ABEL, WILLIE M., Ph.D. Issues Influencing Medication Adherence in Black Women with Hypertension. (2011)
Directed by Dr. Patricia B. Crane. 279 pp.

The purposes of this study were to: (a) describe the differences in adherent and nonadherent Black women who have hypertension (HTN), (b) examine issues that influence medication adherence, and (c) explore the relationship of reactant behaviors and medication adherence. Cox's interaction model of client health behavior was used to guide this study. Client singularity background variables: demographic characteristics (age and education), social influence (religion), previous health care experience (family history of HTN, comorbidities, number of medications, blood pressure [BP], and body mass index), and environmental resources (income and type of health coverage) along with client singularity dynamic variables: intrinsic motivation (reactance), cognitive appraisal (HTN knowledge, self-care of HTN, trust in health care provider, and coping), and affective response (perceived racism and depression) were examined to determine their influence on the health outcome, medication adherence.

A cross-sectional, correlational non-experimental study was conducted with a convenience sample of 80 Black women who were taking antihypertensive prescription medications for blood pressure control. Over half of the participants (56%) were single, divorced, or widowed. Ages ranged from 19 to 60 with a mean age of 47.8 ($SD \pm 9.2$). Almost one-third 30% ($n=24$) of the participants reported household incomes levels at or below the federal poverty level. The majority of the sample was employed (67%), physically inactive (90%), overweight/obese (88%), and had a history of smoking (54%).

The study results did not show a difference between those who adhere to antihypertensive medications and those who do not. Also, there was no relationship between reactant behaviors and medication adherence. However, in the optimal predictive model, those aged 40-49 were less likely to be adherent to their antihypertensive medications. In contrast, those who took 5 to 7 medications were more likely to be adherent. Trust in the health care provider was highly associated with adherence to the medication treatment regimen. These results are congruent with the expectation that trust in the health care provider promotes better medication adherence. Future research should continue to identify factors that influence adherence to the treatment regimen among Black women with HTN and develop interventions that facilitate their ability to better manage their HTN and thus, maintain BP control.

ISSUES INFLUENCING MEDICATION ADHERENCE

IN BLACK WOMEN WITH HYPERTENSION

by

Willie M. Abel

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Approved by

_____
Committee Chair

Without God I could do nothing,
Without Him I would fail,
Without Him my life would be rugged,
Like a ship without a sail.
Beatrice Brown

... I thank my God through Jesus Christ...
Romans 1:8

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of

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CHAPTER I

BACKGROUND

Introduction

Cardiovascular disease (CVD) is the leading cause of death for women in the United States with a substantially higher death rate in Black women ("Facts about women", 2009; "Women's health", 2010; "Women and heart disease", 2010). In fact, almost half (49%) of all Black women 18 years of age or older have some form of CVD (Roger et al., 2011) positioning them at an increased risk for heart attack, heart failure, stroke, and kidney disease. At least one or more of the major risk factors (diabetes, smoking, high blood pressure [BP], high blood cholesterol, physical inactivity, overweight/obesity, and family history of heart disease) for CVD are common for every Black woman ("Love your heart", 2009; Roger et al., 2011). Of all these risk factors, hypertension (HTN) is the leading cause of CVD, especially for Black women (Roger et al., 2011).

The prevalence of HTN is vast, affecting approximately one billion adults worldwide (Chobanian et al., 2003). In the United States, HTN is present in about 76.4 million adults representing 33% of the population (Roger et al., 2011). Of particular concern are Blacks in the United States, aged 20 years of age and older, who have the highest prevalence of HTN in the world. When examining data from 1988-1994 through 1999-2002, HTN for Blacks has steadily increased from 35.8% to 41.4% as compared to

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24.3% to 28.1% for Whites (Roger et al., 2011). When further delineated by sex, HTN is greater for Black women (45.7%), followed by Black men (43.0%), then White men (33.9%), and is lowest for White women (31.3%) (Roger et al., 2011).

Aims to decrease HTN can be achieved by modifying risk factors that affect CVD such as diet (Douglas et al., 2003; "Leading worldwide cause", 2008; "Women and health", 2009) and physical activity, along with antihypertensive drug therapy (Douglas et al., 2003). Black women have not readily participated in risk reduction behaviors to manage and prevent HTN, such as physical activity and diet. More importantly, the reasons for not participating are not fully understood (Benjamin et al., 2005; Smith et al., 2005; Webb & Gonzalez, 2006). Equally perplexing is the lack of adherence of Black women to antihypertensive treatment regimens such as medications that have proven efficacy in lowering BP (Chobanian et al., 2004; Fongwa, Evangelista, & Doering, 2006; Mabotuwana, Warren, & Kennelly, 2009; Martins, Gor, Teklehaimanot, & Norris, 2001).

Nonadherence to the HTN health regimen may create an enormous burden to Blacks because the chronicity of HTN oftentimes results in morbidity, disability, and mortality (Roger et al., 2011). The magnitude of this problem escalates since Blacks develop HTN earlier in life with greater severity and more organ damage, when compared to Whites (Chobanian et al., 2004; Nesbitt & Victor, 2004; Roger et al., 2011). Morbidities associated with CVD include HTN, coronary heart disease, myocardial infarction, angina pectoris, heart failure, and stroke. In the majority (75%) of individuals with CVD comorbidities, HTN is evident (Roger et al., 2011).

Cardiovascular disease is a major cause of disability that negatively influences the lives of about 45 million people in the United States, preventing normal lifestyles, activities of daily living, and employment. Heart disease, stroke, and HTN are among the 15 leading causes of disabilities attributed to CVD (Roger et al., 2011). Eventually, uncontrolled HTN results in increased mortality rates in Blacks. Death rates from CVD were comparable for Blacks (588.7 deaths per 100,000 population) and Whites (586 deaths per 100,000 population) in the 1950s ("Health, United States", 2010). Between 1950 to 2007, both racial groups have experienced a decrease in CVD death rates with a greater decline for Whites (191.4 deaths per 100,000 population) than Blacks (251.9 deaths per 100,000 population) (Xu, Kochanek, Murphy, & Tejada-Vera, 2010). Hence, Blacks are 1.3 times as likely as Whites to die from CVD (Xu et al., 2010). In 2007, the overall death rate for HTN was 17.8 per 100,000. From a race and sex perspective, the HTN death rate for White men and women was 15.7 and 14.3 respectively, whereas the death rate for Black men and women was 49.2 and 37.0 per 100,000 (Roger et al., 2011). In fact, HTN is the leading global risk for mortality in the world and ranks in the top two leading risk factors across all income groups ("Global health risks", 2009). Though a shorter life expectancy is troubling, morbidity and disability present a unique set of problems such as increased health care costs.

Nonadherence to the HTN treatment regimen may result in frequent CVD exacerbations that could create a substantial cost burden to individuals, families, and society (Dragomir et al., 2010; Piette, Heisler, Horne, & Alexander, 2006; Rand & Sevick, 2000). In 2010, an estimated $503.2 billion was spent on health care related to

CVD, and of that amount, HTN was estimated to cost $76.6 billion (Lloyd-Jones et al., 2010). This cost is astounding when considering that a number of the contributing factors for CVD are preventable ("Women and health", 2009).

It is estimated that a surprising 50-70% of those diagnosed with HTN do not follow the prescribed medication regimen resulting in a lack of therapeutic effects ("Adherence to long-term therapies", 2003; Charles, Good, Hanusa, Chang, & Whittle, 2003; Fongwa et al., 2006; Rolley et al., 2008). Moreover, of the individuals prescribed antihypertensive medications, 70% do not achieve a controlled BP less than 140/90 (Rolley et al., 2008; Wetzels et al., 2006). Thus, nonadherence to antihypertensive medication is a significant issue in controlling HTN, especially in Black women who are at increased risk for morbidity and mortality.

Although not implicit, the factors related to antihypertensive medication nonadherence in Black women include the multifaceted nature of historical and socioeconomic determinants such as coping with multiple stressors, perceived racism, (Webb & Gonzalez, 2006), lower education, divergent health beliefs, inadequate lifestyle modifications, poor social support, alcohol and illicit drug use, medication side effects, cost factors, lack of health insurance, lack of access to care (Fongwa et al., 2006), distrust of healthcare provider (Lukoschek, 2003), and poor communication with health care providers (Kressin et al., 2007). Currently, the worldwide prevalence of HTN (Roger et al., 2011) is evidence that Black women have had limited success with interventions for BP control (Fongwa et al., 2006). With the sophistication of technological advances in CVD therapies, HTN disparities among Black women with high prevalence and mortality

rates are unacceptable. Undoubtedly, one of the major obstacles to adequate BP achievement and the attainment of optimal health for Black women is failure to adhere to the health regimen. However, the multifaceted nature of this problem creates a complexity that may be more individualistic in nature whereby one intervention strategy may not fit the majority of this population. The high prevalence of HTN and the limited success of adherence interventions (Douglas et al., 2003) provide evidence of the complexity of this disease process, especially in Black women. According to R. A. Williams (2009), there is a lack of research on new and improved treatment approaches to CVD problems that are unique to Black women. Fongwa et al. (2006) denoted that the lack of successful interventions are attributed to the paucity of research on factors influencing adherence to treatment for Black women. Thus, research focusing on adherence is essential.

Significance

Hypertension is an especially dangerous disease because its victims are oftentimes asymptomatic ("About high blood pressure", 2010), thus the designation of HTN as the silent killer. Over time, damage to arterial walls and diminished blood supply cause destructive effects to major body systems such as the heart, kidney, and brain (Chobanian et al., 2004; "High blood pressure", 2010). The exact cause of HTN cannot be directly ascertained due to the involvement of multiple interactions of body systems, hormones, and physiological pathways (Arnett, 2000; Gutierrez & Peterson, 2007). Though HTN is often attributed to genetic factors (Roger et al., 2011), the results of most genetic studies have had limited success in identifying individual genes that contribute to HTN (Arnett,

2000) and remain experimental ("Human genome project", 2007). Because HTN is multifactorial (Chobanian et al., 2004; Gutierrez & Peterson, 2007), the treatment process is presumed to be multifaceted.

According to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) (Chobanian et al., 2004), the following classifications of BP are established while an individual is at rest. Normal BP is defined as a BP less than 120/80 mm Hg and pre-HTN is a BP 120/80-139/89 mm Hg. Hypertension has two stages; stage 1 is a BP 140/90-159/99 mm Hg and stage 2 is a BP ≥ 160/100 mm Hg. Lifestyle modifications for those with pre-HTN are recommended by JNC 7 (Chobanian et al., 2004). As an exception, antihypertensive medications should be prescribed for those individuals with prehypertension and diagnosed with diabetes or kidney disease that has a BP greater than 130/80. For all individuals with stages 1 and 2 HTN, JNC 7 recommends treatment with antihypertensive medications and lifestyle modifications (Chobanian et al., 2004).

Interestingly, the International Society on Hypertension in Blacks (ISHIB) (Flack et al., 2010) recommends lowering target BP from less than 140/90 to less than 135/85 for clients with uncomplicated HTN (e.g. no target organ damage or CVD) and less than 130/80 for clients with complicated HTN (e.g. target organ damage and CVD). These BP recommendations were made after an extensive review of clinical trials and treatment guidelines (Flack et al., 2010). However, Wright et al. (2010) criticized ISHIB recommendations claiming insufficient evidence to support the lower BP goals.

Nevertheless, to effectively manage HTN in Blacks, guidelines from both JNC 7 and ISHIB warrant an aggressive community health focus.

Because of the critical need to reduce health disparity for Blacks and improve cardiovascular health, Healthy People 2010 objectives underwent revisions for Healthy People 2020. Objectives that relate to BP were retained as previously written or retained with modifications. However, of particular interest is one new objective for Healthy People 2020 that focuses on medication adherence. The goal of this objective is to increase the number of people with HTN who take their medications as prescribed to decrease their BP ("Get to know healthy people", 2010). Thus, medication adherence is recognized as a national health care problem.

A number of different medicine classifications have demonstrated efficacy in BP control (Chobanian et al., 2004; Fongwa et al., 2006; Mabotuwana et al., 2009). For about 30% of individuals with HTN, adequate BP control is achieved with one medication, while over 65% require two or more medications from different medicine classifications (Chobanian et al., 2004). Because multiple medications and multiple doses have been known to contribute to low adherence rates, fixed-dose combinations (two different medicine classifications in one tablet or pill form) were developed to aid adherence, maintain BP control, and decrease costs (Chobanian et al., 2004). However many third party payers will not pay for combination medications that are not available in the generic form because the cost is higher than reimbursing for two generic medications (Chobanian et al., 2004; Gradman, Basile, Carter, & Bakris, 2010; Pitt, 2004).

