was assessed, how the researcher studied this matter, and explains the population of participants under study. The researcher then communicates how the data were gathered, processed, and analyzed. Epistemological and ontological limitations of this study are discussed. Lastly, the researcher expresses ethical considerations pertaining to methods of research conduction as well as outcomes of the research.

Purpose of Study

The research explores employees' management knowledge of HTN, level of physical activity, perceptions, self-awareness of living with the health condition of HTN, and correlations between these three. Research has shown that many Americans with HTN do not have it under control (Department of Health and Human Services, 2013; Valderrama et al., 2012). The prevalence of uncontrolled HTN exists even among those who have access to health care and have the ability to afford medications through health insurance and self-administer prescribed medications. Evidence-based research shows

hypertensive individuals must adhere to medication regimens and other important practices to effectively manage this condition (Clark et al., 1991; DHHS et al., 2003).

This research adds to the existing body of knowledge on which wellness program designers rely. Wellness program designers aware of diagnosis, HTN knowledge level, and stage of behavior change can design programs that more closely match the knowledge, skills, and attitudes of hypertensive wellness employees (Appel, 2003; Chapman, 2004; Marcus & Forsyth, 2009). Others who may benefit from this research include organizational leaders, funders, policy makers, hypertensive employees, employee health nurses, primary care providers, and other stakeholders.

Research Question

Worksite wellness programs often center on the use of biometric screenings and an employee's health risk assessment, which asks questions about lifestyle practices and health-related issues. Wellness program coordinators use these tools to select programs for employees with suboptimal health (Mattke et al., 2013). Assessment rarely occurs of employees' knowledge and actions related to health risks such as HTN. This perspective yields the following research question: does a person's stage of change vary based on their self-awareness of HTN, knowledge of HTN and HTN management in addition to their past experiences with physical activity?

This research question lends itself to the following set of hypotheses. This researcher utilized participant hospital personnel from a community hospital to test these hypotheses.

Hypothesis One: Among employees in a community hospital, individuals self-aware of having hypertension demonstrate a different degree of knowledge of managing hypertension compared to employees who do not have hypertension.

Hypothesis Two: Among employees in a community hospital, individuals self-aware of having hypertension are at a higher stage of change for physical activity compared to employees who do not have hypertension.

Hypothesis Three: Individuals at higher stages of change for physical activity have higher levels of self-efficacy.

For this study, quantitative research was used. A survey served as the data-gathering instrument in this study. This choice of data collection helped avoid errors resulting from personal biases and values (Monette et al., 2005). Use of this instrument also allowed for more precise data analysis for information gathered from a large group.

Study Design

The unit of analysis is the individual at a community hospital in Western Pennsylvania. Quantitative research that is cross-sectional in nature was conducted. Cross-sectional studies have been conducted in behavioral psychology, social sciences, education, and public health (Monette et al., 2005). These studies describe a population of interest in the context of specific variables. With cross-sectional studies inferences about possible relationships can be made which could next be examined through case-studies or other more rigorously designed studies.

Both for the researcher and the exploratory nature of this study, a cross-sectional design seemed more practical over a longitudinal design. The researcher was seeking to understand current knowledge and behavior related to HTN management, which can be

researched appropriately by this method. The hypotheses were examined from the employee's status of program member versus non-wellness program membership as an independent variable.

Cross-sectional research also allows data collection and subsequent assessment of relationships with one time intrusion into the lives of survey participants. This limited interaction tends to be attractive to would-be respondents (Monette et al., 2005). In addition, cross-sectional research conserves the time of the researcher in that data to address the research questions could be gathered upon survey completion. With cross-sectional research, there is no need for the researcher to adjust data if initial participants over time change their perceptions, wellness program or HTN status, or leave the organization. Compared to longitudinal research, cross-sectional research is generally less expensive and easier to conduct. Most of the designs of the TTM stage of change have been cross-sectional.

Currently many intervention programs are developed based on insurer, health risk assessment, and perhaps biometric screening which can identify potential or actual areas of suboptimal health (Mattke et al., 2013). There is rarely assessment of what the employee already knows about health risks such as HTN or what actions they are already involved in to manage this and other chronic conditions. For this reason, this research should add significantly to the current body of knowledge.

Operational Definitions of Variables

In this section, I provide description of the dependent and independent variables of the research, which includes explanation of types of questions, validity and reliability of scales, and details of item measurement. There were 32 questions in the survey for

participants to complete, which assessed self-awareness and perceptions of HTN, individual's understanding of the condition, behavior change habits such as physical activity, and demographic information. Question formats included yes/no, true/false, Likert scales, and multiple-choice options.

Dependent Variable

Stage of Change Scale. As the dependent variable in this study, the TTM's ordinal stage of change scale for physical activity measures an individual's progress toward acquiring a positive behavior or abandoning a negative (Marcus & Forsyth, 2009; Prochaska & Marcus, 1994) (Appendix C). The scale, which consisted of four Yes/no questions, identified which of five advancing stages of physical activity the employee was in: precontemplation, contemplation, preparation, action, and maintenance. The lowest stage represented the individual who was neither physically active nor planning to become active within the near future. The second through fourth stages represented the individual moving toward a lifestyle of physical activity. The fifth stage indicated a lifestyle of maintaining regular physical activity as recommended.

The TTM from which the scale derives considered the attitudes, barriers and motivations to change, cognitive perceptions, and actions that affected behavior change. The stages of change were recognized by DiClemente and Prochaska (1982) as they studied and compared the processes of self-quitters to therapy-quitters. The scale was developed (Prochaska et al., 1992) to explain stages of change for addictive behaviors and to recognize the types of internal and external resources that progressed individuals along stages until they were in the maintenance stage of change. Prochaska's stage model

was modified for applicability to physical activity (Marcus, Eaton, Rossi, & Harlow, 1994; Marcus et al., 1992; Marcus & Simkin, 1993).

Two studies were conducted to stage a percentage of employees who volunteered from a government worksite (30%) and a medical center (34%) (Marcus et al., 1992). A total of 1,492 surveys were conducted across two studies. Similar results between studies were obtained. In the second study, most respondents were in precontemplation, contemplation, and preparation stages of change. Internal reliability and validation of the tool as appropriate to use for stage of change for physical activity was obtained (Marcus et al., 1992). The multivariate analysis of variance (MANOVA) for stage of change was significant, Wilk's Lambda = 426, approximate $F(40, 3960) = 24.98$, $p < .001$). The majority of individuals were in precontemplation and contemplation stages (57.8%). Over a period of 14 days the researchers reassessed (N=20) the Kappa index of reliability which was .78 (Marcus et al., 1992). Concurrent validity for the stage of change scale is evident in its significant association with the Seven Day Recall Physical Activity Questionnaire. The stage of change model for physical activity has been used in subsequent studies successfully (Marcus et al., 1992; Marcus, Rossi, et al., 1992; Marcus & Simkin, 1993). The reliability and validity of this tool for use as a stage of change tool for physical activity was supported.

The TTM's five stages of change in the model are: precontemplation, contemplation preparation, action, and maintenance. Progression through stages of change was considered cyclical rather than linear. Failure of at least one attempt is common for those seeking to terminate a problem behavior or to acquire a positive behavior (Prochaska & Marcus, 1994). Participants were asked to complete the four-item

stage of change scale. Operational definitions of the five stages of change for physical activity follow.

Precontemplation. At this first and lowest stage, **"**Individual is not engaged in regular physical activity according to national recommendation (Physical Activity Guidelines Advisory Committee, 2008) which is 150 minutes/week total of moderate exercise in increments of ten minutes or more, totaling 75 minutes/week of vigorous activity in increments of ten minutes or more and is not planning to become physically active within the next six months" (Marcus & Forsyth, 2009).

Contemplation. At this next to lowest stage, "Individual is planning to engage in regular physical activity according to national recommendation (Physical Activity Guidelines Advisory Committee, 2008) which totals 150 minutes/week of moderate exercise in increments of ten minutes or more or a total of 75 minutes/week of vigorous activity in increments of ten minutes or more in the next six months" (Marcus & Forsyth, 2009).

Preparation. At this third consecutive stage, "Individual is physically active but does not engage in regular physical activity according to national recommendation (Physical Activity Guidelines Advisory Committee, 2008) equaling 150 minutes/week of moderate exercise in increments of ten minutes or more or a sum of 75 minutes/week of vigorous activity in increments of ten minutes or more" (Marcus & Forsyth, 2009).

Action. At this next highest fourth stage, "Individual is engaged in regular physical activity according to national recommendation (Physical Activity Guidelines Advisory Committee, 2008) which equals 150 minutes/week of moderate exercise in

increments of ten minutes or more or 75 minutes/week of vigorous activity in increments of ten minutes or more for less than six months" (Marcus & Forsyth, 2009).

Maintenance. At this fifth and highest stage, "Individual is engaged in regular physical activity according to national recommendation (Physical Activity Guidelines Advisory Committee, 2008) which is 150 minutes/week of moderate exercise in increments of ten minutes or more or 75 minutes/week in all of vigorous activity in increments of ten minutes or more for the past 6 months" (Marcus & Forsyth, 2009).

Independent Variables

Hypertension evaluation of lifestyle management knowledge scale. One of the independent variables is HTN management knowledge. Participants completed the Hypertension Evaluation of Lifestyle and Management Knowledge (HELM), a 14-item questionnaire that measured three domains of HTN management knowledge: monitoring and setting goals, lifestyle and medication management, and general HTN knowledge (Schapira et al., 2012) (Appendix B). Scale items included True/False questions (4), and multiple-choice questions (10) in which respondent chose one best answer in each question. The sum of individual's correct responses was evaluated. Each scale item was worth one point. The lowest possible score an individual could obtain was zero, with 14 as the highest possible score. A higher score indicates more HTN management knowledge than a lower score.

This scale was created based on existing knowledge scales that measured single components of HTN such as weight loss and lowered sodium intake and through exploration of chronic disease management of veterans. Participants provided feedback on relevance, clarity, and difficulty. The item was pilot tested and modified if items were

confusing or too low or too high in difficulty to discriminate HTN knowledge from ability to understand the question.

Through a large random sampling process, 404 predominantly Caucasian male and female veterans whose education levels ranged from less than 12 years to 12^{th} grade or GED to some college were enrolled in a 12 month study (Schapira et al., 2012). The HELM scale was the pre-test/post-test scale for a 12 month intervention program. The total cohort's baseline mean scores (SD) were 8.7 (2.2). Total cohort scores increased after the 12 month intervention to 9.2 (2.2) (P <.0001).

Psychometric analysis of the 14 items showed a range of difficulty of 25% to 89% (Schapira et al., 2012). Correlations between subject's understanding of test items and understanding of self-management were positive. A positive correlation between the patient activation measure and the HELM scale (0.12, P = .015). Between HELM scale and three other variables, correlations by Pearson were positive: health print literacy (0.21, P <.001), level of education (0.28, P <.001), and health numeracy (0.17, P <.001). Descriptions of the three domains of the HELM scale and knowledge measured are provided.

General hypertension knowledge. Measures individuals' ability to define HTN and symptomatology, and recognize complications of the condition if it is not managed properly (Schapira et al., 2012,). Three of the 14 questions assessed this domain.

Lifestyle and medication management. Measures individuals' knowledge of appropriate medications and suitable lifestyle practices (Schapira et al., 2012). Eight of the 14 questions assessed this domain.

Monitoring and setting goals. Measures individuals' knowledge of the reasons for treatment and how to recognize its effectiveness (Schapira et al, 2012). Three of the 14 questions assessed this third and final domain of the HELM scale.

Self-awareness of hypertension. An additional independent variable is individual's self-awareness of having HTN. Individuals with HTN should be making lifestyle management changes to maintain a blood pressure level that is below 140 mm HG systolic and below 90 mm Hg diastolic. Self-awareness of hypertension:

> Defined by (1) a belief individual is hypertensive, (2) a history of individual being told by primary care provider that they have hypertension, (3) currently taking medications to treat hypertension, or (4) documentation of two BP readings greater than or equal to 140/90 mm HG by survey site employee health staff using standardized methods of BP measurement. (Schapira et al., 2012)

These dichotomous variables were coded 0 for no and 1 for yes. Data coding identified the participant as being self-aware of having HTN if a Yes response to any or all of these four options was selected. Data coding identified the participant as not being self-aware of having hypertension if a No response to all four options was selected.

Self-efficacy. Measures how confident the individual is that he or she could be physically active in specific situations (Marcus & Forsyth, 2009). Respondents were assessed using a self-efficacy tool, which is a Likert scale measuring individual's confidence in his or her ability to be physically active given five specific situations (See Appendix D). For each situation respondents selected responses from one of five confidence options on a five-point rating scale with weights (given in parentheses)

assigned to each answer: Not at all confident (1), Slightly confident (2), Moderately confident (3), Very confident (4), and Extremely confident (5).

Validity and reliability of this five-item scale measuring individual's self-efficacy for regular physical activity according to recommendations was obtained via studies conducted among hospital and government employees (Marcus, et al., 1992). Internal consistency of the scale using coefficient alpha was calculated at was .82 (n = 917). Scores on these items differentiated those surveyed at different stages of change for physical activity, $F(3,861) = 85.93$, $p<.001$. The proportion of variance was .23 whereas Cohen defines large effect as proportion of variance accounted for at .14 (Cohen, 1977). Test-retest reliability for this scale was .90 (n = 20) over a two-week period.

Past history. Measures the amount of success or failure the individual has experienced when attempting to change physical activity behavior (Bandura, 1986). The most influential source that feeds individuals' self-efficacy is past history (outcomes) in an area such as physical activity (Bandura, 1986). One item in the survey assessed respondent's experience trying to be physically active on a regular basis. Categorical responses were obtained relative to success and failure with regular physical activity.

Current enrollment in employee wellness program. This is a dichotomous variable coded 0 for no and 1 for yes. In analysis it was used as an indicator variable.

Perspective on ease of managing hypertension. A Likert scale assessed participants' perceptions on the ease of managing HTN compared to management of eight other common chronic health conditions. A three-point rating scale with weights (given in parenthesis) was used to measure responses: Easier to manage than HTN (1),

About the same as HTN (2), and More difficult to manage than HTN (3). Any Not Sure responses were not factored into the weighting average.

Management of chronic health conditions requires more than treatment using professional knowledge and skills. It requires ongoing long-term sometimes lifelong collaborative management between primary health provider, support systems, and the individual (Von Korff et al., 1997). Individuals with chronic conditions have common challenges not typically experienced in acute illnesses such as emotional impact, dealing with lifestyle adjustments, complex medication regimens, and disability (Wagner et al., 2001). Often individuals do not get the help needed to become effective self-managers.

Perspective on importance of managing hypertension. A final Likert scale assessed respondents' perceptions on the importance of managing HTN compared to the importance of managing eight other common chronic health conditions. A three-point rating scale will measure responses: Less important to manage than HTN (1), Just as important to manage as HTN (2), and More important to manage than HTN (3). Any Not Sure responses were not factored into the weighting average.

Perceptions by some with HTN are that it is not as serious as other chronic conditions like diabetes (Anthony et al., 2012). The nature of HTN makes it an easy condition to dismiss as it has no classic signs and symptoms to indicate control or non-control other than the blood pressure measurement itself. Those with HTN do not experience prominent reminders if their condition is not controlled as is the F with diabetes and arthritis in which individuals with these diagnoses feel physically unwell if treatment regimen is not adhered to. Some individuals dismiss the seriousness and risks of uncontrolled HTN (Hill & Sutton, 2000; Ogedegbe, 2008; Siegel, 2005). The lack of

immediate or obvious consequence for unmanaged health conditions can be misleading to individuals with asymptomatic diseases (Miller, 1997).

Confidence in wellness program. A single dichotomous variable item measures respondents' confidence in an employee wellness program's ability to bring about blood pressure control using tailored interventions. Responses were coded 0 for No and 1 for Yes.

Control Variables

Demographic and dichotomous variable information collected indicated participant's gender, age range, highest education attained, and employment status, reported as aggregate data.

Sex. Sex of wellness employee. A dichotomous variable coded 0 for male and 1 for female**.**

Age. Age in years as of survey completion date was coded with six ranges consistent with Healthy People 2020 age ranges for monitoring the proportion of adults with HTN whose blood pressure is under control (Department of Health and Human Services, 2013).

Highest education attained. One of four categories of educational attainment the participant identified with: < High school (1), High school (including General Equivalency Diploma (GED) or equivalent) (2), Some College or Associate's degree (3), Bachelor's Degree or above (4).

Employment status. Classification of one of three categories offered to employees by survey site leadership: Full-time, Part-time, or Casual. Length of employment at organization was measured in years. A regular full-time employee was

assigned to work either 72 or 80 hours in a two week pay period. A regular part-time employee was assigned to work 29 to 39 hours a week. A casual employee worked on an as needed basis less than 39 hours in a two week pay period.

Sampling

I obtained support for this proposed survey research from the leadership of a community hospital in Western Pennsylvania. I used a nonprobability sampling strategy in this study by sampling the entire population of community hospital employees.

The target population for this study was all adults aged 18 and older employed at a community hospital on a full-time, part-time, or casual basis. Both wellness program member employees and non-wellness member employees were invited to participate. "Current enrollment in employee wellness program" is an independent variable and was included as an indicator variable.

The survey site encompassed a 100-year-old 150 bed community hospital with approximately 1,403 employees (see Appendix A). The majority of employees were female (82.12%). A full-time, and part-time/ casual status description of all employees revealed 56.02% and 35.71%, respectively. The average age of employees was 46.1 years while those aged 18-44 comprised the largest age group (42.26%). Non-Hispanic Whites comprised the dominant (98.44%) racial/ethnic group of the organization.

In 2005 this survey site, like many organizations across the country, implemented a worksite wellness program to promote health and prevent disease. Currently, approximately 529 employees (37.70%) maintain enrollment status voluntarily in the worksite wellness program with 88.09% being female employees. Table 2 describes demographics of individuals employed at the community hospital survey site.

Table 2

Survey Site and Employee Demographics

Demographic	n (%)
Total Number of Employees	1403
Male	250 (17.82)
Female	1153 (82.18
Job Status of Employees	
Full-Time	786 (56.02)
Part-Time	445 (31.72)
Casual	172 (12.25)
Age Ranges (in years)	**n (%)**
<18	0
18-24	57 (4.06)
25-44	536 (38.29)
45-54	407 (29.00)
55-64	354 (25.23)
65-74	43 (3.06)
75 & <	6 (0.43)
Average Age	46.1
Job Type	**(%)**
Percent Salaried	23
Percent Hourly	77

Table 2 (continued)

Survey Site and Employee Demographics

Racial/Ethnic Groups (Percent)	(%)
Non-Hispanic White	98.44
Non-Hispanic Black/African-American	0.43
Hispanic/Latino	0
Asian/Asian-American	1.06
American Indian/Alaska Native	0
Native Hawaiian/Pacific Island	0.07
Other	0
Wellness Program	**n (%)**
Number Enrolled 2013-2014	529 (37.70)
Male	63 (12%)
Female	466 (88.09%)

Wellness assessments offered by the program at no charge to the employee include biometric screenings, health risk assessment, vein screening, bone density screenings, and peripheral arterial screenings. These can lead to other screenings and supports such as self-management programs for blood pressure control, counseling, and follow-up. Selection of wellness programs occurred via employee surveys and requests, insurer recommendations, health risk appraisals, and leader recommendations. Table 2 highlights aspects of the survey site such as employee demographics. The Director of People Development supported the study. In addition, the researcher had the trust and support of the Coordinator of Employee Health who also managed the wellness program, is a registered nurse, and was interested in this issue.