Maintaining adherence to the treatment regimen, whether antihypertensive medications or lifestyle modifications, has been problematic for Blacks (Fongwa et al., 2008; Wexler, Elton, Pleister, & Feldman, 2009). One of the most intriguing reasons for nonadherence in Blacks stems from their historical beginnings within the United States healthcare system. Introduced to this country as slaves, Blacks were marketed as property with little to no human rights. They were frequently used in medical experiments by White doctors to perfect their technique before attempting procedures on those who were White (Gamble, 1997; Spillers, 1987; Washington, 2006). Because of skin color and other distinctive features such as hair texture, thick lips, and body shape, the lives of Blacks were not valued, and their exploitation by White physicians endured a long history (Gamble, 1997; Spillers, 1987; Washington, 2006). As a result, perceived stereotypes and prejudices experienced by Blacks in the health care arena have resulted in mistrust, refusal of treatment, and/or poor adherence with treatment regimens by Blacks (Gamble, 1997; "Unequal treatment", 2002). Today, remnants of their history continue in subtle configurations resulting in many Blacks approaching health care with fear, skepticism, and caution (Gamble, 1997).

Historical factors may provide clues to the rationale for disparate rates of HTN for Blacks, especially Black women, thus creating a complexity that generates a multifactorial nature to the disorder. Disparate rates of HTN may be related to evidence of significant differences in healthcare for Blacks at the cultural (e.g. bias in healthcare delivery systems, access to care, and geography), socioeconomic (e.g. racial/ethnic bias, poverty, and education), physiological (unequal burden of risk factors), and genetic

(disease expression from polymorphisms that are DNA sequence variations resulting in altered protein function) levels (Yancy, Benjamin, Fabunmi, & Bonow, 2005). Because these disparities are complex and multifactorial, interventions to affect HTN in Black women must be multifaceted, inclusive of strategies from micro (interpersonal) to macro (local, state, and national) levels (Yancy et al., 2005).

On further exploration of HTN, disparities may be related to either treatment approaches or receptiveness to treatment. Treatment approaches to HTN include antihypertensive medications and lifestyle modifications. Although these approaches have documented effectiveness (Chobanian et al., 2004), about 50% of clients with HTN fail to adhere to the treatment regimen ("Adherence to long-term therapies", 2003). Medication nonadherence is one reason why treatment regimens may fail to control HTN (Bovet, Burnier, Madeleine, Waeber, & Paccaud, 2002; Chobanian et al., 2004; Middleton, 2009; Munger, Van Tassell, & LaFleur, 2007; Schroeder, Fahey, & Ebrahim, 2004; Stanton, 1987; Waeber, 2004). When taken as directed, antihypertensive medications are the most effective treatment for HTN control and are particularly effective with lifestyle modifications such as weight control (body mass index [BMI]18.5-24.9 kg/m^2), healthy diet (rich in fruits, vegetables, low-fat dairy products, restricted sodium, and reduced fats), physical activity (at least 30 minutes of aerobic physical activity such as brisk walking most days of the week), and low alcohol consumption (no more than two standard drinks for men and one standard drink for women per week) (Chobanian et al., 2004). Thus, HTN may be managed effectively

when treatment approaches such as medication therapy and lifestyle modification are employed.

Conversely, receptiveness to treatment approaches is an area that deserves further exploration. It is inconceivable why an individual with HTN may choose not to adhere to treatment regimens since nonadherence could result in chronic debilitating effects such as heart failure, kidney disease, stroke, and coronary heart disease (Chobanian et al., 2004; Munger et al., 2007; Roger et al., 2011; Shea, Misra, Ehrlich, Field, & Francis, 1992; Yancy et al., 2005), all of which could contribute to death from HTN complications (Roger et al., 2011). Understanding why Black women may choose not to adhere to treatment approaches to HTN, such as antihypertensive medication is essential to divert the devastating consequences of HTN.

In an effort to determine effective interventions to manage HTN and avert high morbidity, disability, and mortality rates, it is imperative to clearly understand why adherence to antihypertensive medication is problematic for some Black women and not for others. Although other studies have examined adherence in Blacks with HTN, only one qualitative study (Fongwa et al., 2008) specifically addressed adherence factors in Black women. Few adherence studies in Blacks have been multifaceted (Douglas et al., 2003; Resnick et al., 2009) and none were found that examined the influence of historical and socioeconomic determinants that may affect adherence, especially in Black women. Therefore, research aimed at understanding issues that may positively or negatively influence antihypertensive medication adherence in Black women with HTN is warranted.

Purpose of Study

The purposes of this study were to: (a) describe the differences in adherent and nonadherent Black women who have HTN, (b) examine issues that influence medication adherence, and (c) explore the relationship of reactant behaviors and medication adherence.

Conceptual Framework

In an attempt to integrate the individual nature of each person into a systematic and comprehensive framework that examines multiple determinants of health behavior and their associated outcome, Cox developed the interaction model of client health behavior (IMCHB) (Cox, 1982, 2003; Robinson & Thomas, 2004). The IMCHB originated initially during Cox's work as a nurse practitioner in small rural communities and was composed mostly of Black sharecroppers who did not have many resources (Cox, personal communication, August 4, 2010). As the health care provider, Cox spent a lot of time thoroughly assessing background variables, establishing rapport, and evaluating the client's knowledge base. She found that the clients in these communities were not motivated by their lack of knowledge; therefore, involving the client as a participant in their health care was a key factor. Clients had to have a role in what the health problem was and how to make it right, along with knowledge of the risks involved, knowledge of how they contributed to the risk, and the role they needed to play with risk reduction; thus, ample time was spent clearing up misperceptions, misunderstandings, and misknowledge (Cox, personal communication, August 4, 2010).

When working on interventions to yield positive outcomes, Cox found that her interaction differed from one client to the next in response to the client's affective response, motivation, or cognitive appraisal. For example, the client's affect (fear, anxiety) had to be dealt with before getting to their knowledge base. As she influenced the client, she also found that the client influenced her; hence, mutual influence occurred during the interaction. As a result of their interaction and subsequent interventions, Cox expected to see changes in the client's affective response, motivation, or cognitive appraisal when she saw her clients again in two weeks, and these changes were her cue to proceed to the next step. If there was no change, she had to reassess the background and dynamic variables and start over (Cox, personal communication, August 4, 2010). Thus, interventions were centered on facilitating client health decisions and behaviors to promote positive health outcomes (Cox, 1982).

Cox's IMCHB is a deductive synthesis influenced by the work of four non-nursing health behavior models that were derived primarily from psychological and sociological influences (Cox, 1982). The Rosenstock's health belief model, from a cognitive psychological background, addresses explanations of preventive health and illness behaviors whereby threatening health problems cause people to seek care and make health decisions (Cox, 1982; Matthews, Secrest, & Muirhead, 2008). The Suchman model, derived from a sociological focus, explains client health behaviors based on the influence of sociocultural variables and selected individual characteristics (Cox, 1982; Matthews et al., 2008). The Andersen and Newman model, built on the Suchman and Rosenstock models, adds economic and community resources (Cox, 1982; Matthews et

al., 2008). The self-regulation model, also based on cognitive psychology, explains the

client's ability to process information from various sources and how this information

influences the health care problem and actions to resolve the problem (Cox, 1982).

Cox (1982) noted several shortcomings in these health belief models. First, these

models were not responsive to the multidimensionality and variability in client behaviors

and therefore, were considered to be of little benefit to the clinical practitioner. Second,

these models lacked practical use because they are discipline specific, thus none of the

models represented a holistic view of the client's health beliefs or behavior. Third, all of

the models, except the self-regulation model, evolved from the medical model that

focuses primarily on the physiological and biological aspects of diseases when

diagnosing and treating illnesses. Fourth, these models offered theoretical speculation on

the characteristics of noncompliant clients, rather than more guidelines for interventions.

For some models, the word compliance implied that a client would relinquish their

freewill and choose only behaviors consistent with the goals established by the health

care provider, neglecting the individualistic nature of today's clients (Cox, 1982).

The IMCHB is representative of the individualistic nature of the client, while

responding to the multidimensionality and variability in client behaviors, thus

encompassing a holistic view of the client. Clearly delineated in the model is the nursing

process that depicts the nurses' role in the provision of nursing care, meeting client needs

with nursing interventions, and effecting client health outcomes resultant from the

nursing care experience (Cox, 1982; Cox & Roghmann, 1984). As a result, the IMCHB

aids in the understanding of "what nursing is" and "what nursing does" (Cox, 1982, p.

54). However, the comprehensiveness of the model expands beyond the boundaries of nursing, making it applicable to professional health care providers in various health care settings (Cox & Roghmann, 1984; Matthews et al., 2008).

The complexity and comprehensiveness of the model allows for the study of multiple variables, making it ideal for working with complex contributing factors and health behaviors, especially those that obscure the understanding of disorders such as HTN. In essence, the IMCHB creates a solid platform for the study of Black women with HTN because they have an array of complex physical, psychosocial, and environmental factors that further complicate HTN. In fact, HTN is a multifactorial disorder, and this model offers support to the multifaceted nature of the treatment process (Gutierrez & Peterson, 2007). In addition, the model sheds light on the limited success of adherence interventions and gives some credence to the high prevalence of HTN in Black women (Douglas et al., 2003). Thus, the complexity of HTN with its multiple contributing factors and health behaviors requires a model such as the IMCHB to provide a structure to gain insight into the nature of these occurrences. Because Blacks informed the origins of the model, the model's concepts fit the multifaceted nature of their health behaviors well (Cox, personal communication, August 4, 2010). Thus, the IMCHB is relevant to the care of Black women with HTN and has implications for both clinical practice and nursing research (Cox, 1982; Cox & Roghmann, 1984).

Major Elements

Cox's IMCHB (1982) was used to guide this study (see Figure 1). The three major elements in the IMCHB are: client singularity (background and dynamic variables

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unique to an individual), client-professional interaction, and health outcome. As the

primary objective, the IMCHB purports to identify and explain relationships between the

three major elements (Cox & Roghmann, 1984). The crux of the model is the interaction

between the interrelationship of the client's singularity (background and dynamic

characteristics) and the health care providers' interventions to produce desired health

outcomes (Cox, 1982).
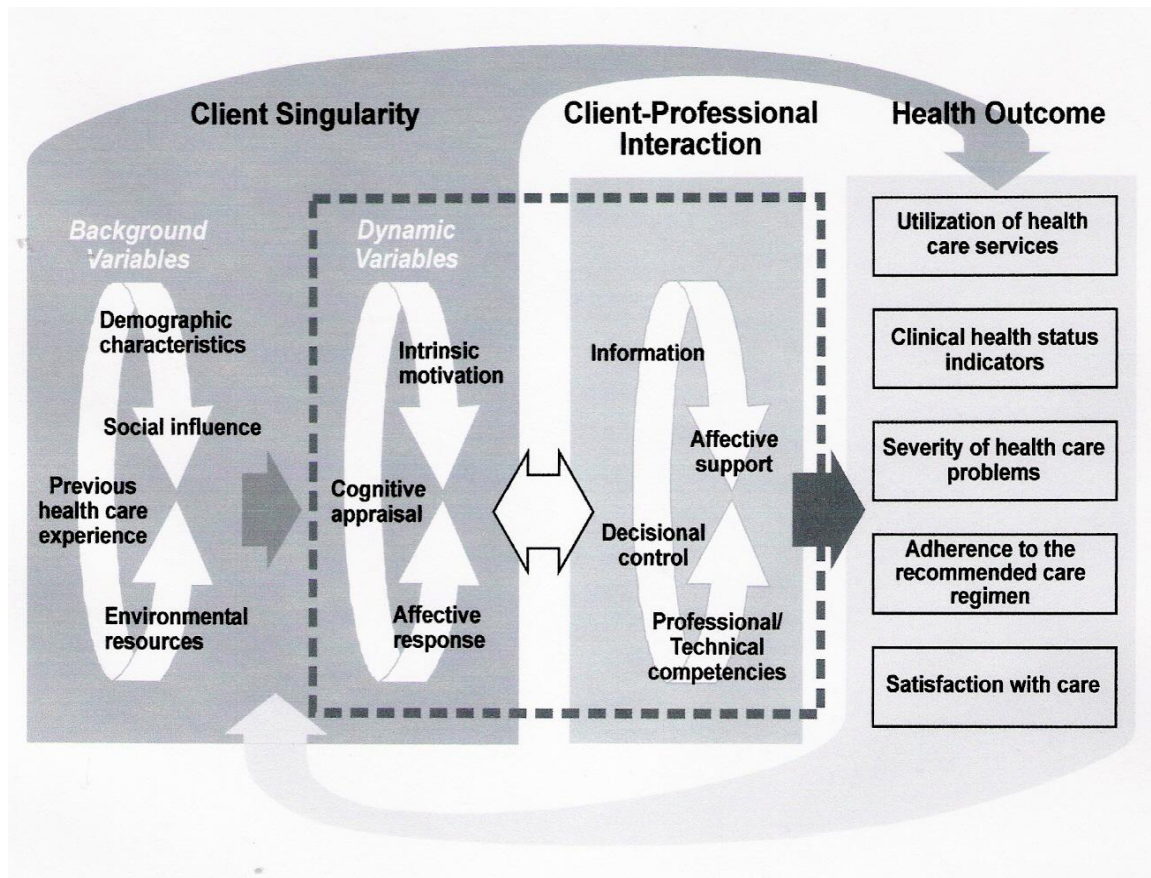
Figure 1. The Interaction Model of Client Health Behavior.
From "A model of health behavior to guide studies of childhood cancer survivors", by Cox, 2003, *Oncology Nursing Forum, 30*(5), p. E92-E99. Copyright 2003 by Oncology Nursing Society. Reprinted with permission.