Data Collection

The survey site's intranet email system was frequently used to contact employees. Information about the survey and invitation to participate was sent to participants via this mode of electronic communication (see Appendix E). The survey (see Appendix F) was compiled in Qualtrics and administered electronically to all hospital employees regardless of wellness program membership. Directions on how to access the online Qualtrics survey for respondents was provided within the body of the email. To increase participation weekly reminders were sent to employees via the survey site's email intranet system.

Quantitative Data Analysis

Analysis of data collected from hypertensive and nonhypertensive program volunteers occurred as well as wellness program members and nonmembers. Multivariate analysis between variables was performed to detect the existence of significant relationships.

Qualtrics survey data were exported to Excel and then to a STATA statistical software program (StataCorp, 2013). Data collected were inserted into STATA tables pre-formatted by the researcher. Data were cleaned to adjust for missing values and information from the surveys. STATA commands were utilized to organize, summarize, and interpret data from the respondents. Univariate and bivariate analysis describe variables and correlations between variables. Factor Analysis and Cronbach's Alpha tests of internal consistency were performed with results of the HELM scale.

An ordinal logistic regression analysis was conducted to investigate how the independent variables, as listed and defined, related to the ordinal stages of change, which served as the dependent variable.

This analytical model addressed the testing of the three hypotheses:

Hypothesis One: Among employees in a community hospital, individuals self-aware of having hypertension demonstrate a different degree of knowledge of managing hypertension compared to employees who do not have hypertension.

Hypothesis Two: Among employees in a community hospital, individuals self-aware of having hypertension are at a higher stage of change for physical activity compared to employees who do not have hypertension.

Hypothesis Three: Individuals at higher stages of change for physical activity have higher levels of self-efficacy.

The logistic regression model tested relationships between the dependent variable stage of change and all independent variables. The existence and significance of relationships between independent variables such as awareness of HTN and management knowledge, presented in Hypothesis one, was tested. With the inclusion of the wellness member variable in the logistic regression model, and the opportunity to use it as a slope indicator variable, the model was also operated to test these hypotheses among both wellness members and non-wellness members employed at the survey site.

Aday and Cornelius (2006) state "In applied public health and health services research, researchers are generally interested in establishing whether a relationship exists between variables, but less concerned with estimating the precise magnitude of the difference" (p. 167).

Nonetheless, using STATA statistical software the researcher attempted to analyze strength of relationship where possible.

Limitations and Weaknesses

All members were requested to participate in the study. However, while this hospital is typical of many across the U.S., this research cannot generalize to a greater population as it represents a quantitative study using cross-sectional data collected via self-report surveys. The use of multivariate ordinal logistic regression provided statistical control relative to the included independent variables.

To maximize transferability of results the researcher has clearly stated where, with whom, and when the survey was done along with study objectives. Other issues of external validity were only available in terms of how the results operate across age, sex, employee, status, and other statistically controlled variables specifically used in this study.

To minimize design specification ambiguity the study objectives have been clearly specified along with related concepts that were measured, particularly in relationship to the underlying study design and statistical analysis.

Because the study was cross-sectional involving a nonprobability sample, the study remained limited in scope from a cause and effect perspective. Nonetheless, this study provided significant opportunity to provide initial exploratory knowledge for better understanding physical activity stages of change relative to organizational wellness programs and a specified physiological condition (HTN).

Ethical Issues

With regard to the protection of survey subjects, several protections were put in place. The invitation letter fully explained the purpose and nature of the study. It informed individuals that their participation was voluntary and that their completion of the survey served as their consent to participate in the study (see Appendix F). Refusal to participate in study was the right of employees, and individuals were informed they may withdraw from the study (i.e., stop answering the questions) at any time during participation in the survey. All individual responses will remain anonymous and reported in aggregate.

On its face, the instrument did not ask questions that caused a participant to stand out from other members. For example the survey did not inquire about occupation or what department the participant worked in, or their position or rank. Results published or shared exist in the aggregate only.

The survey was designed as non-threatening to survey volunteers. However, the researcher recognized the topics of HTN knowledge and physical activity behavior may prove sensitive for some survey volunteers. Nonetheless, given the volunteer nature of the study and the value of the results, the benefits of taking part in the study outweigh any detriments.

Expected Outcomes

The data revealed correlates between the independent variables and the stages of change for physical activity measure. Data analysis showed significance in employees self-aware of having HTN and levels of HTN management knowledge compared to those

who were not self-aware of having HTN. Data analysis also revealed that individuals at higher stages of physical activity had higher levels of self-efficacy.

This research when reviewed by wellness program designers and other stakeholders will inspire development of tailored wellness interventions for HTN management. It is my expectation that as a result of this and similar studies, fewer one-size-fits-all type wellness interventions will exist and directed interventions will be appropriately designed and offered to the right individuals at the right time.

In addition, this research may help funders, policy makers, and other stakeholders consider how they can make sure that interventions offered are appropriate for the target populations in terms of knowledge held and stage of change. Utilizing the worksite wellness program and available community resources to help employees manage HTN through tailored design may prove to be a very effective concept for bringing about behavior change.

Summary

Chapter Three outlined the research method for this study. The design expanded the current base of understanding of HTN management knowledge, individual beliefs, and physical activity behavior among worksite wellness program members with a diagnosis of HTN. Chapter Four outlines specific characteristics associated with the data collected and the related analyses. A discussion of the findings will follow in Chapter Five.

CHAPTER FOUR

FINDINGS

The purpose of this study was to explore community hospital employees' perceptions and understanding of HTN management, and their physical activity practices. This chapter reports on findings from the analysis of quantitative data I collected via a survey administered between June 2014 and August 2014. I analyzed the data using statistical software from STATA (StataCorp, 2013). Initial calculations and summaries included descriptive statistics, frequencies, and correlations. When generating variables I used factor analysis and Cronbach's alpha to analyze multi-item scales. Finally, I utilized logistic regression and determined a best fitting model among dependent, independent, and control variables. From this model, I was able to predict the likelihood of individuals' engagement in high stages of physical activity in relation to predictor variables.

Description of the Sample

I obtained Institutional Review Board (IRB) permission to conduct the voluntary research study among 1,403 employees of a 100-year-old 150-bed community hospital in Western Pennsylvania. I collected the data over approximately one month. The overall employee population was predominantly nonminority White (98.44%) and consisted primarily of females (82.12%). The majority of employees worked full-time (56.02%) with 31.71% employed on a part-time basis and 12.25% on a casual basis. The largest proportion (42.26%) of community hospital employees was 18-44 years of age. Median age reported was 46.1 years. Two hundred eight hospital employees (14.82%) responded to the voluntary survey. I cleaned the survey data by eliminating respondents who

answered five or less of the 32 survey items, which resulted in the elimination of 12 respondents. The remaining respondents totaled 196.

Survey Responses

Sex. Of the respondents who self-identified their sex (n = 189), 91.53% were female and 8.47% were male. Seven individuals did not answer this item. Given the imbalance of male to female respondents, the variable was unsuitable as part of a logistic regression model.

Age range. Due to the small number of respondents in some of the age range categories, I combined the two lower cells of younger respondents and did the same for the two older groups. After combining age ranges, of the 189 survey participants, 39.68% (n = 75) were between 18-44 years of age, 32.80% (n = 62) were aged 45-54, and 27.51% (n = 52) were 55-74 years of age. The median of the five age ranges was three (45-54 years) and the mean was 2.8 (SD = 0.88). Given that the median age of employees at the survey site was 46.1, I assigned the seven respondents who skipped this question to the 45-54 years age group. Table 3 shows age distributions of respondents across the original five ranges and across the three categories created by this researcher following the combining of age groups, which I used for the analysis and thereby reduced the existence of thin cells associated with this variable.

Table 3

Original and Combined Age Ranges of Respondents in Years

Age Ranges of Respondents			
Original	n	Combined	n
18-24	7		
25-44	68	18-44	75
45-54	62	45-54	69[a]
55-64	51	55-74	52
65-74	1		
75 & over	6	0	

Note. N = 196. [a]Seven missing values entered into age range.

Employment status. Regarding job status, 61.22% (n = 120) of the respondents who answered the question were full-time employees. Casual and part-time employees comprised 34.69% (n = 68), with 4% (n = 8) not answering the survey question. I recoded the data to 1 (*yes*) if the employment status answer was full-time; and 0 (*no*) if respondent indicated part-time or casual employment status, indicating not full-time. Next, I ran a logistic regression of full-time on four variables. The variables that helped predict full-time employment included age, confidence of being physically active when tired, and self-efficacy. Although I also included enrollment in the BWell wellness program, it was not significant. I then used the logistic model to determine predicted probabilities for full-time status. Using these results, I chose to regard the eight missing values that had

predicted probabilities of greater than 50% as *yes* and less than 50% as *no*. Table 4 lists the predicted probabilities of the eight missing values.

Table 4

Predicted Probabilities of Missing Values

Respondent's Pseudo ID	Predicted Probability of Full-Time Status
189	.4664309
190	.5254854
191	.6712141
192	.7141892
193	.4826185
194	.5876245
195	.6374242
196	.7736632

Note. *N* = eight.

I imputed these values into the full-time variable, which increased the full-time percentage by 3.06% to 64.28% and resulted in a part-time and casual percentage increase of 1.027% to 35.71%. Among employees in the overall hospital population, 56.02% were employed full-time and 43.97% had a part-time or casual work classification. There was less than 10% difference in full-time job status between the population and survey employment demographic.

Education. This researcher assessed respondent's highest level of education attained. A large percentage (40.30%) of respondents indicated having a bachelor's

degree or higher. The cells for less than a high school diploma (n = 9) as well as high school/GED/equivalent (n = 9) were thin. I combined the two thin cells with the respondents who reported having some college or an associate degree. I recoded these responses, creating a dichotomous variable of those with a bachelor's degree or above (*yes*, n = 79) and those who reported less than a bachelor's degree (*no*, n = 110). Seven respondents did not answer this demographic inquiry. The mean of the four original education categories was 3.2 (SD = 0.76) and median was three, consistent with the *some college or AA degree* category. I imputed the seven missing values as *no* thereby yielding 117 respondents who achieved less than a bachelor's degree. The survey site did not maintain educational records of all employees thereby comparison of population and sample data was not possible for the education demographic.

Confidence in tailored wellness program. The dichotomous variable measured respondents' confidence that a wellness program tailored for employees with HTN could bring about high blood pressure control. Responses were coded 0 (*no)* and 1 (*yes)*. Eight respondents did not answer this item, which generated missing values. I regarded those eight missing data as unsure, which equated to not confident and thereby equated to a *no*. Among respondents, 90.30% believed a wellness program using tailored interventions for employees with HTN could help bring about blood pressure control.

Summary of Demographic Variables

Survey respondents were comprised of males and females, representing all age ranges, job classifications, and education levels. Most of the employees at the hospital and in the sample worked full-time. Most survey respondents reported less than a bachelor's degree in education. The hospital did not maintain education level data of its

employees. An overrepresentation of wellness members responded (55.61%), compared to the percentage of wellness members in the hospital population (39.70%). This aberrancy warranted discussion, which I provide in the Limitations section of Chapter Five.

The vast majority of respondents who indicated confidence that tailored interventions can help an employee obtain a managed blood pressure supported the significance of this investigation. More than a third of hospital employees were wellness program members indicating an opportunity for program member expansion. The majority of hospital employees and survey respondents alike were 45-54 years old. I expected most respondents would be female given that the majority of hospital employees were female (82.12%). Unfortunately, the over-representation of female respondents coupled with the under-representation of male participants limited any analysis of responses from a gender perspective. Table 5 shows a comparison of hospital and respondent demographic characteristics discussed in this section. Each demographic of the hospital population (e.g., gender and job status) was represented among the sample of respondents. Not all sample demographics (e.g., education) were available for population. Given the low response rate (14.82%), consideration of sample findings as representative of the hospital population was not possible (Monette, et al., 2005).

Table 5

Characteristics of All Hospital Employees and Study Respondents

Demographic		Total Hospital Employee Population N = 1403		Sample Respondents N = 196	
Category		n	%	n	%
Age in years	18-44	593	42.26	75	38.26
	45-54	407	29.00	69[a]	35.24
	55-74	397	28.29	52	26.53
	75 & over	6	0.43	0	
Sex	Male	250	17.82	16	8.46
	Female	1153	82.12	173	91.53
Employment	Full-time	786	56.02	126[b]	64.28
	Part-time/ Casual	617	43.97	70[c]	35.71
Education	Bachelor degree or higher	N/A	N/A	79	40.30
	Associate degree or less	N/A	N/A	117[d]	59.69
Wellness	Wellness Member	529	43.97	109	55.61
	Confidence in Wellness Program	N/A	N/A	177	90.30

Note. Hospital employee N = 1403. Surveyed employee N = 196. [a]Seven missing values entered into category. [b]Six missing values entered into category. [c]Two missing values entered into category. [d]Seven missing values entered into category.

Some of the respondent demographics noted in Table 5 served as independent variables to build a model that predicted influences on the dependent variable. Variables from this section of the chapter that were applied to the model included education, age range, being full-time, and being a member of the wellness program. I discuss development of other variables and their application to the model in the next section of this chapter.

Variable Generation

In this section, I first address the development of the dependent variable, stage of change for physical activity. I initially intended to use it as an ordinal variable with five sequential categories and then employ an ordinal logistic regression to analyze results. However, the data did not lend itself to this type of analysis and I discuss the types of changes made and the reasoning behind these changes. Next, I describe the process of generating independent variables other than the descriptive characteristics previously noted.

Dependent Variable

The dependent variable in this study is stage of change for physical activity. Research participants self-reported *yes* (1) or *no* (0) to a scale of four statements that analyzed individual's stage of change for physical activity. Correct analysis required the statements be presented in the specific order listed (Marcus & Forsyth, 2009):

1. I am currently physically active.
2. I intend to become more physically active in the next six months.
3. I currently engage in regular physical activity.
4. I have been regularly physically active for the past six months.

I applied a scoring algorithm to interpret *yes* (1) and *no* (0) responses of participants (Marcus & Forsyth, 2009):

1. If (question 1 = 0 and question 2 = 0), then = Stage 1 Precontemplation,
2. If (question 1 = 0 and question 2 = 1), then = Stage 2 Contemplation,
3. If (question 1 = 1, and question 3 = 0), then = Stage 3 Preparation,
4. If (question 1 = 1, question 3 = 1, and question 4 = 0), then = Stage 4 Action,
5. If (question 1 = 1, question 3 = 1, and question 4 = 1), then = Stage 5 Maintenance.

There were eight respondents in precontemplation stage. The majority of respondents (n = 102) were in maintenance stage. Table 6 lists the number and percent of individuals at each stage according to the algorithm.

Table 6

Physical Activity Stage of Change of Respondents

Stage	n	(%)
Pre-contemplation	8	(4.08)
Contemplation	32	(16.33)
Preparation	28	(14.29)
Action	26	(13.27)
Maintenance	102	(52.04)

Note. N = 196.

Originally, I intended to have multiple ordinal categories with a reasonable number of individuals in each stage. Using ordinal logistic regression, I was going to assess if there was any relationship that existed between the five stages of change for identified physical activity and the independent variables. However, the number of respondents grouped into each of the first four stages was small, which made ordinal logistic regression inappropriate.

To address the situation, I recoded the five stages into a dichotomous dependent variable. Combining stages of change has occurred in research literature when the number of subjects within adjacent stages such as action and maintenance were too small individually for useful analysis of data (Plotnikoff, Hotz, Birkett, & Courneya, 2001). Following this approach, respondents assigned to the three lowest stages of change based on their responses I recoded and assigned collectively into a *not high stage* group. Similarly, I recoded respondents in the top two stages of change into a *high stage* group. I generated a new variable in which all survey participants were recoded in the variable as either 1 (*yes, high stage)* or 0 (*no, not high stage)*. Table 7 shows results of this recoding of the stage of change dependent variable. Having recoded the five stages into a dichotomous variable, I was able to perform a logistic regression of the dependent variable against the independent variables, which I identify in the following section.

Table 7

Distribution of High Stage Status

High Stage	n	%
No	68	(34.69)
Yes	128	(65.30)

Note. N = 196.

Independent Variables

Based on literature reviewed and discussed in Chapter Two, I selected key independent variables potentially influential to the dependent variable: Hypertension Evaluation of Lifestyle Management Knowledge (HELM), self-awareness of HTN, self-efficacy, past history, current enrollment in employee wellness program, perspective on ease of managing HTN, perspective on importance of managing HTN, and confidence in tailored employee wellness program. In this section, I highlight the generation of each of these variables.

Hypertension. Respondents (n = 196) were asked four questions to ascertain self-awareness of having HTN. Those who answered *yes* to any or all of the four survey items listed, I numerically coded as 1 (*yes*) indicating that the respondents were self-aware of having HTN.

- Do you believe you have high blood pressure?
- Have you ever been told by your primary care provider that you have high blood pressure?
- Are you currently taking medication(s) to treat high blood pressure?

- Have you ever had two blood pressure readings greater than 140/90 mm Hg documented by employee health staff who used approved blood pressure measurement methods?

The query resulted in 83 respondents (42.34%) categorized as self-aware of having HTN and a remaining 113 (57.65%) categorized as not aware of having HTN. The dichotomous HTN variable was created based on these responses. Among those self-aware of having HTN, most were 45-54 years of age. There were 55.42% of respondents self-aware of having HTN who self-reported being at a high stage of regular physical activity. Comparatively, 72.57% of those not self-aware of having HTN were at a high stage.

Table 8 displays the number of respondents self-aware and not self-aware of having HTN based on self-reports. The largest proportion of respondents not self-aware was 18-44 years of age. A larger proportion of male respondents (56.25%) were self-aware of having HTN compared to female respondents (39.88%).

Table 8

Number of Respondents Self-Aware and Not Self-Aware of HTN

	Males n = 16		Females n = 173		Sex Unknown n = 7	
	Self-Awareness of HTN					
Age Range	Yes	No	Yes	No	Yes	No
18-44	4	4	18	49	0	0
45-54	3	2	25	32	5	2
55-75	2	1	26	23	0	0

Note. N = 196.

Comparisons between those aware and not aware of having HTN occurred in this study in relation to other variables. I acknowledge that some respondents may have had HTN but were not aware of it at the time of survey completion. National Health and Nutrition Examination Survey (NHANES) data revealed that only 78% of assessed hypertensive adults were already aware of having HTN (Ostchega, Yoon, Hughes, & Louis, 2008). The researchers also reported that the proportion of adults not aware of having HTN was significantly higher among men than among women. Further discussion of this issue occurs in Chapter Five.

HELM scale. To learn what participants understood about managing HTN, I used the 14-item Hypertension Evaluation of Lifestyle Management Knowledge (HELM) scale (Schapira, et al 2012). Using true or false and multiple-choice inquiries of HELM, I assessed knowledge of three components important for HTN management based on the literature: General HTN knowledge; monitoring and setting goals, and management of

medications and lifestyle. Analysis of participants' (n = 196) responses to the 14 HELM items ensued.

I first recoded participants' multiple choice and true or false responses to the 14 items as 1 (*correct*) or 0 (*incorrect*) and 14 new variables were formed based on correct responses. Next, a new continuous variable was generated, HELM scale, which was a summative of frequencies of correct responses made by respondents. One individual answered as few as two items correctly. Six respondents answered all 14 items correctly. Median number of correct answers was 10. On average respondents answered 10.12 (SD = 2.11) of 14 items correctly. A comparison of HTN management knowledge among those self-aware of having HTN and those not self-aware revealed correct response means of 10.34 (SD = 2.17) and 9.95 (SD = 2.06), respectively.

To explore the dimensionality of the scale, I factor analyzed it for clusters of latent variables and found only one factor as shown in Table 9 and the scree plot in Figure 4. The first factor explains 62.95% of the variance. An interesting finding was that the alpha on the HELM scale was poor yielding an alpha coefficient of .36 even after removal of the lowest item-test coefficient associated with the HELM scale relative to definition of HTN. Definition also had a negative relationship compared to the other variables. Manipulation of the factor-analyzed items via acceptable methods did not produce a more acceptable alpha. Further discussion of the HELM scale occurs in Chapter Five.

Table 9

Eigenvalues for HELM Scale (only the eight retained factors included)

Factor	Eigenvalue	Difference	Proportion	Cumulative
1	1.03890	0.42448	0.6295	0.6295
2	0.61441	0.19137	0.3723	1.0017
3	0.42304	0.09370	0.2563	1.2580
4	0.32934	0.06601	0.1995	1.4576
5	0.26333	0.15391	0.1595	1.6171
6	0.10942	0.04000	0.0663	1.6834
7	0.06942	0.06428	0.0421	1.7255
8	0.00514	0.07779	0.0031	1.7286

Note. N = 192.

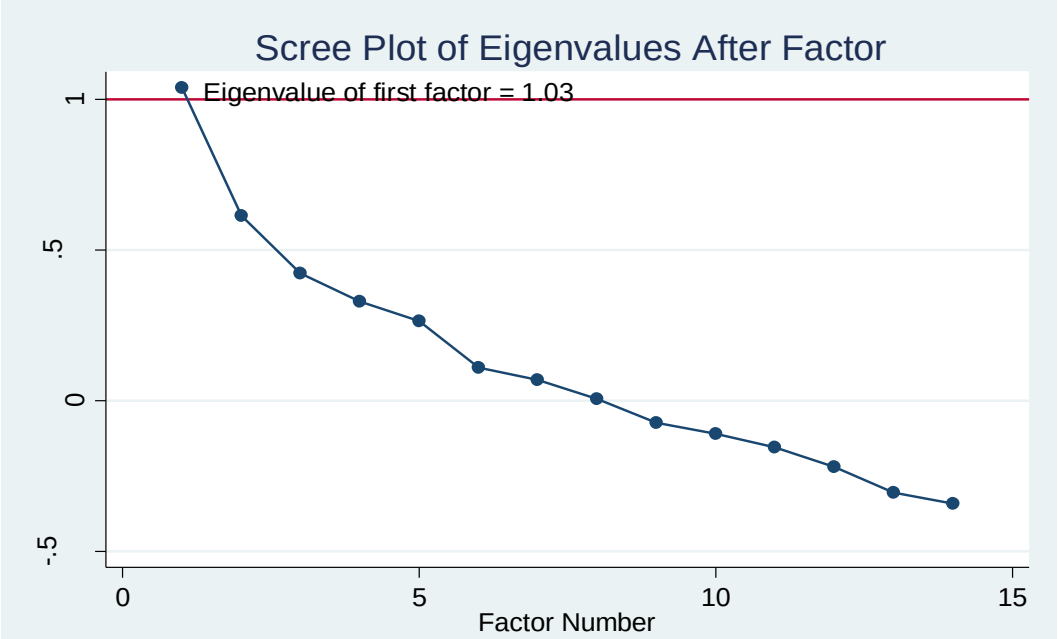

Figure 4. Scree plot of HELM scale items.
Note. N = 192. Important eigenvalue lies above y-line at 1.0 axis.

Although the HELM scale analysis via Cronbach's alpha identified the scale as less than desirable for this sample, I generated a summative multi-item scale. This decision was based on the investigation of the scale as depicted in the literature (Schapira et al., 2012), which identified the scale as a valid assessment of personal health management knowledge concerning HTN. While the literature identified three domains among the 14 items, this researcher constructed a more conservative single scale for this study based on the results of the factor analysis, in which all items loaded onto the first factor and no latent variables were identified. Further discussion addressing knowledge assessment via the HELM scale takes place in Chapter Five.

Self-efficacy. The continuous variable assessed respondents' level of self-efficacy of being physically active despite known barriers. The barriers to engaging in physical activity included being tired, in a bad mood, limited by time, on vacation, and inclement weather. Responses were coded from 1 (*not at all confident*) to 5 (*extremely confident).*

Based on the responses a newly generated self-efficacy variable provided the frequency and average of self-efficacy levels for regular physical activity. The median and mean were very similar, 2.6 and 2.66 (SD = 0.89) respectively. For respondents self-aware of having HTN and those not self-aware, the means were 2.48 (SD = 0.82) and 2.8 (SD = 0.91), respectively.

This researcher factor analyzed the data to determine if the five items in the scale measured a single construct, self-efficacy. This analysis yielded a simple structure where each item loaded strongly on one factor as seen in Table 10 and Figure 5. Three factors were retained. Cronbach's alpha of .81 indicated the self-efficacy scale had good internal consistency and thus had good reliability (Acock, 2014). I explore additional facets relating to self-efficacy in Chapter Five.

Table 10

Eigenvalues for Self-Efficacy for Regular Physical Activity

Factor	Eigenvalue	Difference	Proportion	Cumulative
1	2.39429	2.31507	1.1113	1.1113
2	0.07922	0.07722	0.0368	1.1480
3	0.00200	0.12231	0.0009	1.1490
4	-0.12031	0.08032	-0.0558	1.0931
5	-0.20063		-0.0931	1.000

Note. N = 196

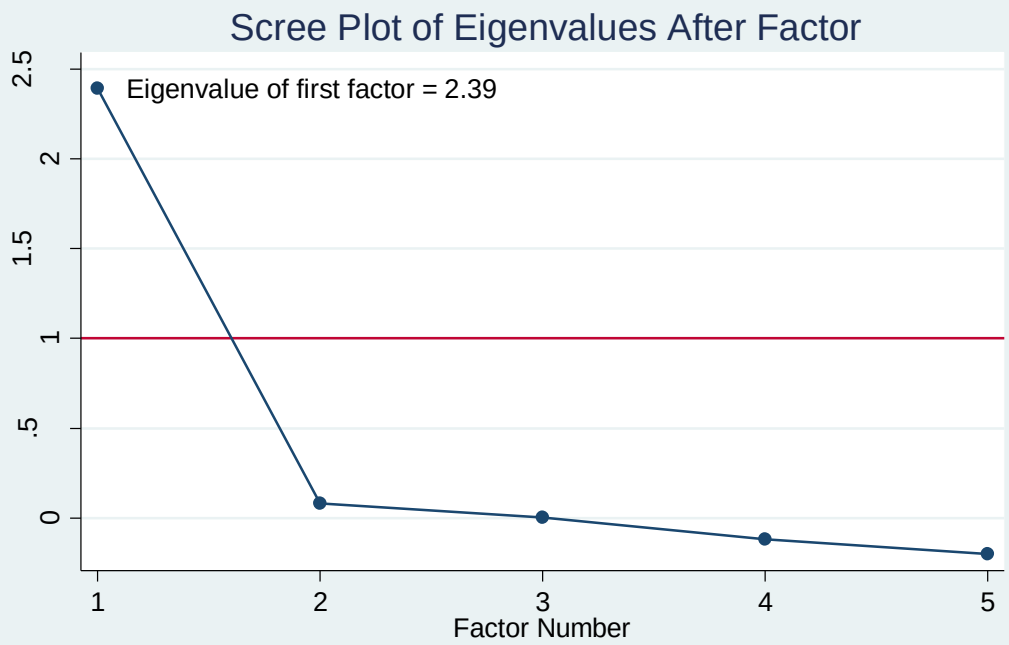

Figure 5. Scree plot of self-efficacy for regular physical activity.
Note. N = 196. Important eigenvalue lies above y-line at 1.0 axis.

Past experience. In order to understand research participants' current physical activity level, their history of success and failure at being regularly physically active was measured. The most influential source that feeds individuals' self-efficacy is past history (outcomes) in an area such as physical activity (Bandura, 1986). Given that regular physical activity is an important component of HTN management, individuals (n = 196) indicated their degree of past success. Results were then recoded 4 (*I have had more success than failure);* 3 (*I have experienced about the same amount of success and failure*); 2 (*I have experienced more failure than success*); 1 (*I have never tried to be regularly physically active*).

For research purposes the variable was again recoded and those respondents (n = 3) who self-reported having never tried to be regularly physically active were combined in the category with respondents who experienced more failure than success. A

respondent who indicated he or she was not regularly physically active or had never tried to be was not in line with national recommendations for physical activity. While respondent reports of degrees of success were across all categories, Table 11 shows that among respondents, 22.12% of those not self-aware of HTN reported having more failure than success. The percentage relative to the same category was doubled (44.57%) among those self-aware of having HTN. Past experience is further discussed in Chapter Five.

Table 11

Respondent's Past Experience Being Regularly Physically Active

Past Experience	% self-aware of having HTN	% not self-aware of having HTN
Success < Failure	44.57	22.12
Success = Failure	38.55	38.05
Success > Failure	16.86	39.82

Note. N = 196.

Perception variables. Americans hold varied perspectives about the dangers of uncontrolled HTN and the importance of managing this condition (Anthony, Valinsky, Inbar, Gabariel, & Varda, 2012; Hill & Sutton, 2000; Miller, 1997; Ogedegbe, 2008; Siegel, 2005). Some regard other health conditions as more important to manage than HTN, even though it is the primary risk factor for heart disease; the number one killer of Americans. I used two eight-item Likert type scales among 32 survey items to understand individuals' perception of ease of managing HTN and their perception of the importance of HTN management.

To assess participant's beliefs I included eight health diseases and conditions common in the United States (http://www.cdc.gov/brfss/; http://www.healthindicators.gov), which represented a segment of indicators of health among Americans. These conditions included arthritis, asthma, cancer, depression, diabetes, heart disease, obesity, and oral health. Individuals selected one of four options that best described whether they perceived the listed condition as 1 (*easier to manage than HTN*); 2 (*about the same as HTN*); 3 (*more difficult to manage than HTN*); or 4 (*not sure*). These same disease conditions were included with the four options designed to assessed participants' view of the condition as 1 (*less important to manage than HTN*), 2 (*just as important to manage as HTN*); 3 (*more important to manage than HTN*); or 4 (*not sure*).

Once this researcher obtained the data, I reverse coded the Likert scale values measuring perceptions of ease and importance so that the options *easier to manage than HTN* and *less important to manage than HTN* received more weight. Selection of these options indicated a higher regard for the challenge and importance of managing HTN compared to the eight other health conditions and diseases listed. I then decreased the code value by one, which made the highest value three and the lowest value zero (*not sure*). I then factor analyzed the eight variables that were recoded to make sure only one dimension was being measured. Following that, I obtained alpha coefficients for the scales to determine their internal consistency (i.e., reliability). I describe these actions in the following subsections.

Within the Likert type scales that assessed respondent's perceptions of the ease and importance of managing HTN compared to other health conditions I found an

unexpected number of omitted responses, as many as 12 – 15 within some items. In addition, a number of respondents selected *not sure* instead of indicating whether they thought the health condition was harder, easier, or equal in ease and importance to manage compared to HTN. The option was selected as many as 32 times in one variable. The frequency of omitted responses and *not sure* responses was unmatched by any other segment in the survey tool. The responses suggested a high degree of uncertainty existed among respondents.

An acceptable method of managing missing values is to generate a variable that is the mean from responses obtained (Acock, 2012) and then impute the mean in the place of missing values. Initially I followed this approach but the tenor of collaborative responses in my investigation changed too much from this researcher's perspective and could have resulted in a less than accurate impression of respondents. Given the small survey size and other aspects, for factor analysis of ease and importance variables, missing values were unchanged and *not* sure responses were not included in analysis.

***Factor analysis of perceived ease scale*.** To determine if the perceived ease scale was unidimensional or multidimensional, I conducted exploratory factor analysis. I first did this with the scale measuring individual perceptions of ease of managing HTN compared to other diseases and conditions (n = 148). The first factor had a dominant effect with an eigenvalue of 1.71. Acock (2012) supports examination of any eigenvalue greater than 1.0. The second factor had a value of 0.31. The first factor explained 100% of the total possible variance. Table 12 lists the four factors retained in the analysis and their associated values.

Table 12

Eigenvalues for Perceived Ease of Managing HTN (only the four retained factors included)

1	1.71901	1.40618	1.0597	1.0597
2	0.31283	0.12345	0.1928	1.2525
3	0.18938	0.10354	0.1167	1.3693
4	0.08584	0.10886	0.0529	1.4222

Note. N = 148.

I generated a scree plot with a line at 1.0 on the Y-axis to emphasize this important eigenvalue. As indicated in Figure 6, there was a large drop off between the first and second factors and then a leveling off effect after the fourth factor. The alpha scale reliability coefficient, or Cronbach's alpha, of the scale of eight variables assessing respondents' perception of the ease of managing HTN was .68, which suggested a minimally acceptable to a respectable degree of reliability (DeVellis, 2003).

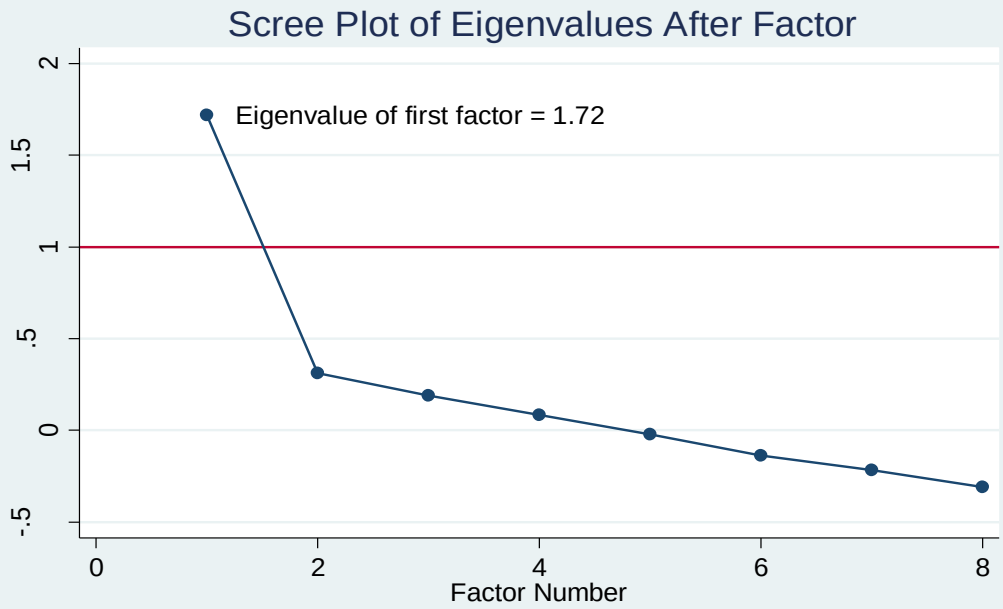

Figure 6. Scree plot of ease items.
Note. N = 148. Important eigenvalue lies above y-line at 1.0 axis.

***Factor analysis of perceived importance scale*.** Next, I factor analyzed respondent's perceptions of the importance of managing HTN in comparison to managing other conditions and diseases (n = 173). The first factor (see Table 13) had a dominant effect and explained 83 % of the variable.

Table 13

Eigenvalues for Perceived Importance of Managing HTN (only the four retained factors included)

1	1.90980	1.16823	0.8354	0.8354
2	0.74157	0.45176	0.3244	1.1598
3	0.28982	0.24720	0.1268	1.2866
4	0.04262	0.11171	0.0186	1.3052

Note. N = 173.

In reviewing Cronbach's alpha coefficient, I found the lowest item-test coefficient of importance items was relative to arthritis. The arthritis item also had a negative relationship compared to the other variables, which was peculiar. Finally, by dropping this item from the multi-item scale, the alpha increased from .57, a very poor indicator of reliability, to .67, indicating a minimally acceptable degree of reliability (DeVellis, 2003). I therefore performed the factor analysis without the survey item, which produced a very clear one-factor solution as seen in Table 14, where the first factor explained 100% of the variance.

Table 14

Eigenvalue for Perceived Importance of Managing HTN Minus Arthritis Variable (only the four retained factors included)

1	1.87995	1.52567	1.0724	1.0724
2	0.35427	0.32588	0.2021	1.2744
3	0.02839	0.00640	0.0162	1.2906
4	0.02199	0.10363	0.0125	1.3032

Note. N = 174.

In the scree plot seen in Figure 7 above, the eigenvalue of the first factor is apparent and approaches a value of two, and the second and subsequent eigenvalues form a leveling pattern and all fall well below one.

To account for the missing values within the scales measuring perceptions of ease and importance I generated two new variables that represented the mean of responses for each respondent associated with the ease scale and the importance scale. Retaining these means allowed me to build a model to estimate the likelihood of the dependent variable

using the maximum number of respondents. Additional discussion surrounding perceptions of ease and importance occurs in Chapter Five.