Basic assumptions. Intrinsic to the IMCHB are several assumptions: (a) the client has the ability to make his or her own health care choices and subsequent health behaviors (Carter & Kulbok, 1995; Cox, 1982); (b) most client health behaviors are voluntary whereby clients choose to engage in positive or negative behaviors based on their personal goals (Cox & Wachs, 1985); (c) the responsibility of care remains the client's responsibility; (d) clients should exert control over determining optimal health for themselves and the actions necessary to attain their health status according to their

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environmental limitations; and (e) the client and health care provider's perceptions of reality may differ, but the client's perception dominates in his or her life (Carter & Kulbok, 1995; Cox, 1982).

Element of client singularity. Client singularity, the first element, defines the individuality of the client and reflects holism. Singularity addresses the client's interaction with his or her background variables that include demographic characteristics (e.g. gender, age), client social group influence (e.g. culture, religion, social network), previous health care experiences (e.g. health history, objective health data), and environmental resources (e.g. finances, access to health care) (Cox, 1982, 1986, 2003). These variables are highly predictive of health behaviors because of their interactive nature: They do not occur in isolation and remain virtually unchanged during the client-provider relationship (Cox, 1982).

The element of client singularity also includes dynamic variables. The dynamic variables are amendable to influence during the client-provider relationship and include intrinsic motivation, cognitive appraisal, and affective response (Cox, 1982). While intrinsic motivation varies for individuals and health situations, it represents free choice and the need to be self-determined and competent in health behaviors (Cox, 1982; Cox & Wachs, 1985). Intrinsic motivation may explain reasons for nonadherence in individual clients and may also predict why some clients adhere to health care interventions while others do not (Troumbley & Lenz, 1992). Cognitive appraisal reflects knowledge, beliefs, and values that aid in the client's perception or interpretation of their current health state. Affective response relates to the client's emotional arousal, for instance stress, that may

have the capacity to affect cognition and behavior (Cox, 1982). The client's decision-making process about health behaviors may be affected by their background variables. Thus, it is the resultant choices, not the background variables, that influence health outcomes and become goals for nursing interventions (Cox & Wachs, 1985; Marion & Cox, 1996). Being able to examine numerous background variables and the choices made as a result of the variables will provide insight into nonadherent behaviors in Black women with illness such as HTN.

Element of client professional interaction. The second element, a major influence on the client's health care behavior and health outcomes, is the client-professional interaction. Proposed as a prescriptive theory for nursing, the IMCHB was designed to prescribe activities to bring about desired outcomes (Carter & Kulbok, 1995; Cox, 1982). The four components of the interaction that impact outcomes include provision of health information, affective support, decisional control, and professional technical competencies. How the client uses health information is dependent on other factors such as singularity, relationship with the health care provider, and client perceived control. Affective support addresses the affective response to keep emotions intact so a cognitive appraisal process of health information can occur. Decisional control relates to the client's participation in health care decisions and is dependent on adequate cognitive, motivational, informational, and affective responses to obtain desirable results from decision-making. The last component, the technical skills of the health care provider (intravenous therapy, BP monitoring, medication administration), decreases as the client'

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health status improves and the client is able to increase their ability to process information and make decisions for themselves (Cox, 1982).

The model includes a nonrecursive block that "demonstrates a multidirectional causal flow with feedback mechanisms that suggest the mutual influence of one set of elements on another" (Cox, 1982, p. 47); predominately, the dynamic variables in the elements of client singularity and the elements of client-professional interaction (Cox, 1982). In the model, health outcomes are determined by the reciprocal interactions between the client and health care provider related to client health concerns (Cox & Roghmann, 1984).

Element of health outcome. The final element, health outcome, reflects the client's health results based on behavior. The five outcome variables include utilization of health care services, client health status indicators, severity of health care problem, adherence to the recommended care regimen, and satisfaction with care. Each outcome variable differs in meaning dependent on the objectives of the research study. For instance, utilization of the emergency room for a symptomatic BP greater than 180/110 is a positive health behavior that maintains or promotes a client's health status; conversely, failure to adhere to the BP treatment regimen is considered a negative behavior that reflects risky activities such as nonadherence to antihypertensive medications. Traditionally, while multiple health outcomes are examined in practice, Cox (1982) advocates one health outcome variable as the focus of an investigation.

For this study, client singularity and health outcome elements were the main focus. Specifically, this study addressed the extent to which client singularity

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(background and dynamic variables) predict the health care outcome of medication

adherence (See Figure 2).
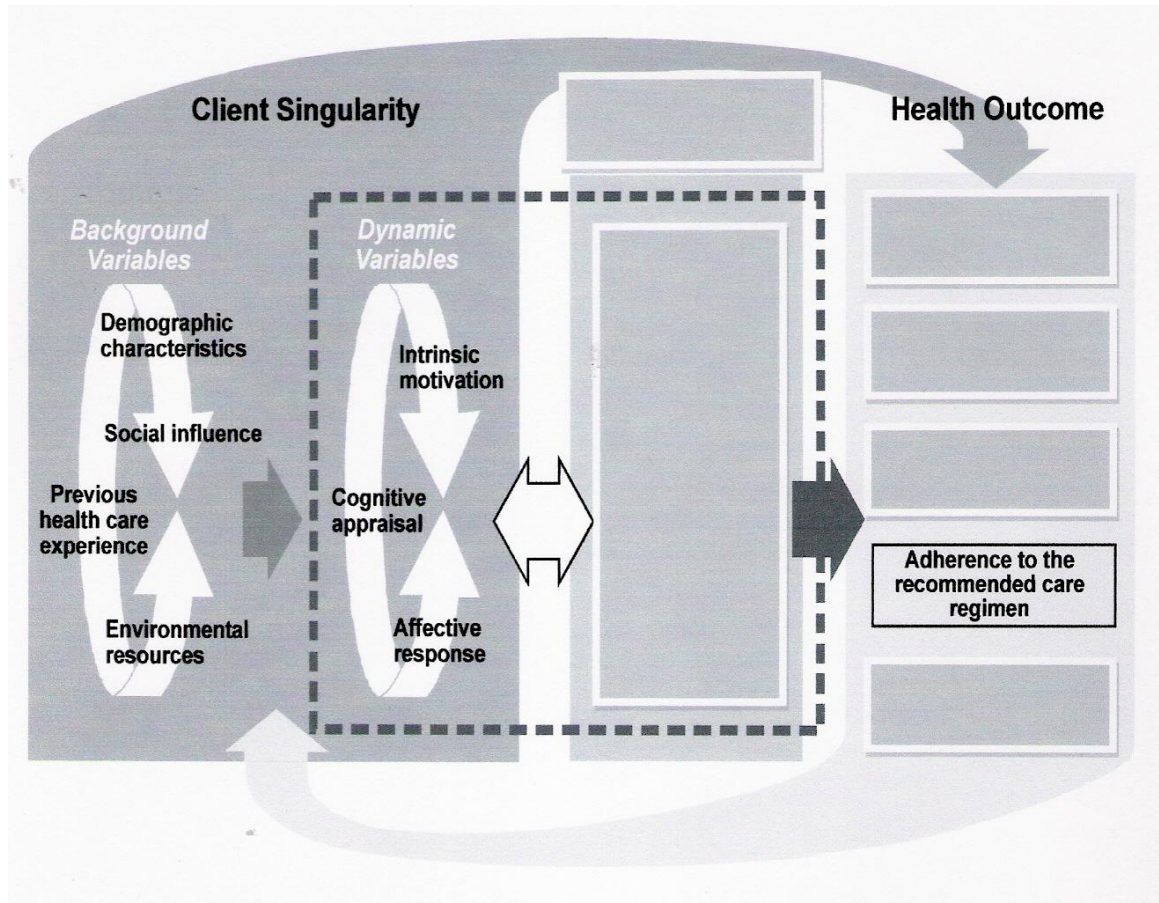
Figure 2. Conceptual Guide to Predict Black Women's Medication Adherence Behaviors. Adapted from the interaction model of client health behavior (Cox, 2003).

Included in the background variables were demographic characteristics (age and

education), social influence (religion), previous health care experience (family history of

HTN, comorbidities, number of medications, BP, and BMI), and environmental resources

(income and type of health coverage). Dynamic variables included intrinsic motivation

(reactance), cognitive appraisal (HTN knowledge, self-care of HTN, trust in health care

provider, and coping), and affective response (perceived racism and depression). The health outcome, medication adherence, was assessed in relation to these variables.

Definitions

1. Demographic characteristics: Demographic characteristics are the variations in attributes of the sample population operationalized as age and education.

    a. Age: The age of the participants was self-reported on the demographic form. For the sample population, the age range in this study was 18 to 60, and was consistent with the rationale of James (1996) when describing active coping. Centered on employment and career goals, active coping is thought to increase around age 18 and diminish around age 60.

    b. Education: Education is an ongoing process of acquiring formal and informal knowledge or skill that occurs throughout the lifespan.

2. Social influence: Social influence is the effect that thoughts and actions of an individual or group have on other people operationalized as religion.

    a. Religion: Religion is the belief, worship, obedience, and reverence to a supernatural power such as God.

3. Previous health care experience: Previous health care experience is an individual's prior exposure to a health care provider in a health care system operationalized as family history of HTN, comorbidities, number of medications, BP and BMI.

    a. Family history of HTN: Family history of HTN is part of a client's medical history where inherited tendencies from direct blood relatives toward HTN are identified.

b. Comorbidities: Comorbidities are the presence of two or more diseases at the same time.

c. Number of medications: Number of medications is the quantity of prescribed and over-the-counter medications an individual consumes.

d. Blood pressure: BP greater than or equal to 140/90 is defined as hypertension (Chobanian et al., 2004). BP is the calculated mean systolic BP and mean diastolic BP determined by averaging the two BP measurements obtained during the interview.

e. Body mass index: BMI is the relation of an individual's weight to their height to determine underweight, normal weight, and overweight categories and disease risk calculated as weight in kilograms divided by height in meters squared also expressed as weight (kg) / [height (m)]^2

4. Environmental resource: Environmental resource is the study participants' personal resources (Cox, 1982) and was operationalized as income and type of health coverage.

a. Income: Income is the annual wages and earnings reported by the study participant.

b. Type of health coverage: Type of health coverage refers to the primary entity that provides resources for health care services as reported by the study participant.

5. Intrinsic motivation: Intrinsic motivation is an individual's choice, desire, and need for competency and self-determinism with respect to the environment (Cox, 1982; Cox & Wachs, 1985) operationalized as reactance.

   a. Reactance: Reactance is the motivational arousal to re-establish freedom when behavioral freedom is lost, reduced, or threatened with reduction (J. W. Brehm, 1966). For this study, reactance was defined by the score on the 28-item Therapeutic Reactance Scale (Dowd, Milne, & Wise, 1991).