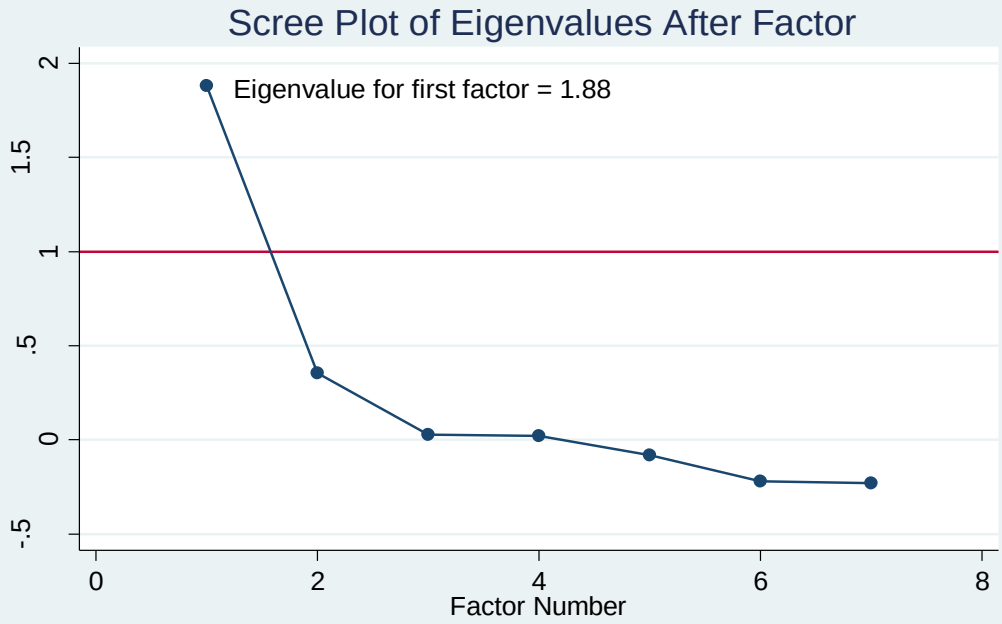

Figure 7. Scree plot of importance items.

Note. N = 174. Important eigenvalue lies above y-line at 1.0 axis.

Wellness program participant. Respondents (n = 196) answered *yes* or *no* to the query of membership in the employer's wellness program. The majority of respondents 55.61% (n = 109) were members, and represented 20.60 % of the wellness member population of the hospital. Among the survey respondents who were self-aware of having HTN, only 54.22% (n = 45) were members of employer's wellness program.

Summary of Variables

High stage of change of physical activity, which is a key component of HTN management, is the dependent variable of this study. To measure individuals' stage I assessed respondent's readiness to be physically active using the stage of change scale. The literature reviewed that addressed physical activity alone and as a component for managing HTN fed the development of other variables used in the analysis. Through

research studies I learned that hypertensive individuals with access to health providers and medication to treat HTN still often had uncontrolled HTN. Possible explanations derived from research were created as independent variables. These originally included self-awareness of having HTN, knowledge about what is required to manage HTN, perceptions of how important and how challenging it is to manage HTN, past experience, self-efficacy, enrollment in a wellness program, confidence in a tailored wellness program, sex, education, job status, and age.

I was unable to use some of the variables in the analysis because of thin data cells. Variables removed from analysis included sex and confidence that a wellness program tailored for employees with HTN could help yield a controlled blood pressure. Table 15 is a display of the dependent and independent variables with related descriptions that I used for analysis in this study.

Table 15

Table of Dependent and Independent Variables

Dependent Variable	Coding	Measure
High Stage of Change	0 = No; 1 = Yes	Is employee at high stage of regular physical activity (action or maintenance)?
Independent Variables	**Coding**	**Measure**
HELM Scale	Continuous variable ranging from 1 – 14	Individual's knowledge of HTN management concepts.

Table 15 (continued)

Table of Dependent and Independent Variables

Independent Variables	Coding	Measure
HTN	0 = No; 1 = Yes	Is employee self-aware of having HTN?
Self-Efficacy	Continuous variable ranging from 1 – 5	Individual's confidence in ability to be physically active when faced with barriers.
Past Experience	1 = More failure than success 2 = Failure equals success 3 = More success than failure	What is degree of past success being regularly physically active?
Wellness Program Member	0 = No; 1 = Yes	Is employee enrolled in employer's wellness program?
Perception of Ease	Continuous variable ranging from 1 – 3	Mean of perception of ease managing HTN compared to managing of other health conditions.
Perception of Importance	Continuous variable ranging from 1 – 3	Mean of perception of importance managing HTN compared to managing other conditions.
Control Variables	**Coding**	**Measure**
Age	1 = 18-44; 2 = 45-54; 3 = 55-75	Age range of respondent

Table 15 (continued)

Table of Dependent and Independent Variables

Control Variables	Coding	Measure
Education	1 = Diploma/GED, some college, or associate's degree 2 = Bachelor's degree or above	Highest level of education completed.
Employment Status	0 = No; 1 = Yes	Is respondent employed full-time

Note. N = 196.

Data Analysis

Prior to creating the model for analyzing the stage of change, I performed ordinary least squares regression by regressing nine independent variables on the HELM scale, which measured knowledge about HTN. The purpose of the analysis was to determine if respondents self-aware of having HTN were significantly different from those not self-aware of having HTN with respect to their knowledge of managing HTN. The model, comprised of independent variables listed in Table 15, explained 14.1% of the variance in HTN management knowledge, F (11, 169) = 2.51, p = .0059. There were 181 cases in the model. Being self-aware of having HTN had a statistically significant positive effect on knowledge of HTN management (p = 0.040). The relationship between HTN management knowledge and education was also positive and significant (p = 0.011). The joint effect of the polychotamous variable, which measured respondents' past

experience with successful physical activity, was significantly positive as well (p = 0.020).

Critique of Ordinary Least Squares Regression

In order to more closely assess the Ordinary Least Squares (OLS) model, I graphed the residuals against the fitted values of the model. In a well-fitted model, it is assumed there is normal independent and identical distribution of residuals against the fitted values. Any visible pattern to the residuals plotted against the fitted values such as what can be observed in Figure 8 suggests a violation of the assumptions of ordinary least squares.

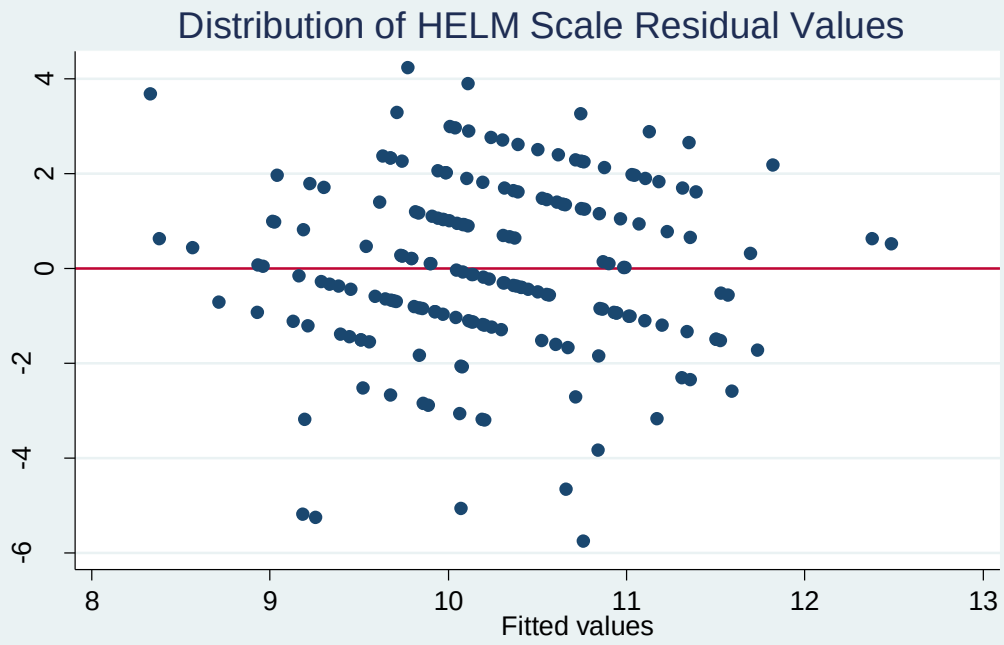

Figure 8. Residuals vs. fitted values for OLS regression model.

Note. N = 181.

I also graphically explored the existence of influential cases by graphing leverage statistics against the (normalized) residuals squared to provide clarity (see Figure 9). Cases were labeled using a Pseudo ID.

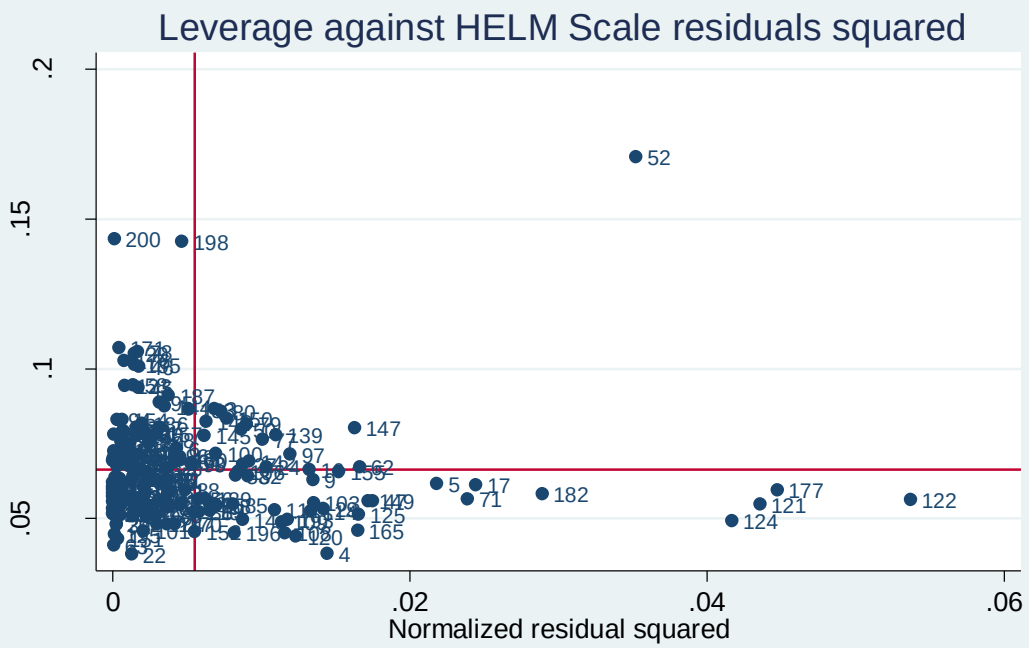

Figure 9. Leverage vs. squared residuals plot for OLS regression model.
Note. N = 181.

As observed in the graph, case #52 emerges as having both a poor fit and high leverage. I examined this case for aspects that made it an outlier. What made this case display as an outlier was that the respondent was self-aware of having HTN, yet scored low on the knowledge scale measuring HTN management. Being self-aware of HTN had a positive relationship with knowledge according to the model; hence, this case tends to go against the observations made on the other respondents. However, there was no other apparent reason to drop this case. The results remained the same in the OLS regression with and without the case so this researcher retained it. Qualitative analysis might have proven useful in identifying the reason this case was a poor fit to the model.

I ran a final OLS regression model with robust standard errors using Huber/White/Sandwich estimator of variance to help control for the unequal variability in the residuals as noted in Figure 8. In this regression of 181 observations, the relationship

remained positive and statistically significant between HTN management knowledge and being self-aware of having HTN (p = .038), having a bachelor degree education or higher (p = .008), and more past success than past failure being physically active (p = 0.020). The model explained 14% of the variance in HELM scale.

With regard to HELM scale knowledge, I assessed the margins of the significant variables and graphed these to visualize the difference within the dichotomous variables HTN and education. Figures 10 and 11, respectively, illustrate the increase in HTN management knowledge score if respondent is self-aware of having HTN versus not being self-aware, and if respondent has a bachelor degree in education or higher versus having less than a bachelor degree.

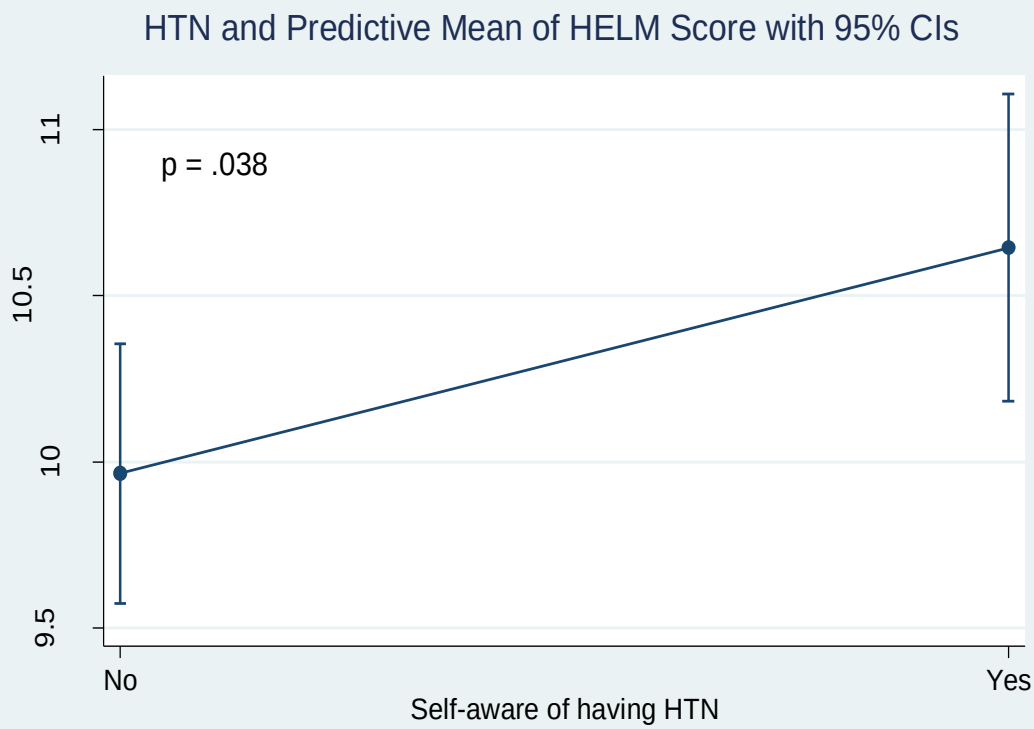

Figure 10. Predicted mean HELM scale score based on HTN awareness.
Note. N = 181.

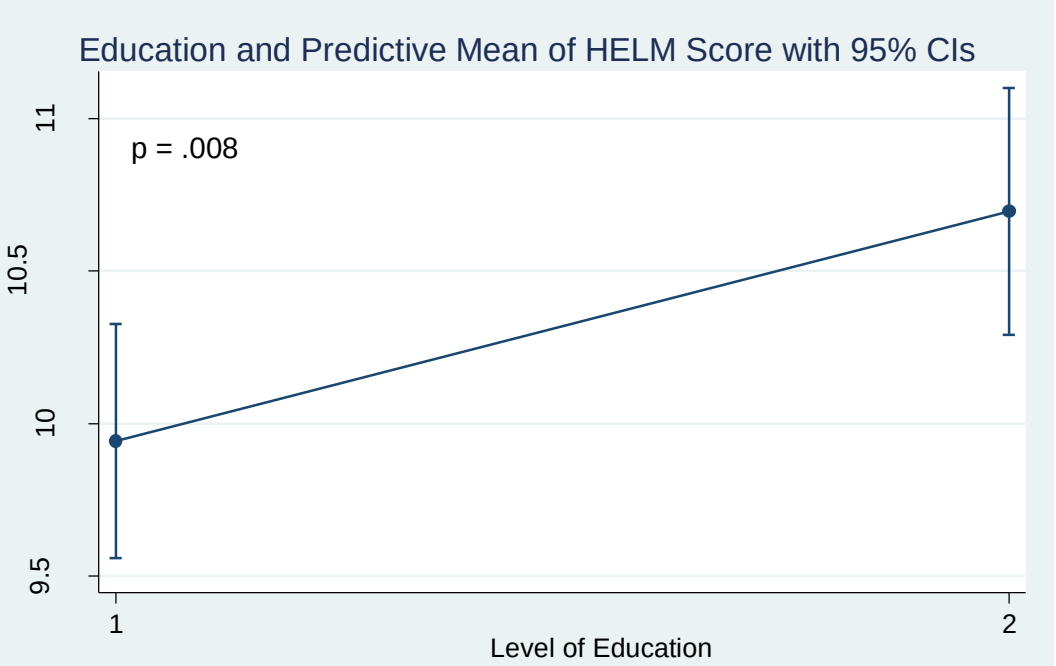

FIgure 11. Predicted HELM scale score based on education.

Note. N = 181. 1 = Less than bachelor degree. 2 = Bachelor degree or higher.

Regarding the polychotamous variable past experience with being physically active, I analyzed the difference in the knowledge scores based on category of experience. Respondents with more past success than failure had a mean score 1.20 points higher on the HELM knowledge scale than respondents with more failure than success (p = .008). The mean score for respondents with past success equal to failure was 1.04 points higher than the mean of respondents with more past failure than success (p = .017). Lastly, I obtained the mean HELM score for each category of past experience. The more past success at being physically active that a respondent had, the higher the HELM scale score. Figure 12 provides a visual representation of the predicted means.

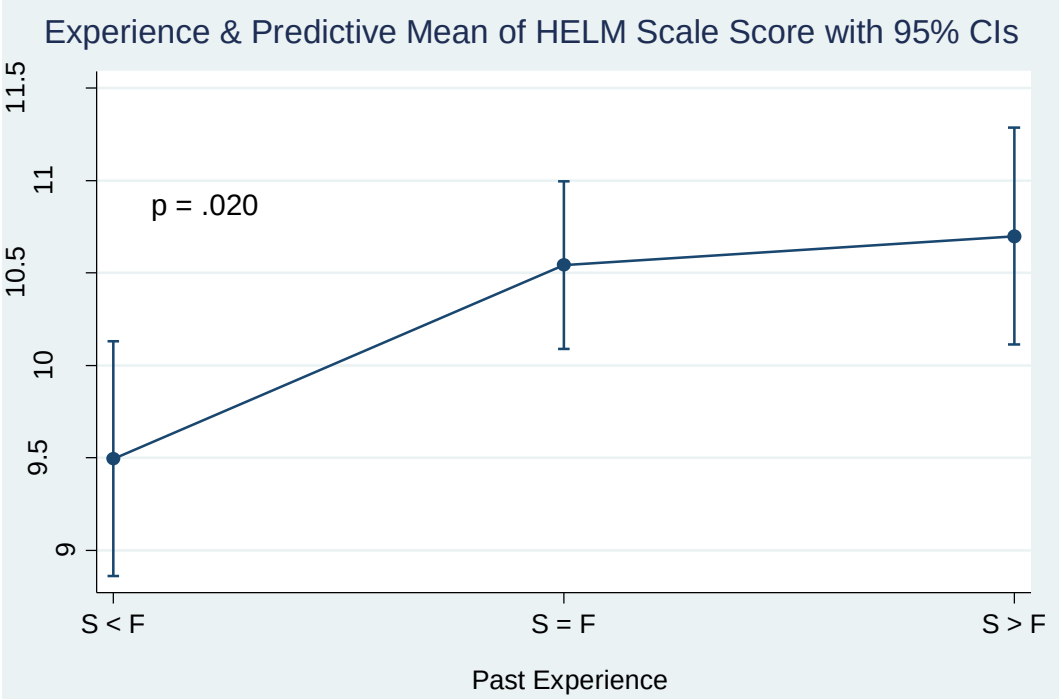

Figure 12. Predicted HELM scale score based on past experience.
Note. N = 181. S = Past success of physical activity. F = Past failure of physical activity.

Finally, I conclude discussion of the analyses from my use of ordinary least squares regression and fitting a model of HELM knowledge on independent variables. The results supported the hypothesis that persons aware of having HTN were in fact more knowledgeable about it. Additional discussion is in the final chapter. The remaining focus of this chapter is on aspects relating to the dependent variable high stage.

Stage of Change Logistic Model Development

Here, I describe how I used the variables generated from survey responses to build a logistic regression model that explained the likelihood of respondents being at a high stage of physical activity. A smaller number of observations (n = 181) were available to be applied to the model due to the number of *not sure* responses given by participants in the scales that measured perceptions of ease and importance in managing

HTN. These could not be recoded without creating a substantial shift in outcome measurements that described the respondents.

I began the second analysis by developing a logistic regression model and used post estimation tests to analyze the appropriateness of the model in addition to its ability to estimate the odds that respondents' had a high stage of change. Influential cases were analyzed closely. I initiated the critique by using OLS regression and regressing the 10 independent variables on stage of change. I used this model to run variance inflation factors and explore the extent of multicollinearity, if any. Once I determined the model was a reasonable fit to the data, I analyzed the joint effect of past experience (a significant categorical variable) and compared probabilities between categories. I did the same for age, which had a p-value ($p < .08$) nearing significance at the $\alpha = .05$ level. Details of these analyses are explained next followed by a summary and discussion in Chapter Four.

Multiple Logistic Regression

I used multiple logistic regression to identify the odds of a respondent being at the *high stage* as defined by the dichotomous dependent variable given the independent predictor variables. There were 181 observations. The likelihood-ratio (LR) Chi-squared test was 64.49 with 12 degrees of freedom at the $p < .001$ level, indicating a significant model. The pseudo R^2 was 28%.

Table 16 provides the odds ratios or the odds of a respondent being at a high stage of physical activity given the influence of the independent variables. Two variables were found significant at the $\alpha = .05$ level, self-efficacy and past experience. Age had a p-value ($p < .08$) nearing significance. With respect to self-efficacy, for each one unit increase in measure the odds of a person being at a high stage of change are 2.70 times

greater; or 170% greater, irrespective of the other variables. The relationship between self-efficacy and the high stage variable was statistically significant (p = .001). In addition, the influence of past experience on an individual's likelihood to be at high stage was also significant (p = .001). Further analysis of self-efficacy and past experience occurs later in this chapter.

Table 16

Multiple Logistic Regression on Stage of Change

	Odds Ratios for Continuous and Dichotomous Variables				
High Stage	Odds Ratio	Std. Error	*z*	P>|*z*|	[95% CI]
HELM Scale	.8956382	.0899522	-1.10	0.272	[.7356027, 1.09049]
HTN+	.8875248	.3964456	-0.27	0.789	[.3697941, 2.130105]
Self-Efficacy	2.699157	.832507	3.22	**0.001**	[.474654, .940446]
Wellness Member	.8069269	.3214286	-0.54	0.590	[.3696319, .761566]
Ease	.6842036	.3738196	-0.69	0.487	[.2344905, .99639]
Importance	.8377295	.6056513	-0.24	0.807	[.2031013, .455374]
Four Year Degree	1.2122	.4948903	0.47	0.637	[.5445835, 2.698262]
Full-Time	1.37765	.5826961	0.76	0.449	[.6013278, 3.156213]
Constant	.5786996	1.14454	-0.28	0.782	[.011994, 7.92168]

Table 16 (continued)

Multiple Logistic Regression on Stage of Change

Joint Effects for Categorical Variables (>2 Categories)	χ^2	P> χ^2
Past Experience	13.18	**0.001**
Age	5.04	0.080

Note. N = 181. Pseudo R^2 = 28%. Likelihood-ratio Chi-squared (12) = 64.49. Significance of variables is in boldface. p <.001.

Stage of Change Model Critique

Multicollinearity. Prior to performing a more in-depth critique, I used a multiple regression to determine if combinations of the 10 independent variables listed in Table 15 would cause problems in estimating likelihood of respondents being at a high stage of change for physical activity. I then computed tolerances (1/VIF) and variance inflation factors (VIF). I discovered a slight degree of multicollinearity between independent variables that measured past experience and self-efficacy.

Acock (2014) suggests a clear determination of multicollinearity may come via analysis of 1/VIF, or tolerance figures. This parameter describes the percentage of the independent variable that is not overlapping and that is not explained by some other variable. For example, regression of the predictor variables on each other yielded the VIF table with mean VIF 1.28 (see Table 17). With regard to the variables used to measure past experience and self-efficacy, only 51% and 58% of each variable respectively was not overlapping with another variable. Both variables were statistically significant in the full logistic regression model and also in models when the other was not included. Bandura (1986) recognizes both self-efficacy and past experience as factors in behavior

change. Yet he identifies the biggest factor affecting self-efficacy as past experience. Hence, finding a degree of multicollinearity with these two variables was expected. Acock suggests a VIF greater than 10 or a 1/VIF less than 0.10 may indicate multicollinearity to the extent of it being a problem.

Table 17

Variance Inflation Factor Analysis of Predictors

Variable	VIF	1/VIF
Past Experience	1.95	0.513966
Self-Efficacy	1.72	0.580997
HTN	1.32	0.757275
Age	1.18	0.849362
Employment Status	1.14	0.877251
HELM Score	1.14	0.876045
Perception of Ease	1.10	0.911325
Perception of Importance	1.08	0.925409
Wellness Program Membership	1.09	0.914700
Education	1.08	0.930128

Goodness of fit. I conducted a goodness of fit test to evaluate how well the independent variables of the model accurately predict likelihood of an individual being at a high stage of physical activity. The first test was a Pearson Chi-square overall goodness of fit test including all observations (n = 181) in the model. The Chi-square was not significant (p = 164.66) indicating that the model was a good fit (i.e., the Chi-square tests the null hypothesis that the model is a good fit (Prob > χ^2 = 0.5585).

Although the test indicated that the model fit relatively well, the number of observations (n = 181) was also the number of covariate patterns (181). This made the applicability of the Pearson Chi-square test questionable. Hosmer, Lemeshow, and

Sturdivant (2013) recommend in these instances that the data be regrouped by ordering on predicted probabilities, that groups equal in size are formed, and the goodness of fit test be repeated. Table 18 reflects the original results of the goodness of fit test and the results of the test conducted as Hosmer et al., suggested. I conducted the same test changing only the number of groups from ten to four. I did this hoping to get less variation in number of observations in each grouping. In neither the analysis by groups of ten, nor by groups of four was the Chi-square significant. The outcome in these cases provided added confidence that the multiple logistic regression model was a good fit to the data.

Table 18

Logistic Model for High Stage, Goodness-of-Fit Tests

Goodness of Fit Test	Ten Groups	Four Groups
Hosmer-Lemeshow χ^2	7.74	1.70
Prob > χ^2	0.4593	0.4284

Note. N = 181.

Classifying. The next test I performed predicted the validity of the model (see Table 19). It classified the predictions of the model according to the number of observations the model accurately and inaccurately predicted would be at high stage of physical activity. This test also provided the number of observations the model did not expect to be at high stage and the correctness or lack thereof, of that prediction. The multiple logistic regression model predicted 100 respondents would be at high stage and there was an additional 25 at high stage that the model did not predict for a total of 125.

The model predicted 37 respondents would not be at high stage but the prediction was off by 19, as there were 56 respondents not at high stage. Sensitivity is the percentage of times the model accurately predicted a respondent would be at high stage. Specificity represents a percentage of times the model accurately predicted respondents would not be at high stage.

The overall rate of appropriate classification was approximately 75.69%, with 84.03% of the high stage group correctly classified (sensitivity) and 59.68% of the low stage group correctly classified (specificity). These test results support the validity of the model.

Table 19

Classification Table of Logistic Regression Model for High Stage (True D)

	True		
Classified	D	-D	Total
+	100	25	125
-	19	37	56
Total	119	62	181

Classified + if predicted Pr (D) > = 0.5
True D defined as high stage ! = 0

Sensitivity	Pr (+|D)	84.03%
Specificity	Pr (-|~D)	59.68%
Positive Predictive Value	Pr (D|+)	80.00%
Negative Predictive Value	Pr (~D|-)	66.07%

Table 19 (continued)

Classification Table of Logistic Regression Model for High Stage (True D)

False + Rate for True ~D	Pr (+|~D)	40.32%
False - Rate for True D	Pr (-|D)	15.97%
False + Rate for Classified +	Pr (~D|+)	20.00%
False - Rate for Classified -	Pr (D|-)	33.93%
Correctly Classified		75.69%

Note. N = 181. Pr = predicted. D = at high stage. ~D = at low stage.

Receiver operating characteristic. The Receiver Operating Characteristic or ROC curve was the third investigatory tool used to analyze the logistic regression. Whereas measures of classification performance for models are good, the area under the Receiver Operating Curve is a better and more complete discerner of a model's classification accuracy (Hosmer, et al., 2013). It is regarded as the standard for evaluating a model's ability to assign cases or respondents correctly to the outcome, which in this case is high stage of physical activity. The area under the curve is indicative of how well the probabilities of the model discriminate between those who will and will not be at high stage. Figure 13 displays the ROC curve of the multiple logistic regression model. The area under the ROC curve is 0.8351, which is indicative of excellent discrimination by the model (Hosmer, et al., 2013).

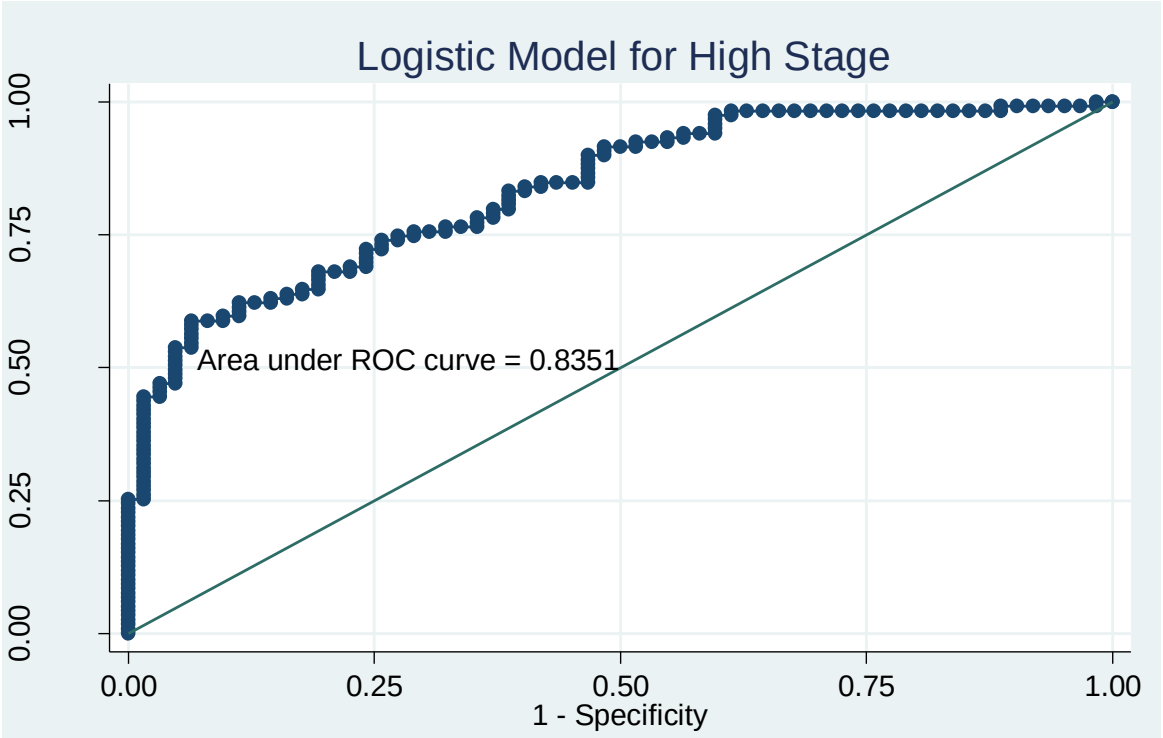

Figure 13. Plot of sensitivity vs. 1 - specificity for all possible cutpoints in the model. Note. N = 181.

Influential cases. I next investigated covariate patterns associated with each observation to identify outliers found outside the predicted model, indicating the observation was predicted incorrectly. I calculated dbeta statistics to measure how much each case influenced the regression as a whole. Figure 14 displays the graphed results, with top influential cases labeled and set proportionally to the size of the dbeta value.

I explored the outlying covariate patterns associated with top influential cases (indicated in the figure as pseudo-ID #186 and #184) to identify any facets that might have caused them to be outliers. I analyzed the dependent and independent variable descriptors of these two outliers as presented in Table 20.

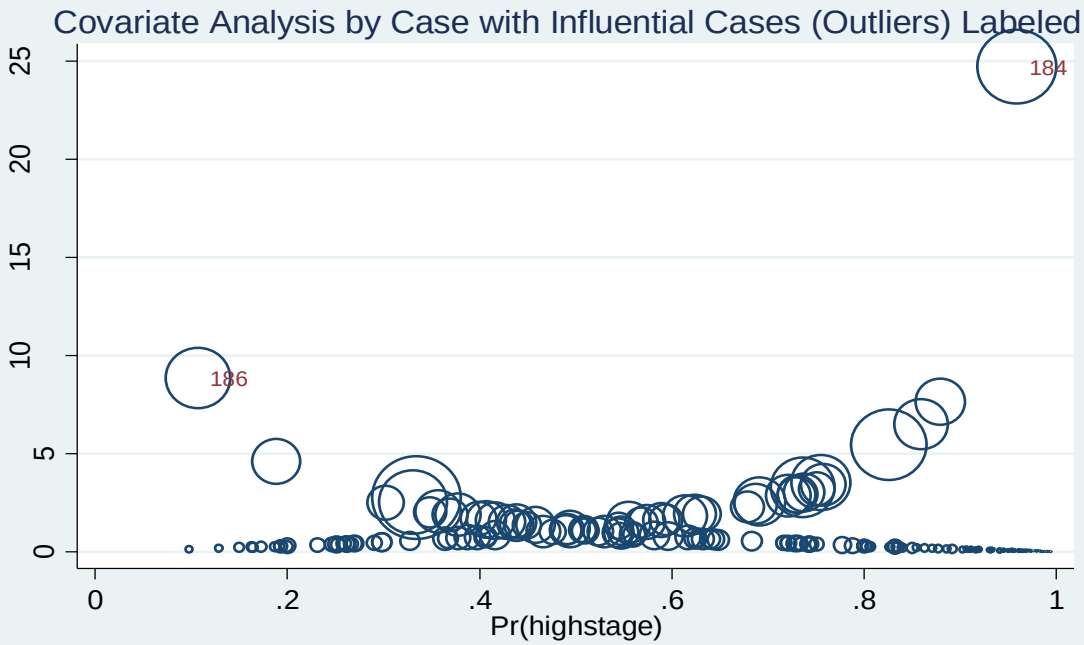

Figure 14. Outliers of logistic regression model.

Note. N = 181. H-L dX^2 = dbeta or value of influence. Pr = Predicted.

Table 20

Variable Descriptors of Respondent Outliers

Variable	Data of Outliers	
Pseudo ID Number	186	184
High Stage	Yes	No
HELM Score	10	10
Self-Aware of HTN	Yes	Yes
Self-Efficacy Mean	1.2	3
Past Experience	Success < Failure	Success > Failure
Wellness Member	Yes	No
Ease Mean	1.125	1.75
Importance Mean	1.857143	1.857143
Age Range	55-74 Years	45-54 Years
Education	Bachelor's Degree or higher	Bachelor's Degree or higher
Full-Time Employee	No	No

From a review of the cases, I did not identify a reason to drop either of these outliers, as they appeared as reasonable observations. However, as a precautionary measure I ran the OLS model with robust standard errors, which did not alter the results thereby strengthening the notion that the model is reasonably well fit. In looking at the outliers, based on their HELM scale, self-efficacy, past experience, and wellness membership status one would expect them to be at the opposite high stage level of what was self-reported. The individuals may have other influencing factors that affected predictability such as support systems, physical health, injury or other life circumstances. However, such considerations are highly speculative and require further research of a qualitative nature.

Summary of Critique

The researcher conducted tests to determine how well the independent variables predicted the likelihood of the dependent variable for respondents. In addition, I examined multicollinearity, measured the validity of the model, how well the predictor model performed, and carefully reviewed outliers of the logistic regression model. The analyses performed indicated the model created through logistic regression to predict the likelihood that a respondent would be at a high stage of regular physical activity fell in line with the assumptions of the model. Once goodness of fit tests showed a reasonable model to predict respondent's stage of physical activity and once investigation of outliers was completed, I conducted post estimation analysis. The analysis allowed me to consider additional details associated with the self-efficacy past experience, and age variables. I discuss these analyses below and close with a summary of the chapter.

Post-Estimation Variable Analysis

Self-efficacy. As self-efficacy increased, the odds of entering a high stage of change also increased. Specifically, for every measured unit of self-efficacy, the odds of being at a high stage of change increased 2.7 times (p = .001). As noted in Figure 15, the probability of a person with a low mean self-efficacy of 0.5 being at a high stage was only 3%; while an employee with a median average self-efficacy of 2.6 (50^{th} percentile) had a 69% probability of being at a high stage. A respondent with mean self-efficacy at the 75^{th} percentile had a 79% probability of being at a high stage and an employee whose average self-efficacy was 4.5 had a 92% probability of being at a high stage of physical activity. Circular markers in the figure graphically represent these probabilities. The vertical x-lines in Figure 15 represent the 50^{th} and 75^{th} percentiles of measured self-efficacy and indicate probabilities of a respondent being at high stage of change as 69% and 79%, respectively.

A wellness designer's efforts to enhance self-efficacy in order to increase respondent's predictive probability of being at a high-stage of physical activity would have the greatest yield if aimed at those below the 50th percentile. There could be as much as a 66% increase in respondent's predictive probability of being at a high stage among those below the 50^{th} percentile. Comparatively, a 31% increase is the most a wellness designer's interventions could yield for those whose predicted probabilities range from 69% (50^{th} percentile) to 92%. Respondents with the lowest levels of self-efficacy have the most to gain from interventions.