6. Cognitive appraisal: Cognitive appraisal is an individual's knowledge, beliefs, and attitudes toward his or her illness and treatment (Cox, 1982, 2003) and was operationalized as HTN knowledge, self-care of HTN, trust in health care provider, and coping.

   a. Hypertension knowledge: Hypertension knowledge is an individual's basic understanding of high BP cause and prevention. Knowledge was determined as the score on the 12-item High BP Prevention Questionnaire ("Check your high blood pressure", 1994).

   b. Self-care of hypertension: Self-care of HTN is an individual's naturalistic decisions that reflect his or her choice of behaviors in the maintenance and management of their BP (Riegel, Lee, Dickson, & Carlson, 2009). In this study, self-care of HTN was determined by the score on the 24-item Self-Care of Hypertension Index (Riegel et al., 2009).

   c. Trust in health care provider: Trust in health care provider is the belief that a health care provider's words and actions are trustworthy and can be relied

upon. In this study, trust was defined by the score on the 11-item Trust in

Physician Scale (Anderson & Dedrick, 1990).

    d. Coping: Coping is an individual's psychological and physiological responses

to prolonged exposure working with difficult psychosocial and environmental

stressors. In this study, coping was measured by the score on the 12-item John

Henryism Active Coping Scale (James, 1996).

7. Affective response: Affective response is the emotional arousal in an individual that

can interfere with cognitive activity and affect behavior (Cox, 1982) operationalized

as perceived race-related stress and depression.

    a. Perceived race-related stress: Perceived race-related stress is the subjective

experience of prejudice or discrimination that encompasses beliefs, attitudes,

institutional arrangements, and acts that tend to denigrate individuals or

groups because of phenotypic characteristics or ethnic group affiliations (R.

Clark, Anderson, Clark, & Williams, 1999). For the purpose of this study,

racial-related stress was determined by the score on the 22-item Index of

Race-Related Stress-Brief Version.

    b. Depression: Depression is an individual's depressed mood exhibiting sadness,

hopelessness, and discouragement or a loss of interest in previous pleasurable

activities characterized by changes in appetite, altered sleep pattern, impaired

thinking, and decreased physical functioning (*Diagnostic and statistical

manual*, 2000). In this study, depression was defined as a score of greater than

or equal to 5 on the nine-item Patient Health Questionnaire-9 indicating mild to severe depressive symptoms (Kroenke, Spitzer, & Williams, 2001).

8. Health outcome: Health outcome is the health status that results from the client's health behavior (Cox, 1982) toward the prescribed HTN medication regimen operationalized as medication adherence.

   a. Medication adherence: Medication adherence is the self-report of an individual's medication-taking behavior. For this study, adherence was measured by the score on the 14-item Hill-Bone Compliance to High Blood Pressure Therapy Scale (M.T. Kim, Hill, Bone, & Levine, 2000).

Specific Aims and Research Questions

The specific aims and associated research questions are:

1. Describe Black women who adhere to antihypertensive medication treatment and those who do not adhere.

   Q1: Are there differences in background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage) in Black women who adhere to antihypertensive medication treatment as compared to Black women who do not?

2. Examine the influence of background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage), and dynamic variables (HTN knowledge, self-care of HTN, trust in health care provider, coping, perceived racism, and depression) on medication adherence in Black women with HTN.

Q2. Are the background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage) and dynamic variables (HTN knowledge, self-care of HTN, trust in health care provider, coping, perceived racism, and depression) associated with medication adherence in Black women with HTN?

Q3. Do the background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage), and dynamic variables (HTN knowledge, self-care of HTN, trust in health care provider, coping, perceived racism, and depression) predict medication adherence in Black women with HTN on an ordinal scale?

3. Explore the relationship between reactant behaviors and antihypertensive medication adherence in Black women.

Q4. Is there a relationship between reactant behaviors and medication adherence in Black women with HTN?

Assumptions

Several assumptions support the underpinnings of this study. First, according to the IMCHB, choices related to health behavior reflect self-will. Secondly, with the theory of psychological reactance, individuals want freedom to make their own choices and any interference whether positive or negative, interferes with their freedom to choose. The third assumption is that the concepts of reactance, knowledge, self-care of HTN, trust, coping, perceived racism, depression, and adherence can be quantified. Finally, the last

assumption is that answers to questions on instruments, tools, and scales reflect honest and accurate responses from participants and thus, represent reality or truth.

Summary

The purpose of this study was to describe the characteristics of Black women who are adherent versus nonadherent to antihypertensive medication treatment and examine issues that influence medication adherence. In addition, this study explored the relationship between reactant behaviors and medication adherence. Cox's IMCHB was used to guide this study. Results of this study will assist researchers to identify issues that influence adherence to antihypertensive medications and determine the impact of reactant behaviors on medication adherence in hypertensive Black women. The findings will provide important information for health care providers regarding issues and behaviors most likely to affect adherence to antihypertensive medications and become the impetus for purposefully designed interventions targeted toward those with the greatest burden of HTN, Black women.

CHAPTER II

LITERATURE REVIEW

Introduction

Several concepts in the literature have been used to describe the client's willingness or unwillingness to follow the prescribed treatment regimen, particularly medication-taking. Frequently used synonymously, compliance, adherence, and concordance are three concepts with different meanings. The historical and current interchange of these concepts in health care creates confusion and ambiguity (Bissonnette, 2008; Lehane & McCarthy, 2009). Ideally, conceptual frameworks or models are used to integrate concepts into a meaningful configuration (Fawcett, 1999). However, no conceptual frameworks or models were found that consistently explain or predict any of the three concepts, thus contributing to a plethora of confusion surrounding these concepts. While scholars and researchers continue to debate and explore these concepts, the lack of adherence to medication regimens has become a major crises in the United States and worldwide ("Enhancing prescription medicine adherence", 2007). One disorder, hypertension (HTN), is adversely affected by medication adherence issues and contributes to increased morbidity, disability, and mortality (Roger et al., 2011). Therefore, it is imperative that scholars agree on common terminology and address the barriers that influence client medication adherence ("Enhancing prescription medicine adherence", 2007), especially for those with HTN.

This literature review focuses on conceptual views of adherence and provides an overview of medication adherence and HTN. In addition, selected components of Cox's interaction model of client health behavior (IMCHB), elements of client singularity (background and dynamic variables) and health outcome, are explored. Cox's IMCHB provides the conceptual framework for client characteristics that may predict adherence to the recommended medication regimen.

Conceptual Views on Adherence

Brawley and Culos-Reed (2000) proclaim that no distinct conceptual model exits for adherence and that while several health belief models have attempted to predict compliance/adherence, including the Pender's Health Belief Model (Hwang, 2010), results have been inconsistent and do not account for large amounts of variance in health outcomes. According to Gearing and Mian (2005), no single model assimilates all the constructs underpinning adherence nor is applicable to every client and their specific illness and associated contexts. This lack of a model is concerning since adherence is viewed as one of the most serious problems facing health care today (Becker, 1985; Middleton, 2009).

Examining three concepts, compliance, adherence, and concordance, assist in determining which concept is most suitable for use in nursing research and clinical practice. The first concept, compliance, is defined as the extent the client's behavior matches the health care providers' recommendations (Haynes, 1979). Compliance implies passive subordination to an order and suggests blame for failure to comply with treatment (Haynes, 1979). Further delineated, compliance infers that the client is a

passive recipient of paternalistic orders from the health care provider in the same manner as when the law commands obedience. According to Evangelista (1999), use of the concept compliance leaves the client little choice or power to make decisions regarding his or her health status and sets the stage for a power relationship between the client and health care provider, whereby all power rests with the health care provider. Because clients should be active participants in his or her health care and more credence should be given to the client's perspective of his or her health problem (Evangelista, 1999), focusing on the client's perspective of the costs and benefits of the health regimen is essential to implementing a plan the client is willing to follow.

Adherence, the second concept, is defined as the extent the client's behavior matches agreed recommendations made by the health care provider (Barofsky, 1978). Hearnshaw and Lindenmeyer (2005) conducted a literature review to identify and categorize definitions and measurements of adherence in diabetic populations. Unfortunately, they noted various definitions of adherence that lacked clarity. The chronicity of many diseases require adherence to the recommended health regimen to ensure a reasonable quality of life with lifestyle changes and medications. Therefore, a clear definition of adherence is imperative to achieve positive health care outcomes in chronic diseases such as diabetes and HTN.

Defining adherence is important and would contribute to a consistent measurement of the concept. Based on a review of 26 papers, Hearnshaw and Lindenmeyer (2005) assigned five categories of adherence definitions. Three of the categories addressed aspects of medication-taking behavior such as the agreement of

client behavior with health care provider advice, evaluation of outcome and process

targets, and taking the medication as prescribed. Client and health care provider

relationships were the focus of the fourth category. Lastly, the final category addressed

the interconnection of adherence with client motivation, health beliefs, and perceived

self-efficacy. These categories captured the complexity of adherence and attest to the fact

that adherence is difficult to simplify into a single definition. Defining adherence as it

relates to complex treatment, lifestyle living, and counsel is difficult because of the need

for: (a) individualization; (b) multiple components such as diet, medication, and exercise;

(c) varying components over time; (d) adherence difficulties for different components;

and (e) the necessity to pre-specify the exact aim of the intervention (Hearnshaw &

Lindenmeyer, 2005). In a concept analysis on adherence, Bissonnette (2008) concluded

that a definition of adherence that uses a client-centered approach and reflects the

dynamic nature of adherence behavior remains elusive in the literature. One reason for

the indefinable aspect of the concept adherence is that its complexity lends itself to a

multifaceted process that is not confined to a common meaning, thus confusion and

ambiguity exist reflective of poorly understood health outcomes in nursing research and

practice.

After identifying the definition categories of adherence, Hearnshaw and

Lindenmeyer (2005) categorized the measurements of adherence according to the

definitions. Because the definition of adherence was oftentimes missing or not explicitly

defined, adherence was difficult to measure. Thus, defining and measuring adherence was

complicated because of the multifaceted nature of chronic disease and its treatment as it

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progresses over time (Hearnshaw & Lindenmeyer, 2005). This review of the literature concluded that measurements of adherence are oftentimes not based on a definition, and thus, the measurement instruments for adherence in many studies were not validated.

Because adherence emphasizes the client's freedom to decide if they will or will not follow the health care provider's recommendation, no blame is associated with the client's decision not to follow recommendations (Barofsky, 1978; Horne, Weinman, Barber, Elliott, & Morgan, 2005). With adherence, the clients' decision to follow a prescribed health regimen becomes a shared responsibility between the client and health care provider by eliciting the client's cooperation through dialogue to understand the client's perspective about his or her condition and how it affects their life (DiGiacomo, 2008). Through open communication, the health care provider and client are able to identify reasons for nonadherence that may contribute to solutions that positively impact adherence (Lutfey & Wishner, 1999). When successful, adherence is viewed as a method that produces long-term lifestyle changes. As an example, long-term weight loss requires a lifestyle of adherence, and those who are most successful partner with weight loss programs such as weight watchers, that provide lifelong education and support (Chiappetta, 2008). Similarly, clients with HTN must collaborate with health care providers to obtain education, support, and monitoring of blood pressure (BP), lifestyle changes, and antihypertensive medications to ensure positive health outcomes. Thus, adherence rather than compliance, would be an appropriate concept for clients with HTN (Chobanian et al., 2004), especially Black women.

Use of the concept adherence removes some of the accusatory tone inherent in the concept compliance. Some may argue that the difference in the two concepts is a matter of academic semantics: However, the goal of using adherence instead of compliance is to improve the relationship between the client and health care provider, creating a more favorable work environment (Singleton, 2008). Adherence and compliance differ because the concept compliance suggests a passive client role that hinders the establishment of a working relationship with the client. In the literature, researchers have exchanged the concept compliance for adherence because it infers a positive connation and working relationship between the client and health care provider. In summary, the relationship in adherence emphasizes: (a) the necessity of an agreement between the client and health care provider, (b) the client's freedom to decide whether or not to adhere to the recommended health regimen, and (c) no blame if the client fails to adhere the health care provider's recommendations (Horne et al., 2005).

The last concept, concordance was coined after a partnership developed between the Royal Pharmaceutical Society of Great Britain and Merck & Dohme pharmaceutical company (Cushing & Metcalfe, 2007; Marinker, 2004). Concordance is defined as an agreement between the client and health care provider that is negotiated based on the beliefs and wishes of the client as to how medications are taken with importance given to the client's decision (Marinker, 1997; Thompson, 2000). The concept concordance addresses the extent, cause, and consequences of non-compliance (Marinker, 2004) that result in nontherapeutic doses to prescribed medications (Marinker, 1997). Using a consultation approach, the client has expertise of his or her body's response to illness and

treatment, and the health care provider is the scientific expert in medications (Weiss & Britten, 2003). An understanding and respect for the client's view is the central focus.