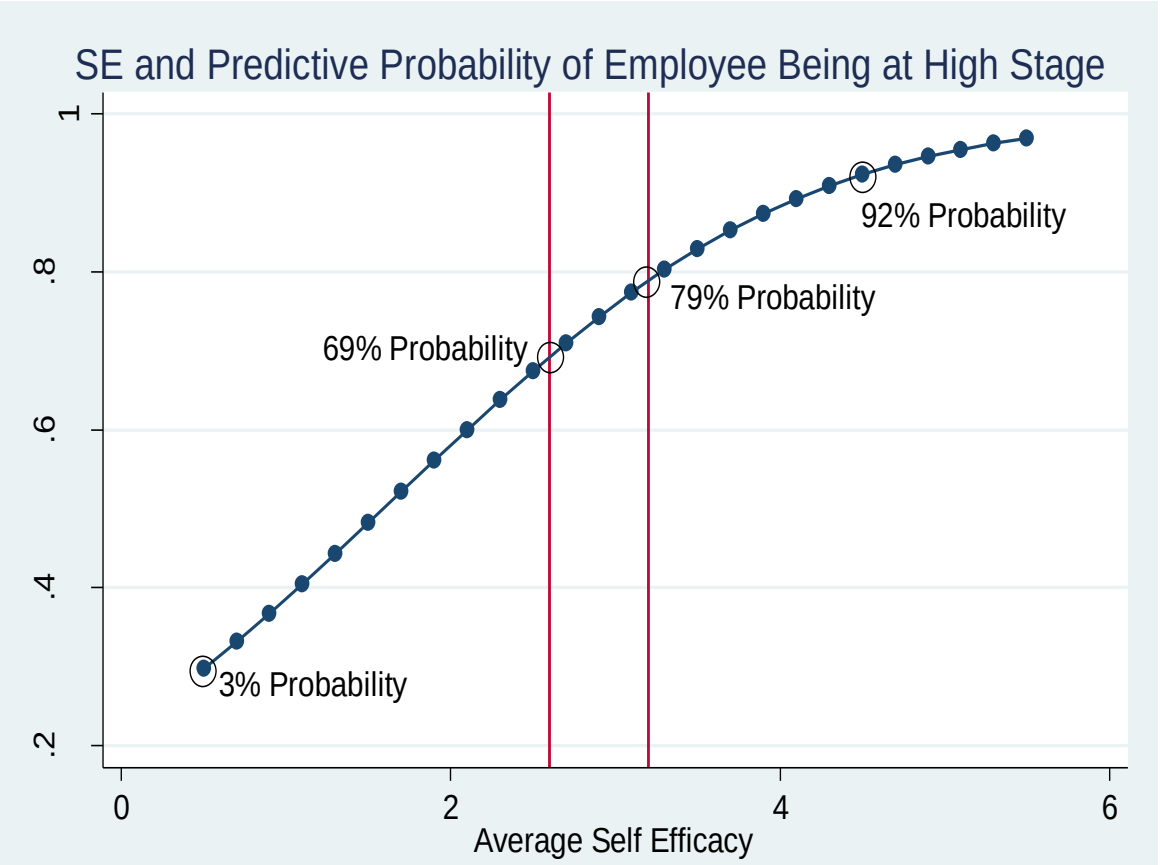

Figure 15. Likelihood of being at high stage based on average self-efficacy.

Note. N = 181. SE = self-efficacy. Pr = Predicted. Xlines at 50th (2.6) and 75th (3.2) percentiles, respectively.

Past experience. A contrast test of the joint effects of the components within the variable past experience against the dependent variable was performed. The Chi-square was significant, χ^2 (df = 2) = 13.18, p = .0014 irrespective of the other variables. Significance of the variable was confirmed. Next, I analyzed comparisons within the variable to determine the likelihood of a respondent being at a high stage of activity, comparing each degree of success to the two other experiences of success. Table 21 displays predicted probabilities that a respondent would be at a high stage of physical activity based on past experience of success, irrespective of the other variables. The

predicted probability was 89% that a respondent would be at a high stage who had more past success being physically active than past failure.

Table 21

Predicted Probabilities from Logistic Regression of Specified IVs on High Stage

Variable Categories	Predicted Probability	Std. Err.
Past Success < Failure	.5015959	.0764585
Past Success = Failure	.6783584	.0528653
Past Success > Failure	.8881659	.0693472

Note. N = 181. Pseudo R^2 = 28%. Likelihood-ratio Chi-squared (12) = 64.49, $p < .001$.

Figure 16 is an illustration of the margins data for past experience listed in Table 21 and visually displays the predicted probabilities of an individual being at high stage based on past experience being physically active. A respondent with more failure than success had a 50% likelihood of being at a high stage of physical activity. A respondent with past success equal to past failure being regularly physically active had a 68% likelihood of being at a high stage. For the individual whose successes outweighed failures, there was an 89% likelihood of being at a high stage of regular physical activity.

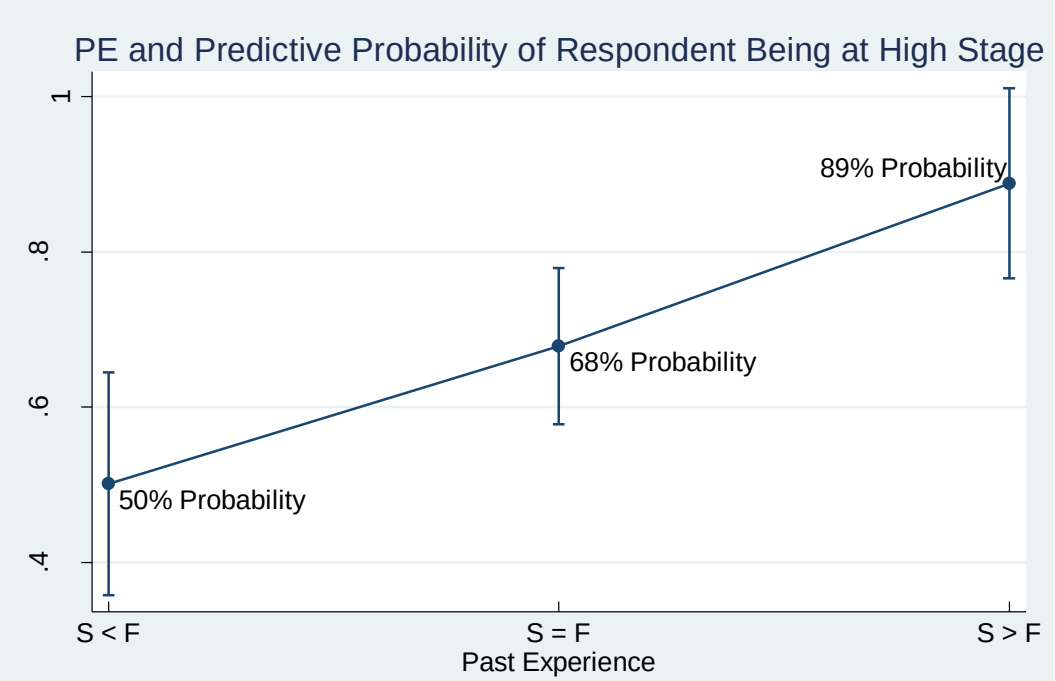

Figure 16. Likelihood of being at high stage based on past experience.

Note. N = 181. PE = Past Experience. S = Past success of physical activity. F = Past failure of physical activity.

Finally, after I analyzed the likelihood of an individual being at high stage based on individual categories of experience, I compared the past experience categories to one another. This allowed me to analyze the probability that a respondent had toward being at a high stage of physical activity across one or more categories of past experience. The results of the comparisons tests are listed next in Table 22.

A respondent whose past success being physically active was equal to past failure was 17% more likely to be at a high stage of physical activity compared to the respondent with more failure than success (p = .051). A respondent had a 38% greater probability of being at a high stage of physical activity if past experience held more success than failure, than if past failures outweighed past successes attempting to be physically active (p < .001). Compared to those whose past success equaled failure, respondents were 20% more likely to be at a high stage if they had more success than failure (p = .0009). Every

group comparison statistically differed. These differences are displayed under the Contrast heading in Table 22.

Table 22

Comparisons of Past Experience Effects Within the Variable

Variable Past Experience	Delta-Method Contrast	 Std. Err.	Unadjusted Z	 P>|z|	Unadjusted [95% Conf. Interval]
Success = failure vs Success < failure	.17676	.090636	1.95	**0.051**	[-.0008802, .3544054]
Success > failure vs Success < failure	.38657	.108431	3.57	**0.000**	[.1740487, .5990913]
Success > failure vs Success = failure	.20981	.080431	2.61	**0.009**	[.0521656, 3674492]

Note. N = 181. Significance is in boldface.

Chapter Summary

The study investigated knowledge, perceptions, and physical activity practices of hospital employees relative to HTN management principles and to understand relationships between these factors. While there are several aspects included in the management of HTN, regular physical activity is very influential in obtaining control of high blood pressure. The following research questions influenced the analysis described in this chapter:

- Among employees in a community hospital worksite, does self-awareness of HTN and participation in a wellness program relate to degree of HTN management knowledge?

- What is the stage of change for physical activity among employees with HTN compared to those who do not have HTN?
- Does a relationship exist between employees' HTN management knowledge and their level of physical activity?
- Does a relationship exist between an individual's stage of change and self-efficacy and past history of success or failure in behavior change attempts?

The hypotheses generated for this research were analyzed using Stata statistical software (StataCorp, 2013). A positive statistically significant relationship was identified between respondents' management knowledge and being self-aware of having HTN (p = .040). Increased education levels (p = .008) and positive past experiences with physical activity (p = .020) also revealed significance in relation to HTN management knowledge as measured by the HELM scale. A significant relationship was not found between stage of change and being self-aware or not self-aware of having HTN. Analysis showed that a significant relationship was lacking between respondents' stage of physical activity and management knowledge. However, a positive statistically significant relationship was realized between stage of physical activity and the independent variables self-efficacy (p = .001) and past experience (p = .001).

Quantitative analysis revealed the theory-derived independent variables with the greatest influence on individual's stage of physical activity included individuals' self-efficacy and their history of success being physically active. As self-efficacy increased, so too did a respondent's likelihood of being at a high stage of physical activity. The respondent who experienced more successes than failures trying to be regularly

physically active had an 88% likelihood of being at a high stage compared to the 50% likelihood of the individual who had more failure than success of being physically active.

The analysis did not reveal additional influences on stage of physical activity that were statistically significant. However, the joint effect of the polychotamous variable age on the dependent variable stage of change was nearly significant ($p = .08$) at the 95% confidence level and was significant at the 90% confidence level. As might be anticipated, the highest age bracket was least engaged in physical activity. This finding suggests additional research into this variable may yield stronger statistical and theoretical significance in relation to stage of physical activity. In Chapter Five, I address the research implications along with applications stemming from these and other findings, limitations of the study, and recommendations for further research and application.

CHAPTER FIVE

DISCUSSION

This chapter presents a brief overview of the study including the identified problem, which was the impetus for the study, and the methods of exploration. Also in this chapter, I discuss research findings and their theoretical and practical application to stakeholders associated with the research topic. This researcher discloses limitations of the study, recommendations for future study, and conclusions.

Summary of the Study and Methodology

The study explored employees' knowledge, perceptions, and actions related to the management of HTN in a community hospital setting. An additional aim included identifying variables related to an employee's stage of change for physical activity. The study is important because many efforts are underway by workplace wellness programmers to improve the health of employees affected by HTN and other conditions. Given the seriousness of HTN (DHHS et al., 2003), an understanding of the hypertensive employee's knowledge about how to control this condition and their actions to obtain control warrant investigation. The findings of this exploratory study showed the value of assessing the employee.

I used the transtheoretical model's (TTM) stage of change scale to assess employee's stage of physical activity (Marcus & Forsyth, 2009). In addition to identifying stage of change, I explored the impact of multiple variables on an employee's likelihood of being at a high stage of physical activity. Using logistic regression, I assessed participants' perceptions about managing HTN, self-efficacy of being physically active, and past experience of physical activity success. Analysis of other variables also

occurred including relationship between HTN management knowledge and being self-aware of having HTN.

This investigator used survey methodology and a cross-sectional design that was appropriate for exploratory research of this nature. The survey method was also appropriate. A nonprobability sampling strategy was employed in hopes of reaching many of the hospital's 1,403 employees aged 18 and above who worked for the organization. I hoped to obtain discriminating data about employees self-aware of having HTN and those not self-aware that could prove beneficial to hospital wellness programs. I explored the proposed questions and hypotheses using 181 of the initial 198 obtained responses.

Conclusions of Hypotheses

Hypothesis One

This hypothesis tested that among respondents employed in a community hospital, individuals self-aware of having hypertension demonstrate a different degree of knowledge concerning managing hypertension compared to employees not self-aware of having hypertension. Through OLS regression with robust standard errors, a significant relationship was identified between HTN management knowledge score and being self-aware of having HTN ($p = .038$).

This significance supports a component of the chronic care model (Clark et al., 1991) and Orem's self-care theory (Orem, 2003a; Orem 2003b). These stress the importance of the individual having knowledge of aspects of his or her own condition or disease in order to effectively self-manage, while working with important others such as primary care providers and community supports. There are actions the hypertensive

employee needs to perform (e.g., being informed about condition)in order to bring about behavior change and the OLS regression with robust standard errors model suggested this was taking place amongst some study participants. A larger majority of hypertensive subjects (68%) answered HELM scale questions correctly compared to those not self-aware of having HTN (59%). In fact, five of the six respondents who answered all of the HELM scale items correctly were self-aware of having HTN. While the reliability of the HELM scale was less than desirable, the significance of relationships between knowledge score and being self-aware of having HTN, and between score and past experience and education variables adds to the validity of HELM scale.

Additional work for a more reliable scale is one action that would benefit the research area. Qualitative inquiry with focus groups in workplace settings could provide valuable insight otherwise missed by wellness program leaders hoping to help the hypertensive employee population. Methods that are both qualitative and quantitative in nature would be beneficial to knowledge scale development.

Hypothesis Two

This hypothesis tested that among employees in a community hospital, individuals self-aware of having hypertension are at a higher stage of change for physical activity compared to employees not self-aware of having hypertension. I could not accept the hypothesis as true based on the multiple logistic regression results. I initially expected respondents' hypertensive management efforts to manifest at significantly higher stages of physical activity for those self-aware of having HTN compared to those not self-aware of having HTN. Instead, irrespective of the other variables, there was no relationship

between stage of change and HTN status. Analyses of the multiple logistic regression model offer several possible explanations that I now disclose.

As self-efficacy increased the predicted probability of being at high stage increased (p = .001). In addition, the most influential component of self-efficacy is past history of success (Bandura, 1986). Unfortunately, the largest majority of hypertensive respondents (45%) experienced more past failure than success at being physically active. The predicted probability of being at high stage of physical activity was lowest among those with more past failure than success (p = .001), which included many self-aware of having HTN.

High stage attainment for employees with HTN can seem like an impossible-to-reach brass ring due to the influence of past failure being physically active. Individuals when attempting behavior change are encouraged to put their past behind them or to move on and not look back. In contrast to these adages, the likelihood of an individual being at a high stage of physical activity based on past experience is significant and bears consideration.

Qualitative research could identify common themes among employees self-aware of having HTN that could further explain the reasons why more are not at high stage of physical activity. Queries into recognized barriers and reasons why past attempts were unsuccessful would be helpful. In addition, this researcher recommends a repeat of this study using a larger sample of participants to add clarity to these initial exploratory results.

Hypothesis Three

This hypothesis tested that individuals at higher stages of change for physical activity have higher levels of self-efficacy. Multiple logistic regression results supported this hypothesis. The odds ratio between self-efficacy and being at a high stage of physical activity was statistically significant ($p = 0.001$) such that for every measured unit of self-efficacy, the odds of being at a high stage of change increased 2.7 times. The probability of being at a high stage of change moved from 30% for respondents at the lowest level of reported self-efficacy to 69% at the median of reported self-efficacy to 92% at the highest level of reported self-efficacy.

The results clearly indicate that respondents at different stages of physical activity did not have the same level of confidence that they could successfully maintain the behavior change. This outcome was consistent with previous cross-sectional findings measuring self-efficacy and physical activity reviewed in Chapter Two (Marcus et al., 1992; Parschau, et al., 2011; Simonavice & Wiggins, 2008). Programs that address individuals' self-efficacy have been more effective at bringing about behavior change than programs that do not (Dallow & Anderson, 2003; Garcia & Mann, 2003).

Several methods for improving self-efficacy exist in the research. Bandura (1986) recommends vicarious capability, verbal persuasion by others, and helping an individual recognize feelings detrimental to success (physiologic state). Individuals have successfully progressed through stages of change via consciousness-raising, helping relationships, counterconditioning, and supportive environments (DiClemente & Prochaska, 1998). A recognized barrier to managing HTN is access to supportive people with whom HTN related problems could be discussed (Hill & Sutton, 2000).

Other research among different populations showed many would quit exercise regimens in a short amount of time for reasons not fully understood (Carmody, Senner, Manilow, & Malarazzo, 1980). Prochaska and Marcus (1994) expect setbacks to occur with attempts to change behaviors such as regular physical activity (Prochaska & Marcus, 1994).

Use of HTN management coaches who build self-efficacy can reduce dropout rates in the initial phases of interventions and beyond. Bandura (1986) noted that if an individual's inability to accomplish a goal occurred early in the attempt because of what the individual did or failed to do, then it was especially detrimental to the individual's belief that their efforts could bring about change. Research should continue of assessment and improvement of self-efficacy in individuals attempting physical activity behavior change.

Additional Research Findings

Past Experience

The past experience variable assessed respondents' self-report of experience with past attempts to engage in physical activity. Multiple logistic regression revealed the likelihood of respondents being at a high stage of physical activity was greatest for persons who had more past successes at being physically active than failures ($p = 0.001$). The predicted probability that a respondent would be at a high stage was 89% if the respondent's past held more success than failure in being physically active ($p < .001$). Conversely, for the respondent with more past failure than success the likelihood was only 50%. Respondents with more success than failure were 38% more likely to be at a high stage of change compared to those with more past failure than success ($p < .001$).

Respondents with more past success were more likely to be at action and maintenance stages of physical activity, while those with more past failure were not. Unfortunately, only 17% of hypertensive respondents self-reported having more past success than failure.

Past experience can be a benefit or a barrier. Bandura (1986) notes the greatest influence on self-efficacy is past experience. However, there is a paucity of research on past experience with physical activity as it relates to future physical activity (Lee & Laffrey, 2005). What we do know is that individuals with past failures may not take into account the effect of external barriers at the time of the behavior change attempt and could therefore embrace the shortcomings as solely their own doing (Bandura, 1986). Thus, it is important to minimize and eliminate external barriers to employee's completion of intervention where possible. For future research of employees with HTN, a qualitative exploration of internal and external causes of past failure and past success being physically active can help advance program design. Past motivations identified could be incorporated in with future intervention designs. Program designers could use this information to find ways to minimize or circumvent identified barriers in an employee's past.