As equal partners of concordance, the health care provider and client negotiate an agreed plan of care inclusive of both their views. Ultimately, the client decides if he/she will or will not take medications. When disagreements occur, the health care provider bears the responsibility of offering future discussions if the client chooses to address the issue (Marinker, 2004). Pound and colleagues (2005) assert that because most clients self-regulate prescribed medications, it would be safer if health care providers accepted this practice and guided them through the process. The authors (Pound et al., 2005) advocate concordance as the mechanism to help clients test and modify prescribed medications while given sufficient information, feedback, and guidance from healthcare providers. With concordance, clients would be partners and make informed decisions about prescribed medication regimens. Pounds et al. (2005) recognized that concordance may not be ideal for all clients such as those with HIV or poor mental health. In addition, concordance may not be best for clients with HTN who need to maintain BP levels within an acceptable range to preserve major body organ functioning, especially when lifestyle changes have not been effective (Chobanian et al., 2004).

Implementing adherence closely resembles concordance by the health care provider when involving the client through collaboration and dialogue. Yet, one major contrast between the two is the ability for negotiation in concordance (Aronson, 2007; Lehane & McCarthy, 2009). Physicians argue that a negotiated agreement is not relevant in interactions with clients because a definitive diagnosis leaves no room for negotiation

(Aronson, 2007). Other concerns center on the lack of clinical evidence of the benefits and harms of concordance. To date, there is no specific research study that test the benefits of concordance; instead, research describes achieving, promoting, improving, and enhancing concordance (Aronson, 2007; Lehane & McCarthy, 2009).

Another major problem with the term concordance is that it focuses on the interaction with the health care provider and the partnership rather than the actual client behavior, specifically medication-taking (Horne et al., 2005; Lehane & McCarthy, 2009). In contrast, both adherence and compliance describe individual client behavior. In essence, the main issue with taking medicine is the client's individual behavior and the degree to which that behavior does or does not match the prescribed treatment regimen (Horne et al., 2005). In fact, the National Health Service in Great Britain who coined the term concordance, now advocates adherence as the term of choice to describe the client's medication-taking behavior (Horne et al., 2005).

Of the three concepts, Lehane and McCarthy (2009) purport that adherence is the most appropriate concept for nursing research and clinical practice. Adherence implies the ability of clients to stick to prescribed treatment regimens and follow recommended instructions (Bissonnette, 2008; Buchmann, 1997). In addition, adherence refers to a steady or faithful attachment or fidelity, implying loyalty, devotion, and commitment (Chiappetta, 2008; Evangelista, 1999). The factors that change adherence to nonadherence are related to client choice and therefore, not completely understood. As a component of human behavior, adherence is complex, multifaceted, challenging, and influenced by social, psychological, and environmental contexts (Bissonnette, 2008).

Therefore adherence behaviors deserve further research to identify factors that may

predict adherence and nonadherence while ultimately informing practice interventions.

Of great concern is the lack of understanding of medication adherence in those with

HTN, especially since antihypertensive medications have proven efficacy in lowering BP

(Chobanian et al., 2004; Fongwa et al., 2006; Mabotuwana et al., 2009; Martins et al.,

2001). Therefore, an understanding of medication adherence issues in clients with HTN is

vital to achieving effective interventions that produce positive health outcomes,

especially for Black women.

Medication Adherence in Clients with HTN

Adherence to medication-taking has been the subject of research in clients with

HTN for more than 30 years (Hill, Miller, & DeGeest, 2010). Findings reveal that many

clients with HTN who seek health care do not successfully adhere to prescribed

antihypertensive medications ("Healthy people 2010"; L. M. Lewis, Askie, Randleman,

& Shelton-Dunston, 2010; Ndumele, Shaykevich, Williams, & Hicks, 2010), despite

goals to influence client health behaviors to achieve positive health outcomes (Singleton,

2008). Surprisingly, only about 50% of those prescribed antihypertensive medications

continue treatment after one year (Hill et al., 2010). Even with advances in medical

technology and client centered approaches to health care, the nonadherence problem

remains unsolved ("Enhancing prescription medicine adherence", 2007; Kaufman &

Birks, 2009).

To achieve success in BP control for clients with HTN, many lifestyle changes are

required including weight control, healthy diet, physical activity, low alcohol

consumption, and smoking cessation (Chobanian et al., 2004; Flack et al., 2010). Adherence to the prescribed antihypertensive medication regimen may be another lifestyle alteration. A combination of lifestyle changes along with antihypertensive medications taken as directed are the most effective treatment for BP control (Chobanian et al., 2004).

Adherence to the treatment regimen has been positively affected by factors such as satisfactory client-provider interactions, social support systems (Chobanian et al., 2004; Flack et al., 2010), health education with multiple intervention strategies, self-management of HTN, and support in managing HTN (Connell, Wolfe, & McKevitt, 2008). Several research studies have further identified that adherence to the antihypertensive medication regimen was associated with decreased morbidity and mortality for individuals diagnosed with HTN (Dragomir et al., 2010; L. M. Lewis & Ogedegbe, 2008). Poor medication adherence, especially in Blacks, may provide an explanation for racial disparities in BP control between Blacks and Whites (Dickson & Plauschinat, 2008; Gerber, Cho, Arozullah, & Lee, 2010; L. M. Lewis & Ogedegbe, 2008). Despite adherence research, medication-taking behavior is not well understood and no interventions targeting antihypertensive medication adherence have produced reliable, long-term results (L. M. Lewis & Ogedegbe, 2008). Therefore, a significant gap remains in the science concerning adherence to the treatment regimen in persons with HTN, especially medication-taking.

<center>**Elements of Client Singularity**</center>

Background Variables

   The IMCHB provides a foundation for holistic client care and offers a theoretical framework for understanding poor adherence to health treatment regimens for Black women with HTN. The IMCHB is operationalized using two of the major elements, client singularity and health outcome (Cox, 1986). The elements of client singularity have two components, background and dynamic variables. The first component, background variables, addresses environmental and sociological determinants of behavior that contribute to definitive predictions about health care behaviors (Cox, 1982). Background variables encompass multiple external attributes pertinent to the unique nature of individuals. The background variables of interest unique to this study included demographic characteristics, social influence, previous health care experience, and environmental resources.

   Demographic characteristics. Two demographic characteristics significant to Black women with HTN are age and education. Typically HTN increases with age (Chobanian et al., 2004), but for Blacks, HTN tends to occur earlier in life with greater severity and more organ damage when compared to Whites (Chobanian et al., 2004; Nesbitt & Victor, 2004; Roger et al., 2011). Thus, morbidity, disability, and mortality are frequent consequences of HTN, especially when diagnosed at an early age. In addition, HTN is more prevalent in Blacks who have lower educational levels that contribute to the likelihood of lower income levels (Roger et al., 2011). Thus, lower socioeconomic status

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(low educational and income levels) and the daily stressors associated with it may predispose individuals to HTN (Chaix et al., 2010; James, 1996; R. B. Williams, 2010).

Age. Individuals with the highest rate of HTN tend to be middle aged or older (Roger et al., 2011). If we are able to predict issues that influence adherence to the treatment regimen in younger aged hypertensive clients, then we may impact HTN control in the middle aged. The same could hold true in predicting issues that influence adherence to the treatment regimen in middle aged hypertensive clients and possible HTN control in older clients. This study identified factors that predicted adherence to the treatment regimen in younger and middle aged Black women that could improve HTN outcomes in middle and older adults and contribute to longer life spans without increased morbidity, disability, and mortality.

In the 18-39 age group, the prevalence of HTN increases with age 7%, as compared to 30% in the 40-59 age group and 67% in the 60 and older age group (Ostchega, Yoon, Hughes, & Louis, 2008). If risk factors for cardiovascular disease (CVD) such as HTN can be prevented or managed, then the probability of survival to 85 years of age increases without major comorbidities. However, if CVD risk factors are present during middle age, the predicted probability of survival to age 85 decreases significantly (Terry et al., 2005). According to the United States Census' 2010 Statistical Report ("Projected life expectancy", 2009), none of the racial ethnic groups in the United States experience an average life expectancy of 85 years. Blacks experience the lowest average life expectancy (73.8 years overall, 70.2 for males and 77.2 for females) as compared to Whites (78.9 years overall, 76.5 for males and 81.3 for females).

Surprisingly, Hispanics reported the highest average life expectancy (81.1 years overall, 78.4 for males and 83.7 for females). Thus, the age range of 18 to 60 in the sample population in this study could be an opportune age for identifying HTN adherence issues and eventually contribute to the institution of appropriate interventions to ensure positive health outcomes in middle and old age.

Education. Based on data collected from the American Community Survey and the Current Population Survey, the 2007 United States Census Bureau (Crissey, 2009) reported lower educational attainment for Blacks and Hispanics when compared to Whites and Asians on all educational levels. For instance, lower high school completion rates were noted for Blacks (80%) and Hispanics (61%) when compared to Whites (89 %) and Asians (86%). In addition, completion of a college degree was lower for Blacks (17.3%) and Hispanics (12.5%) than Whites (30.5%) and Asians (49.5%). The same trend was true with lower percentages of advanced degrees for Blacks (5.8%) and Hispanics (3.9%) than Whites (11.3%) and Asians (19.6%) (Crissey, 2009). According to Roger et al. (2011), the highest rates of HTN are noted in individuals who are less educated. However, this statement does not hold true for Hispanics who have the lowest educational attainment, but the prevalence rate of HTN in Hispanic men (25.9%) is lower than Black (43%) and White (34.4%) men ("Men and cardiovascular diseases", 2010). Similarly, HTN prevalence rates for Hispanic women (31.6%) are lower than Black women (44.8%) but about the same as White women (31.1%) ("Women and cardiovascular diseases", 2010). Thus, the association between low educational

attainment in Blacks and HTN may be coupled with unknown factors not evident in Asian, White, or Hispanic populations.

      Social influence. The cultural heritage of Blacks was thought to be lost because Africans were brought to the United States from many different parts of West Africa with diverse languages, religions, customs, and institutions that were subjugated during slavery. Levine (1977, p. 4) writes that the culture Africans possessed was tangible and could not be lost because it was their "style of life." He further described culture as a process that is not fixed but interacts with the past and present. For Africans, culture was expressed in various methods such as music, song, dance, folktales, spirituality, folk medicine, magic, superstition, kinship, and fictive kinship family bonds. Many of these cultural expressions continue to be evident in the lives of Blacks today, especially spirituality.

      The church is a group of persons with beliefs that influence and inform its member's lifestyles. Through the historical legacy of slavery and oppression, Blacks have found peace and inner strength in the church that has helped them withstand insurmountable hardships (Chang, 2004, August). Spirituality became vital to survival of Blacks and played a significant role in their ability to transcend and transform horrific experiences (L. M. Lewis & Ogedegbe, 2008) of slavery and oppression. Thus, Blacks' strong affiliation to the church has endured for centuries. As a result, Blacks are regarded as the most religiously devout group of all ethnic/racial groups in the United States (Vu, 2009, February).

Religion. Spirituality and religion are separate but related concepts. Spiritually denotes an inner freedom to engage in faith, while religion refers to the outward adherence to highly prescribed beliefs and rituals. Both concepts relate to the reliance, trust, and faith in a higher being, such as God (L. M. Lewis & Ogedegbe, 2008). Lewis and Ogedegbe (2008) proposed a conceptual model of spirituality and medication adherence to guide the development of spiritually based interventions to improve adherence to medication therapy. This model purports that spiritually based interventions could be used to eradicate key barriers to medication adherence (L. M. Lewis & Ogedegbe, 2008). Yet, no correlation was found between spirituality and medication adherence in heart failure clients (Black, Davis, Heathcotte, Mitchell, & Sanderson, 2006). Black et al. (2006) assert that many clients are becoming more concerned about spiritual issues since they are living longer with chronic diseases such as heart failure and HTN. Despite client concerns, spiritual needs are rarely recognized by health care providers although they claim to provide holistic health care (Black et al., 2006). Thus, religious activity and spirituality are concepts that deserve further exploration in nursing research and clinical practice.

According to Gillum and Griffith (2010), religious activity contributes to positive health outcomes in several ways that include providing social support, regulating health behaviors, promoting healthy beliefs, and generating positive emotions. Hence, religious activity is thought to reduce the emotional impact of stress and depression while enhancing coping abilities. Particularly, social support preserves the continuity of positive health behavior and is associated with cooperation and self-care that is essential

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for treatment of chronic diseases such as HTN (Naewbood, Sorajjakool, & Triamchaisri, 2010, March). Although the health benefits of religious activity are encouraging, unfortunately, many Blacks have not experienced positive health outcomes in relation to chronic diseases.

High levels of religiosity have been associated with lower BP. Using data from NHANES III, a large data set (N=12,488) was analyzed to compare those who attend religions services weekly or more often to those who never attend services. Results revealed lower odds of HTN among Whites and Blacks, particularly Black women, while no relationship was noted between attendance and HTN for Hispanics (Bell, Bowie, & Thorpe, 2010). Similarly, religiosity was found to have a positive association between lower BP and better lipid profiles for individuals with Judeo-Christian religious practices in a critical review of the literature (Seeman, Dubin, & Seeman, 2003). Although Blacks and Hispanics are considered to be more religious than Whites (Bell et al., 2010), this relationship between religion and lower odds of HTN has not held constant for Blacks who have the highest prevalence of HTN in the United States (Roger et al., 2011). Thus, the influence of religiosity on the physiological response of BP is not clear. Although these research findings are intriguing, they present a significant gap in the literature that warrants further research.

Culture. Some Blacks engage in behaviors associated with cultural practices that have an adverse effect on health. Cultural influences that result in risky health behaviors are not fully understood by the larger society. One cultural practice is the "kinship burden" whereby many Blacks exhibit a strong commitment to family (Webb &

Gonzalez, 2006, p. 260) by sacrificing their health and personal needs to meet the needs of family. This commitment or burden is more pronounced in Black women and as a result, women tend to report more life stressors (Jones & Shorter-Gooden, 2003). The "strong Black woman" is a perception embraced by Blacks. This perception is actually a myth that creates undue stress and leads women to feel inadequate when the myth does not become a realization (Jones & Shorter-Gooden, 2003, pp. 11, 22). Stress affects quality of life in Blacks, and there is a strong relationship between stress and HTN (Lehman, Taylor, Kiefe, & Seeman, 2009; Schneider et al., 2001). Research suggests that chronic environmental stress, negative emotions, and risky health behaviors may contribute to allostatic load accumulation (Lehman et al., 2009). Allostatic load refers to the increased persistent stress on the body that consumes energy and sustains a physiological stress response that eventually results in chronic diseases such as HTN (B. S. McEwen, 2003). Research examining HTN in Black women must note the influence of culture on HTN and medication adherence.

In a qualitative study, Peters, Aroian, and Flack (2006) found that it is oftentimes difficult to understand Black health behavior without first recognizing that their health behavior is entrenched within their culture. The experiences of discrimination, oppression, and mistreatment have had a profound effect on Blacks, thus contributing to a sense of collective identity that has shaped their attitudes toward health care and ultimately influences their health outcomes (R. M. Peters, K. J. Aroian, & J. M. Flack, 2006). This finding becomes significant when cultural practices result in non-adherent behaviors that impact the health care regimen. In a study of Black adults, Peters et al.

(2006) noted that study participants were reluctant to adhere to dietary, weight, and activity recommendations for fear that they would be perceived as acting White and disregarding their culture. Therefore, to avoid criticism and ostracism from family and peers, participants refused to engage in preventive care even to the detriment of their health. Peters et al. (2006, p. 840) used the metaphor "circle of culture" to describe these boundaries that bind many Black families and communities together while separating them from outsiders. This metaphor may provide an explanation of why many health behavior programs focusing on adherence are not effective (R. M. Peters et al., 2006). Similarly, an online research study found that three out of four (75%) people were aware of a family member with HTN, but three out of five (60%) with this knowledge choose not to engage in preventive health behaviors before their own diagnosis of HTN ("The pressure is on", 2009). While this study did not examine the rationale for lack of health promoting behaviors, these alarming ratios lend support to other influences, such as the "circle of culture." Other researchers (Wexler et al., 2009) described this behavior as fatalistic in nature whereby many Blacks tend to believe that HTN is inevitable, so why do anything about it. Although negatively affecting adherence and contributing to subsequent health problems for Blacks, clearly, cultural practices in Blacks are poorly understood.

Defeatist behavior is also exemplified in overweight and obese Blacks who communicate disinterest in increasing physical activity to control weight (R. M. Peters et al., 2006), while others cite physical inactivity to the lack of a convenient, safe environment due to poor crime-ridden neighborhoods (Fongwa et al., 2008). Obesity is

prevalent among Black women (51%) as compared to Mexican (43%), and White (33%) women (Roger et al., 2011). Another factor that contributes to overweight and obese Blacks is the high dietary sodium and fat that remains a cultural practice indigenous to slavery for food preservation and making undesirable animal parts palatable (Martins & Norris, 2004). Cultural traditions for diet and food preparation unique to slavery are attributed to poor eating habits today. Further, the low socioeconomic status and limited income of many Blacks may contribute to the purchase of cheaper, nonnutritious, high fat, high caloric foods, rather than more costly nutritious foods such as fruits, vegetables, and lean meats (Ewing, n.d.; R. M. Peters et al., 2006; Webb & Gonzalez, 2006). Likewise, the use of alternative treatments with foodstuff may be practiced to make medicinal remedies for various ailments. Alternative treatments may include home remedies such as vinegar, ginger, lime, raw onions, and garlic to self-treat high BP (Fongwa et al., 2008; Lukoschek, 2003). Many Blacks attribute the use of alternative therapies to a lack of finances and to decreased access to health care and appropriate medications, thus affecting adherence to the health care regimen. Thus, psychosocial stressors, dietary factors, greater weight, and adherence to antihypertensive medications are major risk factors for CVD, particularly HTN (Munger et al., 2007; Roger et al., 2011).

All Black cultural practices do not have negative health effects. Spirituality has probably been the sustaining force that has provided comfort and hope for Blacks during years of slavery and oppression. Faith and reliance on God has allowed Blacks to persevere and overcome insurmountable odds of slavery and racial injustice (L. M. Lewis

& Ogedegbe, 2008). In an effort to combat health disparities for Blacks, researchers have begun to focus studies in the heart of the Black community, the church. Several studies have shown positive results in the reduction of CVD risk factors in church-related exercise and diet programs (DeHaven, Hunter, Wilder, Walton, & Berry, 2004; White, Drechsel, & Johnson, 2006; Yanek, Becker, Moy, Gittelsohn, & Koffman, 2001) resulting in positive health behaviors that promote spiritual, physical, and psychological health. However, strong evaluations, program effectiveness, and outcome measures are generally lacking in many of the church-based studies making it difficult to determine the contribution of these programs to improved health and quality of life in Black churches and communities (Campbell et al., 2007; DeHaven et al., 2004).

Cultural influences that may result in risky health behaviors for Blacks are poorly understood. This is evidenced by the reluctance of many Blacks to practice health behaviors that are not costly and can be addressed through lifestyle changes to reverse the effects of physical inactivity, alcohol use, overweight/obesity, sedentary lifestyle, and smoking; all of these are modifiable risk factors. Jenkins (2009) asserts that nonadherence to modifiable risk factors may be attributed to lack of knowledge and effort for many Blacks. Conversely, Peters, Aroian, and Flack (2006) contend that individual Black behavior, attitudes, and beliefs cannot be understood independent of culture. Consequently, some cultural influences have proved detrimental to the health of Blacks, especially when resultant behaviors dictate non-participation in preventive care while sacrificing healthy behaviors for poor health.

Because the rate of HTN is increasing in Black women, there is a need for discovery of primary factors that influence adherence and effective HTN management that are beneficial to healthy outcomes (Fongwa et al., 2006). One factor, cultural practices, presents a challenge to health care providers. Although little is known about what accurately predicts adherence to the treatment regimen from a Black cultural perspective, what is known is that HTN is a multifaceted disease process, and using multiple constructs and multiple interventions are more effective than single constructs (Middleton, 2009). Thus, studies are needed to fill the gap in knowledge that exists about how culture influences adherence and nonadherence to HTN treatment, particularly in Black women.

Previous health care experience. Previous health experiences are potential determinants of health-related behavior and current health state (Troumbley & Lenz, 1992). Experiences are selected for this study because of their importance to the health problem, medication adherence in Black women with HTN. Previous health care experiences include family history of HTN, comorbidities, number of medications, BP, and body mass index (BMI).

Family history of HTN. Family history is a non-modifiable risk factor of HTN and attributed to genetic factors (Arnett, 2000; Roger et al., 2011). According to Arnett (2000), the results of most genetic studies have had limited success in identifying individual genes that contribute to HTN. Numerous gene studies (epithelial sodium channels, the renin-angiotensin aldosterone system, α- and β-adrenergic receptors, endothelin and endothelin receptors, kallikrein, natriuretic peptides and their receptors,

increased sodium absorption and salt sensitivity, transforming growth factor

hyperexpression, and the nitric oxide pathway) have resulted in a dearth of information

from primarily small case-control studies using nonrandom convenience samples

(Ferdinand & Welch, 2007). However, a recent research study involving variants located

on two genes, natriuretic-peptide precursor A (NPPA) and natriuretic-peptide precursor B

(NPPB) associated with the production of atrial and b-type natriuretic peptides (ANP and

BNP) have shown promise in reducing BP. Both ANP and BNP lower BP through salt-

wasting and vasodilatory effects. Future treatments may be aimed at establishing normal

levels of natriuretic-peptide in individuals who are deficient to decrease the risk of HTN

(Newton-Cheh et al., 2009).

Another recent discovery in animal research with mice identified corin, a

transmembrane serine protease enzyme in the heart. Corin converts pro-atrial natriuretic

peptide (pro-ANP) to active ANP to reduce BP. When corin is deficient, not only does

BP elevate, but cardiac hypertrophy occurs as well. Although the corin study has been

limited to animal research, the data indicate that corin deficiency may be responsible for

HTN in humans and may alter antihypertensive drug performance. These findings may

prove beneficial for Blacks who have the highest prevalence of HTN in the world (Zhou,

Jiang, Cui, & Wu, 2009).

Comorbidities. HTN may co-exist with other medical conditions such as heart

failure, kidney disease, and diabetes requiring medication therapy. All comorbidities

must be stabilized and monitored at follow-up visits as prescribed (Chobanian et al.,

2004). One study conducted by Lagu et al. (2009) examined the effect of cardiovascular

and noncardiovascular comorbidities on antihypertensive prescription filling in Black Medicaid clients with HTN. Results indicated that 25% of prescriptions for antihypertensive medication were not filled by clients and those ≤ 50 years of age had 42% lower odds of filling a prescription. Interestingly, prescriptions for clients with cardiovascular comorbidities were not more likely to filled, whereas clients with five or more noncardiovascular comorbidities were significantly more likely to fill prescriptions. However, clients with stage II HTN were more likely to fill prescriptions than clients with controlled BP. Although medication cost was not a factor, these findings indicate the need to explore other issues that impact medication adherence and the necessity of developing interventions to maximize medication-taking benefits.

Number of medications. The increased quantity of medications, better known as polypharmacy, can create a substantial cost burden, especially to the elderly client. In addition, polypharmacy could cause untoward side effects and compromise the health status of the client, especially if multiple comorbidities are present. As noted by West, Lefler, and Franks (2010), when side effects increase, medication adherence decreases. Moss and Crane (2010) investigated polypharmacy in elderly women who had experienced a myocardial infarction and found that participants took approximately seven medications daily. The study concluded that the elderly could suffer adverse effects from polypharmacy; therefore, health care providers should be aware of polypharmacy complications and cost considerations.

Medical management of HTN can be achieved when health care providers and clients are persistent in working together to achieve optimal BP control using established

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medication guidelines. More than 75% of individuals diagnosed with HTN require two or more antihypertensive medications from different drug classifications for BP control (Chobanian et al., 2004), and many clients with HTN may have one or more comorbidities requiring additional medications (Munger et al., 2007). Simplifying the medication regimen and using a multifactorial intervention approach may improve medication adherence (Chobanian et al., 2004; Munger et al., 2007). Strategies may include selecting antihypertensive medications that are tolerated with minimal adverse effects, use of long-acting medications to decrease dose frequency, client education combined with motivational approaches, and the use of an electronic home BP device to actively engage the client in the treatment process (Munger et al., 2007). Polypharmacy could have detrimental effects on adherence due to financial issues and difficulty organizing medication time frequencies (Chobanian et al., 2004; Munger et al., 2007). Thus, examining the number of medications is important when exploring adherence.

　　　　Blood pressure. Hypertension is generally defined as a BP greater than or equal to 140/90. According to Chobanian, et al. (2004), HTN can be further delineated as systolic HTN and diastolic HTN. Systolic HTN is a major risk factor for CVD and increases with age throughout the lifespan. In contrast, diastolic HTN predominates by rising before age 50 and then levels off and remains virtually unchanged in later life, thus, it is a more potent CVD risk factor. Most health care providers tend to consider diastolic HTN as more important and institute aggressive treatment. However, systolic HTN increases CVD mortality, stroke, and heart failure, necessitating that more emphasis be placed on

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its management, especially in older adults (Chobanian et al., 2004). Yet, to avoid untoward CVD events, both systolic and diastolic HTN should be managed appropriately.