Perceptions

The study brought out other interesting ideas not specifically hypothesized. For example, compared to HTN, respondents more highly regarded the difficulty and importance of managing other health conditions such as diabetes. Analysis of data showed that 75.00% perceived HTN was easier to manage compared to other conditions

and 95.11% perceived other conditions were more or equally important to manage than HTN.

It is reasonable that those employed in an acute care health setting would have higher regard for the management of obesity, cancer, diabetes, and heart disease. However, based on Miller (1997) and others, a similar regard for HTN is likely even among those not employed in a health setting. Those with asymptomatic conditions like HTN could find themselves deceived by the absence of immediate or obvious consequences for unmanaged health conditions (Miller, 1997). Hypertension, called the silent killer, can lead to heart attack, stroke, kidney disease, and cardiovascular disease with little warning (DHHS et al., 2003). Prior studies have addressed the disregard some have for the risks and seriousness of uncontrolled HTN (Hill & Sutton, 2000; Ogedegbe, 2008; Siegel, 2005). Education and awareness of the dangers of HTN would benefit worksite employees.

Quantitative assessment via surveys and scripted telephone interviews could provide wellness directors with greater understanding of employee's perceptions about HTN. In addition, qualitative inquiry would help wellness designers understand employees' HTN related values, knowledge, and attitudes that could inform development of awareness campaigns and other related activities.

In addition to assessment, stakeholders should discover ways to increase interest in health and self-awareness of HTN among male employees. Only 4.49% (n = 63) of the male employees were members of the survey site's wellness program. Nine male survey participants were self-aware of having HTN. It is important for worksite wellness leaders to understand and appreciate male employees' regard for HTN and their health in general.

The low number of surveyed self-identified males aware of having HTN is consistent with national research. In one study, for example, a significantly higher number of men were unaware of having HTN compared to women (Ostchega, et al., 2008).

The lack of awareness could possibly stem from how infrequently males visit primary care providers compared to women. Case in point, the CDC reported the age-adjusted rate of primary care provider visits by women was 58% higher than the rate of visits for men (U.S. Department of Health and Human Services, 2001). These studies, in addition to initial findings of this researcher are cause for concern for male employees. The reason being, while high blood pressure control has improved nationally a smaller percentage of men (43.1%) had controlled blood pressure compared to women (56.6%) during a 2009-2012 period of study (U. S. Department of Health and Human Services, 2013). For wellness program specialists, this researcher recommends closer investigation of the male subgroup of employees in the workplace as an area for future research. In addition, employee health nurses could assess blood pressure levels via mobile blood pressure clinics and visit departments in the organization to assess employees who are reluctant to visit a primary care physician. These nurses could identify those whose measured blood pressure is consistently uncontrolled on two or more assessments and share the rationale for evaluation by a primary health provider.

Limitations

Generalizability

Given the less than desirable representativeness of the sample, I could not generalize results to the site population. Most of the respondents were female (91.53%) compared to the population at large (82.12%). A larger percentage of sample respondents

(55.61%) were members of the wellness program compared to the percentage of wellness members (37.70%) in the general population of employees. People in general tend to participate in surveys that hold an interest for them personally. The nature of the study may have attracted more people inclined toward health and physical activity.

Methods to increase number and diversity of participants could allow generalization of future results to the employee population. Possible methods include provision of a survey link via the internet that is accessible to employees off site, conducting between-department competitions for survey completion, endorsement by all administrators, and incentives for survey completion while maintaining anonymity.

In contrast to the 250 (17.82%) males employed at the site, the 16 (8.46%) who participated was an underrepresentation of males in the sample. Knowledge of ways to increase male participation would be beneficial for research purposes. In a tailored worksite intervention designed to improve blood pressure control, 84% of Chrysler employees who completed the six-month intervention were male (Jackson, et al., 2011). The authors did not disclose how wellness leaders obtained the high participation rate among males, but use of such practices could increase wellness program participation at other worksites as well.

Survey Method

A drawback to the use of computer systems may have been the perceived burden of getting to the survey to complete it. The site's intranet email system did not allow an external link to the Qualtrics survey tool. Instead, through the intranet email employees received instruction to open a separate internet browser window to visit the Homepage where a link to the survey was located. The number of steps to participate may have

affected sample size. A link embedded within the intranet email may have increased responses but it was not technologically possible at the research site.

Not all employees had consistent access to a computer during the workday. There were numerous public computers in patient care areas, and also in the employee library for survey completion. There were none in the cafeteria or employee lounges where many employees traditionally assembled during breaks and mealtimes. More employees might have completed the survey if computers were in these locations as well. For this researcher, the computer as the survey method was useful for many reasons including cost, efficiency in distribution and collection of the completed tool, so to speak, and for compilation of data. To increase survey access in the future, researchers should provide computers for survey completion in employee break rooms and allow access to survey link off site.

Self-Reporting

A larger than expected proportion of respondents (65.31%) reported being at a high stage of physical activity. The occurrence was possibly due to the over-representation of wellness members who participated in the study as previously discussed. Another possible explanation is that researchers have shown where self-reporters over-estimated and underestimated both vigorous- and moderate-intensity levels when compared to objective methods (Prince, et al., 2008; Sallis & Saelens, 2000). To counter the risk I provided a definition of regular physical activity to help respondents answer accurately. Despite the unexpected finding, self-reporting was an appropriate measurement style for an exploratory investigation, as this researcher iterated earlier in Chapter Two.

Hypertension Evaluation of Lifestyle and Management Knowledge Scale

This researcher used the HELM instrument (Schapira et al., 2012) to understand participants' knowledge of various facets of HTN management. It is possible that my data did not result in significant findings because of the less than desirable alpha coefficient. The scale had construct validity and was theoretically sound in that it addressed blood pressure control concepts of which a self-aware hypertensive individual should know. In addition, analysis of knowledge among those self-aware and not self-aware of HTN adds to the value of the scale. Significance of relationships was identified in a multiple OLS regression with robust standard errors between the HELM scale and three independent variables: Self-aware of HTN (p = .038), education (*p* = .008), and past experience (.020).

According to Monette et al. (2005), a possible explanation for limitation of the HELM scale could be that each of the 14 items in the HELM tool measured a different facet of HTN management in a manner not typical of traditional scales. Other contributing factors may include sample size, too few items, and vagueness or ambiguity of questions. Further research and development of a reliable and valid scale to measure HTN management knowledge beyond the ability of the scale used would prove helpful for future investigations. Orem (2003c) identified that the individual's awareness, understanding, and knowledge of their altered health condition, how to improve it, and their ability to make the necessary changes warrants consideration by interventionists.

Delimitations

The delimited study that assessed stage of physical activity practices and not all concepts of HTN management was appropriate. Findings related to stage of change for

physical activity are not applicable to participants' stages of change in other areas of HTN management. Exploration of respondents' stage of change in other areas of HTN management such as alcohol consumption, medication adherence, dietary practices, and stress management would have required many more questions be included in the survey tool. The research instrument constructed by this researcher consisted of 32 items. A lengthier research tool might have taxed the respondent to answer all items sincerely and could have led to an even smaller response rate.

The researcher acknowledges that comorbidities such as obesity and uncontrolled asthma can hinder regular physical activity among those with HTN. However, the study did not attempt to explain the influence of comorbidities on high stage of physical activity in employees self-aware of having HTN.

The study, delimited by the single survey site in Western Pennsylvania, did not address HTN management issues of employees in other hospitals or other settings. Despite the delimitation, the research provided solid theoretical and empirical evidence for the value of assessing self-efficacy and past experience of employee populations to inform design of interventions for those with HTN.

Summary and Recommendations

The research explored employee knowledge, perceptions, and practices relating to HTN management. The paucity of research that described employees' readiness to manage HTN and other conditions made my study an important concept to explore. The study offers insights for key stakeholders. A significant and positive relationship existed between HTN management knowledge score and individuals who had more past success than past failure, those with a bachelor degree or higher, and those self-aware of having

HTN. Based on this finding wellness program providers should consider using campaigns to raise HTN knowledge awareness in the workplace, especially among employees with more past failure, those less educated, and those not self-aware of having HTN.

An additional insight gleaned from this investigation is that with significance the predicted probability that an individual would be at a high stage of change increased as self-efficacy increased. Similarly, positive past experiences with engagement in physical activity also led to higher probabilities of having a high stage of change. This suggests that a one-size-fits-all intervention will not suffice for HTN management programs. Individuals will likely exist at different stages of readiness based on self-efficacy and past experience aspects. Wellness program providers would do well to tailor interventions to match employees at different stages of change and different levels of self-efficacy. In addition, program providers and users alike should realize that a relationship between past experience being physically active and current efforts to be at a highs stage of activity might exist, for good or for bad.

Implementation of policy by wellness administrators that requires and supports: (a) an effective assessment of employees' self-efficacy and past experience as a component of interventions; and (b) effective interventions that efficiently guide employees toward goals could assist the success of tailored interventions.

Based on research findings, I next provide application and research implications in no certain order, to benefit stakeholders including wellness programmers, administrators, intervention designers, program members, and researchers. Following recommendations, I conclude the chapter.

Practice Implications

Recommendations for HTN management interventions to wellness program directors, managers, intervention designers, wellness coaches, and employee health nurses are for the benefit of employees who are members of workplace wellness programs. While this study focused on HTN and stages of change, some stakeholders may find the following points applicable to other wellness interventions as well:

- Assess employee's stage of change using a valid and reliable tool prior to implementing interventions to manage HTN, obtaining high stage of physical activity, or meeting other goals. Bandura (1986) suggests viewing the targeted individual as the most influential component for changing behavior. Design of interventions around a problem, rather than around the individual with the problem, hinders the right employee from receiving the right intervention at the right time (stage).
- Implement processes such as coaching, watching others, and raising awareness, which promote change based on employee's self-reported stage.
- Minimize and eliminate external barriers to employees' completion of interventions where possible.
- Provide meaningful incentives for completion of interventions within established guidelines (National Archives and Records Administration, 2013). Program leaders should acknowledge and possibly reward employee's progress toward goal attainment and not of attainment only.
- Identify past external and internal barriers of employees and minimize and eliminate these where possible in future interventions. Recall previous

practices that helped and motivated employees to be physically active and incorporate these into the design of interventions where possible.

- Evaluate effectiveness of tailored interventions and disseminate findings among wellness program providers and recipients to build awareness and potentially improve management efforts for employees with HTN.

Research Implications

The recommendations provided for researchers, employee health nurses, and other stakeholders are for the purpose of extending the knowledge obtained from this study:

- Quantitatively and qualitatively, study hypertensive employee's perceptions of how easy and important it is or is not to manage the condition. Assessment, an important first step, can guide HTN awareness campaigns.
- Using findings from focus groups and other forms of query related to employee perceptions about HTN, develop a valid and reliable tool to measure individuals' knowledge of HTN management. Consider adding additional questions to the 14-item scale used in this study. Experts including registered nurses and physicians should review scale to ensure knowledge questions match the most current recommendations for management of HTN. Focus group participants can point out ambiguity and confusing terminology in scale items and pilot test the tool to assess its clarity.
- Repeat this study following scale enhancement and consider ways to increase participation in order to generalize findings to the population of interest.

- Among employees with HTN, qualitatively explore internal and external causes of past failure and past success being physically active. Past motivations identified could be incorporated in with future intervention designs. Program designers could use this information to find ways to minimize or circumvent identified barriers in an employee's past.
- Continue to identify and implement additional evidence-based methods that increase self-efficacy. Any program designed to influence health behavior such as HTN management should include a tailored component that assesses and increases the individual's confidence in their ability to influence their own health (Bandura, 1997).
- Disseminate research findings through academic and popular journals and via wellness stakeholder forums such as the National Wellness Institute (http://www.nationalwellness.org/)
- Explore the significance of self-efficacy and past experience on other components of HTN management such as alcohol consumption, maintaining healthy weight, stress management, and healthy eating. Control of the condition is multi-faceted. Interventions that encompass all dimensions of HTN management, not only physical activity, would more aptly supplement hypertensive employees' efforts for blood pressure control.

Conclusion

Researchers revealed that many Americans with hypertension do not have the health condition under control at a level below 140/90 mm Hg (U. S. Department of Health and Human Services, 2013; Valderrama et al., 2012). Uncontrolled HTN occurs

despite adults having vital resources such as a health care provider, health insurance, and medication accessibility and affordability. Uncontrolled hypertension translates into potential complications such as myocardial infarction, and kidney failure, and stroke (DHHS et al., 2003).

Uncontrolled HTN can also increase health expenditures for employers through direct costs such as prescriptions and hospitalizations, and indirect costs of absenteeism and presenteeism. Among six large employers researched in the U.S., HTN was among the top 10 most expensive health conditions (Goetzel et al., 2004). Analysts expect costs related to HTN to triple by the year 2030 (Heidenreich et al., 2011). Many employers are seeking the most effective ways to improve and maintain employee's health and decrease associated costs of poor health. Employers have the opportunity to implement wellness initiatives to help employees manage HTN.

The purpose of the study was to explore the knowledge, perceptions, and practices of employees in a community hospital to inform tailored design of HTN management intervention in workplace settings. Descriptive research is an appropriate initial endeavor toward understanding and then helping a group (Thomas et al., 2013).

A primary strength of the exploratory HTN management study was the discovery of self-efficacy and past experience as significant predictors of the likelihood a respondent would be at a high stage of physical activity. Variance in self-efficacy that existed among respondents at different stages supports tailored intervention design that first assesses self-efficacy and then addresses the need of individuals at different levels. These important initial measures could help employees achieve a high stage of physical activity. The significant associations between self-efficacy, past experience and high

stage of physical activity extend previous research and warrant further investigation into factors affecting HTN management. An additional benefit was the significant association realized between being self-aware of having HTN and knowing more about the condition.

According to the dearth of literature on the subject, people with HTN do not always think the condition is as serious as other chronic conditions (Anthony et al., 2012). Perception of HTN management is a newer area of research that needs greater focus using both qualitative and quantitative approaches.

An overwhelming majority of this researcher's study respondents (90.30%) expressed confidence that tailored interventions could positively affect management of HTN. Arguably, research has shown that tailored worksite wellness programs, such as stage matched interventions, designed around the needs of the employee have been more successful than nontailored programs at bringing about behavior change (Chapman, 2004; U. S. Department of Health and Human Services, 2001; Jackson et al., 2011; Marcus & Forsyth, 2009). The significance of self-efficacy and past experience realized in this study suggest the need and probable benefits of ongoing research and actions by employee wellness program stakeholders.

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Appendices

Appendix A

Background Information of Survey Research Site

1. Age of Organization (years) 100

2. Hospital Employee demographics
   a. Total number of employees 1403
      Number or % Male 250
      Number or % Female 1153

   b. Job status of employees
      Number or % full time 786
      Number or % part-time 445
      Number or % causal 172

   c. Age of employees
      #<18 years of age 0
      #18 –24 years of age 57
      #25 – 44 years of age 536
      # 45 – 54 years of age 407
      #55-64 years of age 354
      # 65-74 years of age 43
      # 75 years of age or greater 6
      Average age of employee population 46.1

   d. Job Type
      Percent of salaried employees 23%
      Percent of hourly employees 77%

   e. Racial/ethnic group of employees
      % Non-Hispanic White 98.44%
      % Non-Hispanic Black/African American .43%
      % Hispanic/ Latino 0%
      %Asian/Asian American 1.06%
      % American Indian/Alaska Native 0%
      % Native Hawaiian/Pacific Islander .07%
      % Other 0%

f. Education level of employees UNKNOWN
% Less than high school _____
% High school graduate/GED _____
% Some college/technical school _____
% College graduate _____
% Post-graduate/advanced degree _____

3. Year wellness program initiated. _2005__

4. Is wellness program reflective of organization's mission? __Yes__ Values? __Yes

5. Wellness program employee population demographics
   a. Total number of employees enrolled _529 (2013-14 year)_
      Number or % Male _63__
      Number or % Female _466_

   b. Job status of wellness program participants: UNKNOWN
      Number or % full time _____
      Number of % part-time _____
      Number of % casual/temporary _____
   c. Age UNKNOWN
      Average age of wellness program population _____

Appendix B

The HELM Knowledge Scale
Hypertension Evaluation of Lifestyle and Management
The Journal of Clinical Hypertension Vol 14 | No 7 | July 2012

Item no. Stem Response Choices

1 A person is considered to have hypertension if either their systolic blood pressure is 140 or their diastolic is 90 or higher on two separate occasions.

1. True
2. False

2 Most people can tell when their blood pressure is high because they feel bad.

1. True
2. False

3 Uncontrolled hypertension can lead to which of the following:

1. Lung cancer
2. Kidney failure
3. High cholesterol
4. Diabetes

4 Which of the following increases your risk of having hypertension?

1. Weight lifting
2. Drinking >2 cups of coffee a day
3. Smoking a pack of cigarettes
4. Gaining 15 pounds

5 People with hypertension do not need to take medicine if they exercise regularly

1. True
2. False

6 Which of the following statements about taking blood pressure medicine is TRUE?

1. Blood pressure medicine should always be taken with food
2. More than one type of blood pressure medicine can be taken at the same time
3. Blood pressure medicine works best if it is taken at bedtime
4. Blood pressure medicine should not be taken if a person drank alcohol that day

7 Most of the salt Americans eat is added with a salt shaker.

1. True
2. False

8 There are about as many calories in 12 ounces of regular orange juice as there are in 12 ounces of regular cola.

1. True
2. False

9 An overweight 60-year-old man has hypertension. He drinks one bottle of beer and 4 cups of regular coffee a day. He adds regular table salt to his food at most meals. Which one of the following changes is the most likely to lower his blood pressure?

1. Lose 10 pounds
2. Stop drinking alcohol
3. Switch to decaffeinated coffee
4. Switch to sea salt

10 Which one of the following changes to your diet is most likely to lower blood pressure?

1. Eat more fruits, vegetables, whole grains, and low-fat dairy products
2. Eliminate spicy foods
3. Drink one glass of red wine daily
4. Drink herbal tea instead of coffee

11 Which one of the following statements about exercise and blood pressure is TRUE?

1. People who are on their feet most of the day will not benefit from more exercise
2. Exercising for 30 minutes every day lowers blood pressure more than exercising for 30 minutes, 3 days a week
3. Weight lifting should be avoided by people with high blood pressure
4. When exercising, you must raise your heart rate to at least 100 beats a minute to improve blood pressure

12 A man reports that his blood pressure is 148/78 mm Hg when he checks it using the blood pressure machine in the pharmacy, 144/66 mm Hg in his family doctor's office, and 132/74 mm Hg when he checks it at home. Which of the following statements is TRUE?