In the 20-year longitudinal community based Coronary Artery Risk Development in Young Adults (CARDIA) study (D. A. Levine et al., 2011), a biracial cohort was followed from early adulthood to examine if risk factors for HTN are explained by racial and geographic variability. When adults aged 18 to 30 were recruited for the CARDIA study in 1985-1986, systolic and diastolic BP increases were higher in Black men and women than in White men and women. Over the 20-year period, Black women had the largest systolic and diastolic BP indicating significantly higher rates of HTN incidence. Thus, better monitoring and aggressive management of HTN risk factors, such as obesity and physical inactivity, is indicated for Black women (D. A. Levine et al., 2011).

Body mass index. Overweight and obesity are considered to be an epidemic in the United States (Flack et al., 2010). Black women (51%) have the highest prevalence rates of obesity when compared to Mexican (43%), and White women (33%) (Roger et al., 2011). Increased health risks, such as CVD, are significantly higher in women who are overweight (20%) and obese (64%) (Roger et al., 2011). As predictors of increased health risk, BMI and waist circumference have been used to assess obesity-related diseases. The BMI, calculated as weight in kilograms divided by height in meters squared, is categorized as underweight (less than 18.5 kg/m^2), normal weight (18.5 to 24.9 kg/m^2), overweight (25-29.9 kg/m^2), or obesity (greater than or equal to 30 kg/m^2) ("BMI classification", 2010; "Calculate your body mass index", n.d.). Whereas, a waist

circumference greater than or equal to 88 cm in women and 100 cm in men is regarded as abdominal obesity (Mosca et al., 2007; Roger et al., 2011).

Together, BMI and waist circumference have served as predictors of morbidity and mortality associated with chronic diseases such as diabetes, CVD, stroke, and metabolic syndrome. However, in a study conducted by Janssen, Katzmarzyk and Ross (2004), waist circumference was found to be a better predictor of obesity-related diseases independently of BMI. In contrast, a study by Benetou et al. (2004) indicated that BMI was the dominant predictor of BP for women, but waist circumference was the dominant predictor of BP in men. Conversely, another study showed that both obesity variables, BMI and waist circumference, contributed to higher BP in the mediating role (Chaix et al., 2010). However, BMI is misleading in Asians and waist circumference may be a better indicator of CVD risk (Friedewald, Nesbitt, Ram, & Roberts, 2010). Because abdominal obesity can be problematic for individuals in the normal weight range, assessment of both BMI and waist circumference is recommended ("Abdominal fat", 2006) and both were anthropometric measures for this study.

Environmental resources. Adequate environmental resources are relatively static and considered a major determining factor for personal health care, barriers to health care, and access to health care (Cox, 2003). Lack of environmental resources in Black women with HTN may be a factor that negatively impacts adherence to the treatment regimen. The variables of interest in this study are income and type of health coverage.

Income. In 2009, the median income for Blacks ($32,584) was lower than Hispanics ($36,039), and Whites ($54,461). The poverty rate in 2009 was higher for

Blacks (25.8%) when compared to Hispanics (25.3%) and Whites (9.4%) (DeNavas-Walt, Proctor, & Smith, 2010). Thus, a wide economic gap continues to exist between Blacks and Whites.

Historical evidence has shown that socioeconomic status is a strong predictor of health outcomes with poverty as the leading cause of avoidable morbidity and mortality (Bierman & Dunn, 2006). James (1996) noted an inverse correlation between socioeconomic status and health; those with lower socioeconomic status are more likely to experience illness and premature death than those with higher socioeconomic status, thus adversely affecting Blacks, and other minority/ethnic groups. Similarly, Ndumele et al. (2010) write that low income clients, particularly Blacks, have challenges with medication adherence contributing to poor BP control. Likewise, another study (Kressin, Orner, Manze, Glickman, & Berlowitz, 2010) on racial disparities in BP control revealed that Blacks (58%) with household incomes < $20,000 were more likely to have uncontrolled BP than Whites (36%) with the same income level. Thus, low income levels for Blacks and Whites may not result in the same health outcomes.

Type of health coverage. In the United States most people had employee-based health insurance coverage in 2009 (55.8%). In the same year, 30% were covered by government health programs such as Medicaid (15.7%) and Medicare (14.3%). The uninsured rate was less for Whites (12%) as compared to Blacks (21%) and greatest for Hispanics (32.4%) (DeNavas-Walt et al., 2010). According to a study conducted by Kressin et al.(2010) , uncontrolled BP was more likely to occur in clients with Medicaid and free care. Because health coverage in some of these programs may require a copay to

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purchase medications, this is an important variable to measure when examining medication adherence, especially in those with low income levels.

Dynamic Variables

The second component of client singularity, dynamic variables, addresses psychological determinants of behavior that contribute to definitive predictions about health care behaviors (Cox, 1982). Subject to change over time, dynamic variables encompass internal processes that are formulated with background variables and contribute to the individual's nature. Dynamic variables of interest that are unique to study participants include intrinsic motivation, cognitive appraisal, and affective response.

Intrinsic motivation. An assumption of the IMCHB is that the majority of health maintenance and promotion behaviors are dependent on individual choice to adhere or not adhere to the prescribed health regimen (Cox & Wachs, 1985). Important to the manifestation of overt behavior, intrinsic motivation is dependent on volitional control centered on meeting an individual need (DiNapoli, 2003). When prescribed a health care regimen, individual needs may be impacted by background variables such as age, sex, race, education, religion, family history, income, and insurance type that may contribute to how choices are made about subsequent health behaviors. However, Cox and Wachs (1985) assert that it is the individual's choices that will ultimately impact health outcomes and not the background variables. Thus, when individual needs are threatened or hindered by the health care regimen, intrinsic motivation may invoke an individual's

will to choose adherence or nonadherence to resolve conflicts among needs (Cox &

Wachs, 1985).

In an exploration of adherence (compliance), Fogarty (1997) concluded that

diagnosis such as HTN may involve substantial lifestyle changes such as medications,

diet, and physical activity that could impact a number of highly valued freedoms. These

health care demands may disrupt personal routines and restrict valued freedoms (Fogarty,

1997), while triggering the motivation to act to preserve those freedoms. Because the

asymptomatic nature of HTN makes the treatment regimen seem more troublesome than

the disease itself, some client's react negatively and perceive the prescribed treatment

plan as a threat instead of a health benefit (Fogarty, 1997). The persistence of

nonadherence to the treatment regimen led Fogarty (1997) to propose the theory of

psychological reactance as a means to understanding nonadherent behaviors, particularly

in Black women with HTN.

Reactance. J. W. Brehm's (1966) theory of psychological reactance was

developed to depict the behavioral motivation to re-establish lost or threatened freedom.

An awareness of reactant behaviors may assist healthcare providers in mediating

adherence with behavioral tasks such as adhering to the medication regimen, ultimately

affecting healthcare outcomes (Dowd et al., 1991).

The psychological reactance theory was conceived by J. W. Brehm (1966) when

he noted that as advice is given to another person, oftentimes the person acts contrary to

the advice (S. S. Brehm & Brehm, 1981). Rather than exerting a positive influence, the

advice seems to have a negative influence on the person: people do the opposite of what

they are told to do. According to J. W. Brehm (1966), the best description of this phenomenon is the desire for freedom to make a decision without outside interference. Freedom implies having the power to change a situation or control a potential outcome. Thus, people are free to govern their own behavior. When an individual feels their freedom is threatened or restricted, they are motivated to preserve that freedom (J. W. Brehm, 1966; Christensen, 2004). Thus, reactance is a motivational state to re-establish the perceived or actual threatened or eliminated freedom (J. W. Brehm, 1966).

Several tenets explain the motivational state of a reactant individual. First, when a free behavior is threatened or eliminated, a "forbidden fruit effect" prevails where the individual's desire for the behavior increases (Christensen, 2004, p. 33). Second, the greater the force to restrict or threaten to eliminate a behavior, the more intently the individual will engage in the behavior to preserve it. Any attempt to discourage the individual's behavior creates an opposite reaction known as the "boomerang effect" (J. W. Brehm, 1966, p. 14; Christensen, 2004, p. 33). Lastly, the greater the importance of a threatened freedom (implies the loss of other freedoms), the more inclined the individual is to restore the freedom and also increase the frequency of the restricted behavior (J. W. Brehm, 1966; S. S. Brehm & Brehm, 1981; Christensen, 2004).

The magnitude of reactance arousal is determined by four principles that may threaten, restrict, or eliminate freedom (S. S. Brehm & Brehm, 1981; Christensen, 2004). First, the individual must believe they have a certain freedom (e.g. freedom from lifetime commitment to medications). Second, the freedom must be important to the individual (e.g. importance of the freedom to be medication-free and virtually healthy). Third, the

reduction of more than one freedom or total elimination of a freedom is evident (e.g. reductions related to diet and physical inactivity or the elimination of a medication-free life). Last, the implied reduction of freedom is inferred to other freedoms (e.g. threats to freedom of smoking and drinking alcohol) (J. W. Brehm, 1966; J. W. Brehm, 1976; S. S. Brehm & Brehm, 1981).

As noted by Christensen (2004), threats and oftentimes elimination of personal freedoms are commonplace in the medical environment. Clients are expected to renounce freedom and surrender control to the health care team. Staff in hospital environments may dictate what the client can and cannot do regarding eating, sleeping, medications, diet, activity, diagnostic tests, and visitors: The list of restrictions may be endless. The theory of psychological reactance becomes operational as the client attempts to regain control over the lost freedom and restricted behaviors imposed upon them. Client adherence issues began to surface when the perceived freedom is restricted or threatened with elimination and the client becomes reactant to treatment regimen. The restriction of free choice becomes a control issue for the client whose desire or motivation is to protect their sense of freedom. The motivational state of the client yields a response of reactance in an attempt to regain control (Christensen, 2004). Although psychological reactance theory has rarely been used in nursing, the implication of high reactance levels and loss of control to medication adherence warrants further study, especially in Black women.

Psychological reactance may be relevant to Blacks because of their history of slavery and oppression. Because of the lingering effects of their historical legacy, Blacks tend to view freedom from a different perspective than other races. Reactance to potential

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restrictions or threats to eliminate freedoms may contribute to physiological tension and

psychological pressure with changes in perceptions and judgments (J. W. Brehm, 1976).

The historical legacy of slavery and its lingering effects places Black clients in a unique

position to protect and safeguard their personal freedoms. Thus, if health care providers

could identify and address Black client's underlying reactant behaviors initially with the

IMCHB's elements of client singularity, then interventions to control HTN with lifestyle

changes and medication adherence could be implemented.

Woller, Buboltz, and Loveland (2007), noted that highly reactant individuals are

likely to experience anxiety and are distrustful of others. Further, Palmentera (1996)

stated that reactant individuals demonstrated more stress, hostility, and emotion-focused

coping styles with feelings of self-deprecation linked to depressive symptoms. Thus, the

psychological ramifications of highly reactant behaviors may hinder therapeutic

relationships with health care providers (Seemann, Buboltz, Jenkins, Soper, & Woller,

2004) and impede adherence to the treatment regimen, especially medication-taking

(Christensen, 2004).

Reactance varied with race in a study conducted by Seemann et al. (2004). Blacks

had higher levels of reactance than Whites on the verbal, behavioral, and total therapeutic

reactance scale. In another study (Woller et al., 2007), the scores of Blacks and

Hispanic/Latinos were not significantly different, but were significantly higher than both

Whites and Native Americans. According to Seemann et al. (2004), minorities may have

higher reactance levels when compared to Whites because of constantly defending their

freedoms in a White dominated society plagued with economic, social, and occupational

discrimination. Woller, Buboltz, and Lovelace (2007) further stated that differences in reactance levels for minority groups may result from disparate environmental opportunities related to discrimination that restricts free behavior, especially for Blacks and Hispanic/Latinos. Thus, reactance behaviors experienced in society may be generalized to relationships with health care providers implementing the treatment regimen.

The vast amount of literature on lack of compliance and adherence attest to the continual resistance of individuals to taking medications, even though they may receive pertinent information, interventional strategies, and admonishments (Fogarty, 1997; Pound et al., 2005). Several authors contend that because varying degrees of resistance exist and are usually hidden from health care providers, it is highly unlikely that individuals will stop resisting prescribed medications (Fogarty, 1997; Pound et al., 2005). Intrinsic motivation as described by Cox and Brehm's reactance theory may provide insight into factors that promote adherence behaviors. The rationale for reactant behaviors and resulting resistance to the treatment regimen, particularly medication-taking, warrants further exploration.