1. It is common for blood pressure readings to vary like this
2. The highest blood pressure reading is the correct one
3. The lowest blood pressure reading is the correct one
4. He can be reassured that his blood pressure is normal

13 When measuring your blood pressure at home, you should:

1. Always take your reading before you take your blood pressure medicine
2. Take several readings, a minute or 2 apart, and record the lowest one
3. Tale your blood pressure right after exercising and at least 2 hours after a meal
4. Take two readings, a minute or 2 apart, and write down the average value

14 Blood pressure is measured with two numbers, an upper number and a lower number. It is usually written as upper/lower. If someone is told that their goal blood pressure is 126/76, when have they reached that goal?

1. When the upper is below 126 and the lower is below 76
2. When the upper is below 126, even if the lower is over 76
3. When the lower is below 76 even if the upper is over 126
4. When the average of the upper and the lower is <100

Schapira, M. M., Fletcher, K. E., Hayes, A., Eastwood, D., Patterson, L., Ertl, K., Whittle, J. (2012) The development and validation of the hypertension evaluation of lifestyle and management knowledge scale. Table 4. *Journal of Clinical Hypertension 14* (7) p. 464

Appendix C

Physical Activity Stages of Change Questionnaire

For each of the following questions please select Yes or No. Please be sure to read the question carefully. Physical activity or exercise includes activities of moderate intensity such as walking briskly, yard work and vigorous activities like jogging or bicycling.

1. I am currently physically active

   No
   Yes

2. I intend to become more physically active in the next 6 months.

   No
   Yes

   For activity to be considered regular, it must add up to 150 minutes per week (2.5 hours/week) or more for moderate activity lasting a minimum of ten minutes at a time, or 60 minutes per week for vigorous activity and last a minimum of 10 minutes at a time

3. I currently engage in regular physical activity

   No
   Yes

4. I have been regularly physically active for the past 6 months.

   No
   Yes

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Appendix D

Self-Efficacy Scale

Select the option that indicates how confident you are that you could be physically active in each of the following situations:

Scale:

Not at all confident
Slightly confident
Moderately confident
Very confident
Extremely confident

1. When I am tired
2. When I am in a bad mood
3. When I feel I don't have time
4. When I am on vacation
5. When it is raining or snowing

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Appendix E

Intranet Email Announcement for Survey Site Employees

Dear IRMC Employee:

As an employee of Indiana Regional Medical Center you are invited to participate in a research study about high blood pressure and exercise habits. You do not need a diagnosis of high blood pressure to participate in this survey. This study is being conducted by Sarah Jones, a doctoral student at Indiana University of Pennsylvania under supervision of Professor John Anderson. The purpose of this study is to measure physical activity practices and general knowledge and attitudes about high blood pressure. Individual responses will be anonymous. Survey results will only be reported in an aggregate form. The survey, called High Blood Pressure Survey takes approximately seven minutes to complete. It is located on the Home page of the IRMC internet portal and is available for completion from June 23rd through July 31st. Thank you in advance for your participation!

Sarah D. Jones MSN, RN

Appendix F

Informed Consent Form and Survey Tool

High Blood Pressure Knowledge & Activity Survey

INFORMED CONSENT FORM You are invited to participate in a research study about exercise and managing high blood pressure (HTN). This study is being conducted by Sarah Jones, a doctoral student at Indiana University of Pennsylvania. The following information is provided in order to help you make an informed decision whether or not to participate. You are eligible to participate because you are an employee of Indiana Regional Medical Center. The purpose of this study is to measure attitudes and general knowledge about high blood pressure and employee physical activity practices. You do not need to have a diagnosis of high blood pressure to participate in this survey. The study is intended to be interesting and informative to employees, wellness program planners and designers, policy developers, and administrators. The findings of this study will lead to a better understanding of employee perceptions, knowledge, and behavior related to managing high blood pressure. Participation in this study is voluntary and you may withdraw at any time while responding by closing your browser or skip any question that you do not feel comfortable answering. Individual responses will be anonymous. Survey results will only be reported in an aggregate form. There are no foreseeable risks from participation in this study. The results of this study will be published in a doctoral dissertation and may ultimately be presented in other formats such as academic journal articles or conference presentations. You may request a copy of the survey results by contacting the researcher. The researcher for this study is a doctoral candidate at Indiana University of Pennsylvania in the Administrative Studies and Leadership Ph. D. program. She is being supervised in this project by: Dr. John Anderson, Professor, Indiana University of Pennsylvania, Department of Sociology, Dixon University Center, Richards Hall 3rd Floor, 2986 North Second Street, Harrisburg, PA 17110, 724-357-2956. CONTACT: Sarah Jones, Researcher, Indiana University of Pennsylvania, Indiana, PA 15705, Sarah.Jones@iup.edu. This research study has been approved by the Indiana University of Pennsylvania Institutional Review Board for the Protection of Human Subjects. You may contact the Indiana University of Pennsylvania Institutional Review Board at (724) 357-7730 or by email at irb-research@iup.edu. Your completion of this survey indicates your consent to participate in this research study. Do you wish to participate in this survey?

- ❍ Yes, I agree to participate
- ❍ No, I will not participate

INSTRUCTIONS Thank you for agreeing to participate in this survey. There are 34 survey questions. Topics include your thoughts on high blood pressure (also known as HTN and hypertension), your understanding about high blood pressure, your recent physical activity habits, and demographic information. Question format includes yes/no, true/false, scales, and multiple choice. You should not complete this survey with anyone else. Please allow ten minutes to complete the survey.

INSTRUCTIONS: For each of the following questions please choose the option that best describes you.

Are you currently a member of the BWell Wellness Program at Indiana Regional Medical Center (IRMC)?

- ❍ Yes
- ❍ No

Do you believe you have high blood pressure?

- ❍ Yes
- ❍ No

Have you ever been told by your primary care provider that you have high blood pressure?

- ❍ Yes
- ❍ No

Are you currently taking medication(s) to treat high blood pressure?

- ❍ Yes
- ❍ No

Have you ever had two blood pressure readings greater than 140/90 mm Hg documented by employee health staff using standardized methods of blood pressure measurement?

- ❍ Yes
- ❍ No

Select the option that represents your opinion on the ease of managing other health conditions compared to managing HTN

	Easier to manage than HTN	About the same as HTN	More difficult to manage than HTN	Not Sure
Arthritis	❍	❍	❍	❍
Asthma	❍	❍	❍	❍
Cancer	❍	❍	❍	❍
Depression	❍	❍	❍	❍
Diabetes	❍	❍	❍	❍
Heart Disease	❍	❍	❍	❍
Obesity	❍	❍	❍	❍
Oral Health	❍	❍	❍	❍

I am currently physically active.

❍ Yes
❍ No

I intend to become more physically active in the next 6 months.

❍ Yes
❍ No

Following is a definition of regular physical activity: Regular physical activity: Moderate exercise that totals 150 minutes/week, for example 30 minutes/5 days a week, for a minimum of ten minutes at a time, or vigorous activity that totals 75 minutes/week for a minimum of ten minutes at a time. Examples of moderate exercise are yard work, vacuuming carpet, raking, jogging, brisk walk for 10 to 20 minutes, ballroom dancing, tai chi, and playing tag with kids Examples of vigorous exercise are pop dancing, running, stair climbing, shoveling snow, chopping wood, firefighting, basketball, mountain or rock climbing, jumping rope, soccer, racquetball, brisk walk for 30 minutes, spinning class, and working with heavy equipment.

I currently engage in regular physical activity.

- ❍ Yes
- ❍ No

I have been regularly physically active for the past 6 months.

- ❍ Yes
- ❍ No

Select the option that indicates how confident you are that you could be regularly physically active in each of the following situations:

	Not at all confident	Slightly confident	Moderately Confident	Very confident	Extremely confident
When I am tired	❍	❍	❍	❍	❍
When I am in a bad mood	❍	❍	❍	❍	❍
When I feel I don't have time	❍	❍	❍	❍	❍
When I am on vacation	❍	❍	❍	❍	❍
When it is raining or snowing	❍	❍	❍	❍	❍

What option best describes your experience with trying to be regularly physically active?

- ❍ I have experienced more success than failure
- ❍ I have experienced about the same amount of success and failure
- ❍ I have experienced more failure than success
- ❍ I have never tried to be regularly physically active.

INSTRUCTIONS: For each of the following questions please select an answer from one of the choices given.

A person is considered to have hypertension if either their systolic blood pressure is 140 or their diastolic is 90 or higher on two separate occasions.

- ❍ True
- ❍ False

Most people can tell when their blood pressure is high because they feel bad.

- ❍ True
- ❍ False

Uncontrolled hypertension can lead to which of the following (Select one):

- ❍ Lung cancer
- ❍ Kidney failure
- ❍ High cholesterol
- ❍ Diabetes

Which of the following increases your risk of having hypertension? (Select one)

- ❍ Weight lifting
- ❍ Drinking >2 cups of coffee a day
- ❍ Smoking a pack of cigarettes
- ❍ Gaining 15 pounds

People with hypertension do not need to take medicine if they exercise regularly.

- ❍ True
- ❍ False

Which of the following statements about taking blood pressure medicine is TRUE? (Select one)

- ❍ Blood pressure medicine should always be taken with food
- ❍ More than one type of blood pressure medicine can be taken at the same time
- ❍ Blood pressure medicine works best if it is taken at bedtime
- ❍ Blood pressure medicine should not be taken if a person drank alcohol that day

Most of the salt Americans eat is added with a salt shaker.

- ❍ True
- ❍ False

There are about as many calories in 12 ounces of regular orange juice as there are in 12 ounces of regular cola.

- ❍ True
- ❍ False

An overweight 60-year-old man has hypertension. He drinks one bottle of beer and 4 cups of regular coffee a day. He adds regular table salt to his food at most meals. Which one of the following changes is the most likely to lower his blood pressure? (Select one)

- ❍ Lose 10 pounds
- ❍ Stop drinking alcohol
- ❍ Switch to decaffeinated coffee
- ❍ Switch to sea salt

Which one of the following changes to your diet is most likely to lower blood pressure? (Select one)

- ❍ Eat more fruits, vegetables, whole grains, and low-fat dairy products
- ❍ Eliminate spicy foods
- ❍ Drink one glass of red wine daily
- ❍ Drink herbal tea instead of coffee

Which one of the following statements about exercise and blood pressure is TRUE? (Select one)

- ❍ People who are on their feet most of the day will not benefit from more exercise
- ❍ Exercising for 30 minutes every day lowers blood pressure more than exercising for 30 minutes,3 days a week
- ❍ Weight lifting should be avoided by people with high blood pressure
- ❍ When exercising, you must raise your heart rate to at least 100 beats a minute to improve blood pressure

A man reports that his blood pressure is 148/78 mm Hg when he checks it using the blood pressure machine in the pharmacy, 144/66 mm Hg in his family doctor's office, and 132/74 mm Hg when he checks it at home. Which of the following statements is TRUE? (Select one)

- ❍ It is common for blood pressure readings to vary like this
- ❍ The highest blood pressure reading is the correct one
- ❍ The lowest blood pressure reading is the correct one
- ❍ He can be reassured that his blood pressure is normal

When measuring your blood pressure at home, you should: (Select one)

- ❍ Always take your reading before you take your blood pressure medicine
- ❍ Take several readings, a minute or 2 apart, and record the lowest one
- ❍ Take your blood pressure right after exercising and at least 2 hours after a meal
- ❍ Take two readings, a minute or 2 apart, and write down the average value

Blood pressure is measured with two numbers, an upper number and a lower number. It is usually written as upper/lower. If someone is told that their goal blood pressure is 126/76, when have they reached their goal? (Select one)

- ❍ When the upper is below 126 and the lower is below 76
- ❍ When the upper is below 126, even if the lower is over 76
- ❍ When the lower is below 76 even if the upper is over 126
- ❍ When the average of the upper and the lower is

Select the option that represents your opinion on the importance of managing other health conditions compared to managing HTN:

	Less important to manage than HTN	Just as important to manage as HTN	More important to manage than HTN	Not Sure
Arthritis	❍	❍	❍	❍
Asthma	❍	❍	❍	❍
Cancer	❍	❍	❍	❍
Depression	❍	❍	❍	❍
Diabetes	❍	❍	❍	❍
Heart Disease	❍	❍	❍	❍
Obesity	❍	❍	❍	❍
Oral Health	❍	❍	❍	❍

A wellness program with tailored interventions for employees with hypertension (HTN) can help bring about high blood pressure control.

❍ Yes
❍ No

INSTRUCTIONS: For each of the following questions, please choose the option that best describes you. All answers are confidential and data will not be associated with your individual responses in any way.

What is your gender?

❍ Male
❍ Female

What is your age group?

- ❍ 18-24 years
- ❍ 25-44 years
- ❍ 45-54 years
- ❍ 55-64 years
- ❍ 65-74 years
- ❍ 75-79 years
- ❍ 80 and over

Which best describes the highest level of education that you have completed?

- ❍ < High school
- ❍ High school (including GED or equivalent)
- ❍ Some College or AA degree
- ❍ College graduate or above

What is your current employment status at IRMC?

- ❍ Full-time
- ❍ Part-time
- ❍ Casual

Thank you for your participation!

Appendix G

Permission to Use Survey Tools

HUMAN KINETICS

1607 North Market Street • P.O. Box 5076 • Champaign IL 61825-5076 • (217) 351-5076 • Fax (217) 351-2674

November 16, 2012

Sarah D. Jones
31 North Fifteenth Street
Indiana, PA 15701

RE: Request to use questionnaires 2.1, 4.1, 4.2, and 4.4 on pages 168, 169-170, 171, and 173 of *Motivating People to Be Physically Active, Second Edition*, by B.H. Marcus and L.H. Forsyth, in your dissertation research and also to include them in your dissertation [ID #4437]

Dear Ms. Jones:

We are pleased to approve your permission request for one-time use of questionnaires 2.1, 4.1, 4.2, and 4.4 on pages 168, 169-170, 171, and 173 of *Motivating People to Be Physically Active, Second Edition*, in your dissertation research and to include them in your dissertation, to be submitted to Indiana University of Pennsylvania. This is your confirmation that we are granting nonexclusive print and electronic rights, for worldwide distribution, contingent upon your use of the following credit line adjacent to the reprinted material.

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    - Questionnaire 4.1 is adapted from table 3 on page 389 of *Health Psychology* 11(6). This questionnaire includes a partial list of the statements in that table. Some of the statements have been changed slightly.
    - Questionnaire 2.1 is attributed to the same article, but I did not see a table with the same statements in it. Possibly it was adapted from the text. I would assume you can access the article to determine that on your own.
    - Questionnaire 4.4 is adapted from table 1 on page 259 of *Health Psychology* 11(4).

- Questionnaire 4.2 was adapted from Research *Quarterly for Exercise and Sport*. I was not able to view this article online. For permission information for this journal, I would suggest you contact Linda Topper, Managing Editor (ltopper@aahperd.org).

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Sincerely,

Martha Gullo
Rights Manager
Ph: 217-351-5076 ext. 2223
Email: marthag@hkusa.com

Appendix H

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Appendix I

Request/Permission to Use HELM Scale

Subject: **FW: Sarah Jones' Request to use HELM scale in dissertation**

From: "Ertl, Kristyn ,Kristyn.Ertl@va.gov>

Date: 08/30/13 05:40 PM

To: sarah.jones@iup.edu

From: Ertl, Kristyn
Sent: Friday, August 30, 2013 4:38 PM
To: 'sara.jones@iup.edu'
Cc: 'Marilyn Schapira (mschap@mail.med.upenn.edu)'
Subject: RE: Sarah Jones' Request to use HELM scale in dissertation

Hi, Sarah!

Here is the link to the hypertension (HTN) knowledge questionnaire:
http://www.milwaukee.va.gov/Power/Power.asp

The questionnaire and the answer sheet can be found under "Academic Products," which you'll see if you scroll down a little bit.

If you have any questions, let me know. Thanks for your interest in our scale!

Kristyn Ertl, BA, CCRC
Research Coordinator
Clement J Zablocki VAMC
Mail Stop 151
5000 W National Ave
Milwaukee WI 53295
kristyn.ertl@va.gov
Office: (414) 384-2000, Ext. 46441
Fax (414) 382-5017

From: Marilyn Schapira [mailto:mschap@mail.med.upenn.edu]
Sent: Friday, August 30, 2013 7:53 AM
To: sara.jones@iup.edu
Cc: Kristyn Ertl
Subject: FW: Sarah Jones' Request to use HELM scale in dissertation

Dear Sara,

We would be happy to have you use the HELM scale in your work. I am cc'ing our Kristyn Ertl who can direct you to a web site where you can download the instrument. Please let me know if you have further questions. Good luck on your work and thanks for your interest in the scale. I appreciate any feedback you have regarding how the scale is working in your study population.

Sincerely,

Marilyn

Marilyn M. Schapira, MD, MPH
Associate Profess of Medicine
Co-Leader, Cancer Control Research Program, Abramson Cancer Center
General Internal Medicine
Perelman School of Medicine
University of Pennsylvania
mschap@upenn.edu
Phone: 215-898-2022

From: Marilyn Schapira [mailto:mschap@mail.med.upenn.edu]
Sent: Friday, August 30, 2013 8:49 AM
To: Marilyn Schapira
Subject: Fwd: Sarah Jones' Request to use HELM scale in dissertation

Sent from my iPhone

Begin forwarded message:

From: "Sarah Dorethea Jones" <sarah.jones@iup.edu>
Date: August 29, 2013, 10:35:07 AD EDT
To: <mschap@mail.med.upenn.edu>
Subject: Sarah Jones' Request to use HELM scale in dissertation

Hello Dr. Schapira,

I am emailing to request permission to use the Hypertension Evaluation of Lifestyle and Management Knowledge (HELM) Scale presented by you and colleagues in the July 2012 edition volume 14 No 7 of the The Journal of Clinical Hypertension.

I desire to compare knowledge and activity levels of employees diagnosed with hypertension and enrolled in the work-site wellness program to wellness program enrolled employees not diagnosed.

As a Registered Nurse for more than twenty years I have observed the focus of hypertension management to be primarily on medication regimens. However, as was clearly identified in the original work presented by you and your co-authors, there are other significant components to effective management of HTN, such as physical activity.

I expect that my research study will enlighten stakeholders focused on improving the health of employees through appropriate work-site wellness interventions.

The HELM scale is exactly what I have been looking for to utilize in my dissertation research. I feel blessed to have located it so quickly. I hope you and co-authors of this informative research document will carefully consider my request for permission to use the scale and administer it to survey participants employed at a community hospital in Indiana, Pennsylvania.

I am pursuing a PhD in Administrative and Leadership Studies from Indiana University of Pennsylvania. It is a state university located about 50 miles east of Pittsburgh. I am a long way from home having been born and raised in North Philadelphia!

I am happy to discuss my research interest and request further with you via email or by phone at 724-541-4054.

Dr. Schapira I look forward to hearing from you soon.

Thank you,

Sarah
Sarah D. Jones MSN, RN
Doctoral Candidate (Ph.D.)
Administrative and Leadership Studies
Indiana University of Pennsylvania
Indiana, PA 15701