Cognitive appraisal. Cognitive appraisal provides insight into the client's perceptions and interpretation of his or her health status, behavioral choices, and interaction with the health care provider (Cox, 1982). Importantly, the client's perceptions and interpretations are representative of his or her reality and may or may not reflect that of the health care professional (Carter & Kulbok, 1995; Cox, 1982). The client's cognitive appraisal related to HTN knowledge, self-care of HTN, trust in health

care provider, and coping are explored in relation to medication adherence in Black women with HTN.

Hypertension knowledge. It seems logical to assume that knowledge of HTN diagnosis, medications, and lifestyle modifications are imperative to attain adequate BP control. However, Pascucci et al. (2010) assert that the association between knowledge and adherence is disconcerted because knowledge in itself is not enough to ensure adherence, but it is necessary for adherence to occur (Pascucci, Leasure, Belknap, & Kodumthara, 2010). While educational information is usually beneficial for individuals who are motivated to adhere to the treatment regimen but unlearned in regimen process, individuals unmotivated in adherence and already knowledgeable are unlikely to improve with additional educational information (Becker, 1985). Thus, client education is essential, although its effectiveness may be questioned, especially when intrinsic motivation is lacking.

Becker (1985) asserts that providing information to clients about diagnosed illnesses and prescribed treatments have not increased adherence. In a systematic review of randomized controlled trials, Schroeder et al. (2004) concluded that client education was not successful. In fact, a recent Cochrane review on intervention effectiveness for BP control in clients on prescribed medications concluded that client education alone was not associated with large BP reductions (Glynn, Murphy, Smith, Schroeder, & Fahey, 2010). In contrast, a study (E.-Y. Kim et al., 2007) examining intentional and unintentional nonadherence to antihypertensive medication regimens in middle-aged Korean Americans with HTN noted that intentional medication nonadherence was significantly

associated with lack of high BP knowledge. However, literacy was not reported as an issue in this study even though over 45% of the sample had less than a high school education. Authors recommended individualized client education on HTN disease management with an emphasis on medication side effects, a frequently cited reason for medication nonadherence.

Several studies of racially mixed adults with HTN indicated that Blacks with less than a high school education had insufficient HTN knowledge (Ayotte, Trivedi, & Bosworth, 2009; Sanne, Muntner, Kawasaki, Hyre, & DeSalvo, 2008; Viera, Cohen, Mitchell, & Sloane, 2008). Similarly, a study conducted by Chaix et al. (2010) found that decreased individual educational level and lower average neighborhood educational level was strongly associated with HTN. In contrast, Martins et al. (2001) conducted a study on HTN knowledge in Blacks living in an urban community and concluded that participants with greater HTN knowledge were associated with a higher educational level or a personal history of HTN. Thus, deficient HTN knowledge and less than a high school education may be related to health literacy issues.

Literacy issues may be one of the primary reasons for uncertainty of educational effectiveness. For almost 50% of U. S. citizens, reading skills are inadequate (M. V. Williams, Baker, Parker, & Nurss, 1998), and Flack et al. (2010) contend that nonadherence to treatment regimens in Blacks with HTN is likely attributed to an inability to read and satisfactorily follow prescription instructions. Low literacy levels can result in difficulty understanding health information, accessing health care, following instructions from a health care provider, and taking medications correctly; all of which

contribute to poor adherence to the treatment regimen, uncontrolled chronic disease, and increased health care costs (Safeer & Keenan, 2005).

Milio (1976) exerts is that it is not enough to make clients knowledgeable about healthy lifestyle choices without assuring that clients have ready access to the treatment options promoted. If health care providers adequately assess clients prior to implementing treatment and allow clients an opportunity to exert control over determining optimal health for themselves, then the actions necessary to attain their health status could be implemented according to the client's environmental limitations (Carter & Kulbok, 1995; Cox, 1982). Adequate assessment of the client's ability to practice positive health behaviors within the environmental resources available may provide a realistic expectation for the client to succeed in adhering to the health care regimen and allow the health care provider an opportunity to individualize the health care regimen, thus making adherence a viable possibility.

Self-care of HTN. As defined by Riegel, Lee, Dickson, and Carlson (2009), self-care is a decision-making process that clients naturally use to choose behaviors to maintain their physiological status and manage any symptoms that may occur. Created after the self-care of heart failure model, the self-care of HTN model includes the same two concepts, self-care maintenance and management. Maintenance refers to living a healthy lifestyle, adhering to the treatment regimen, and monitoring symptoms that may require decision making if a response is needed. Conversely, management is the deliberate process of action to recognize symptoms, evaluate the need to act, implement a treatment strategy, and evaluate treatment effectiveness (Riegel et al., 2009). As a chronic

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disease, HTN includes a constellation of lifestyle alterations that require intermittent consultation with health care providers. Thus, clients are left to self-manage symptoms that arise and engage in decision-making and problem-solving to maintain their physiological status (Pascucci et al., 2010). Therefore, clients who are expertly engaged in self-care should possess qualities such as knowledge, experience, and skill relevant to their disease process (Riegel et al., 2009).

Involving clients as active participants in self-care is a crucial aspect contributing to the success of HTN maintenance and management. As collaborators of care, health care providers must be abreast of current research on HTN interventions to assist clients toward positive health outcomes. Of all the self-care of HTN interventions, the one with the most evidence of effectiveness is simplification of the medication dosing regimen (Viera & Jamieson, 2007). Because most clients may require more than one medication for BP control, use of combination medications may be desired to improve client adherence to the medication-taking regimen (Chobanian et al., 2003; Viera & Jamieson, 2007). Evidence has shown that education alone is not effective in improving client adherence to antihypertensive medications. However, dietary advice has shown modest short-term improvements in fat intake and fruit and vegetable consumption. Conversely, advice to increase physical activity has not shown effectiveness (Viera & Jamieson, 2007). According to these evidence-based client self-care interventions for HTN, further research is warranted to determine mechanisms to enhance adherence to the treatment regimen, especially in Black women.

Finkelstein and Cha (2009) proposed an innovative study on HTN telemanagement in Blacks. This randomized clinical study used technology to implement client self-care, enhance health care provider decision support and care coordination using JNC 7 guidelines, improve client-provider communication, provide client education, control client adherence to individualized treatment regimens, counsel clients on healthy lifestyle, and provide social support. A BP monitoring device and weight scale are part of the telemanagement system. The system was designed to initiate alerts if the client does not complete scheduled self-testing, did not take medications as prescribed, or exceeded specified clinical parameter thresholds. A nurse monitored the system, contacted clients to counsel and educate and notified the physician of client events monthly and problem areas as needed. Pilot testing on focus groups has generated enthusiasm in participants. The potential impact of a multi-component telemanagement system could improve BP control in Blacks and provide better methods of monitoring client self-care.

Trust in health care provider. Client trust is an essential element of the client and health care provider relationship that directly impacts adherence to the treatment regimen (P. A. Clark, 2009). According to Cox (2003), the content of the health care provider's interaction and sensitivity to the client's elements of singularity are evidenced by the client's satisfaction with care, which is strongly predictive of subsequent adherent behavior.

As cited by several authors (Flack et al., 2010; Greer, 2010; Watkins & Terrell, 1988)**,** Blacks seem more apt to mistrust White health care providers. However, trust with

Black clients differs from White clients because Blacks generally consider health care providers as untrustworthy. Therefore, signals of distrust by Blacks may include behaviors such as anger (Watkins & Terrell, 1988), assertive behaviors that are oftentimes misinterpreted as attitudinal or militant (Fongwa, 2002), and request for the services of a Black health care provider (Flack et al., 2010; Greer, 2010; Watkins & Terrell, 1988).

Lack of trust in health care providers hinders the establishment of a trusting client-health care provider relationship. Factors that may impede relationship development include health care disparities (Greer, 2010; L. M. Lewis & Ogedegbe, 2008), multiple episodes of real and perceived racism or discrimination (Greer, 2010), and lack of health care provider cultural competency (Flack et al., 2010). This lack of trust may explain the Black client's lack of adherence with treatment, missed follow-up appointments (Flack et al., 2010; Greer, 2010; Watkins & Terrell, 1988), hesitance to accept referral appointments (Greer, 2010), failure to get prescriptions filled (Greer, 2010), expectancy of poor treatment from White health care providers (Greer, 2010; Watkins & Terrell, 1988), and self-treatment behaviors in lieu of or in conjunction with medical treatment (Pound et al., 2005).

Health care disparities revealed in research findings (B. D. Smedley, Stith, & Nelson, 2003) have confirmed suspicions of unequal treatment in healthcare and reiterated fear and distrust among many Blacks. Fear and distrust create a powerful motivating factor for nonadherent health behaviors. For example, the trust factor was illustrated in a qualitative study where one participant voiced concern that the health care

provider's office would call to remind of appointment times indicating wanting their

business but would not follow-up to monitor their health status when new treatment was

prescribed (Wexler et al., 2009). If a trusting relationship were apparent and the client felt

the healthcare provider cared about their health status, then the study participant may

have telephoned the health care provider to report any adverse effects from their

treatment. When the lack of trust is present, it may negatively affect an individual's

health behavior toward the health care provider and the prescribed treatment regimen.

Disparate health care for Blacks and other racial/ethnic groups is well

documented ("Unequal treatment", 2002). Because remnants of Black history continue to

exist in subtle configurations, many Blacks approach health care with fear, skepticism,

and caution (Gamble, 1997). Several studies cited distrust of the medical community as

the rationale for nonadherent health behaviors (Lukoschek, 2003; Martins & Norris,

2004; R. M. Peters et al., 2006). Many study participants were quick to mention the

Tuskegee experiments and other perceived injustices experienced personally or by family

members and friends. The reluctance to seek health care due to distrust in the medical

system is oftentimes pervasive in the Black culture (R. M. Peters et al., 2006) and has

contributed to significant health problems from nonadherence to treatment regimens

(Fongwa et al., 2008; Wexler et al., 2009). Therefore, it is important that health care

providers, along with Black clients, devise mechanisms to transcend the effects of

history, restore trust in the health system, and overcome barriers to forming relationships

to foster optimal health care.

According to a study conducted by Benkert, Hollie, Nordstrom, Wickson and Bins-Emerick (2009), nurse practitioners were found to have better trusting relationships with Black clients. However, study participants with higher trust and satisfaction were in concordant client-provider relationships. Further study findings revealed that Black men reported less satisfaction with care provided by nurse practitioners and were more suspicious of the health care system. Reasons for lack of trust in this study were not investigated (P. A. Clark, 2009). Consequently, several authors cited (Cooper & Powe, 2004, July; Greer, 2010; Saha, Komaromy, Koepsell, & Bindman, 1999) that many Blacks prefer care and treatment from Black health care providers who they feel can identify with their plight in life. However, the shortage of Black health care providers leaves clients with little choice for health care providers of the same ethnicity (Cooper & Powe, 2004, July; Greer, 2010).

Black clients who have experiences of perceived racism may mistrust other racial/ethnic groups, and this mistrust may filter into their relationship with the health care provider. A study conducted by Benkert, Peters, Clark, and Keves-Foster (2006) found that the majority of low-income, urban dwelling Blacks were fairly trusting of their healthcare providers and satisfied with the health care given. Trust was more likely to be higher in nurse practitioners and highest in nurse managed clinics, both of which were mostly women, than Asian providers and male physicians. However, negative effects of perceived racism on trust and satisfaction were evident. This study confirms that Blacks do experience an element of trust in their health care providers, but skepticism continues.

An attempt to reestablish trust in health care providers to foster the Black client's adherence to the health regimen is a major issue. Adherence centers on the ability of health care providers to establish a working (trusting) relationship with the client where both perspectives are fully understood (DiGiacomo, 2008) and prejudices, stereotypes, and other issues that may hinder the establishment of a working relationship are addressed. A good working relationship between the healthcare provider and client can facilitate medication adherence. According to Rand and Sevick (2000), the health care provider should work with the client to meet their needs in coping with issues that may interfere with adherence and allow them the autonomy they need to actively participate in the treatment process. Thus, an agreement between the client and health care provider implies a working relationship that allows a reciprocal exchange of information (Cox, 1982), and contributes to an understanding of forces that shape client's lives.

Health care providers need to understand the social, political, environmental, and economic influences that affect the health of clients and simulate rebellion, conflict, and mistrust in relationships with health care providers (Butterfield, 2002). Oftentimes, short-term health interventions are not successful when "band-aids" are placed on psychological or physiological symptoms rather than addressing the socioeconomic problem that contributed to client's health situation. Hence, times exist when health care providers must work to alter the systems that influence the health status of individuals and populations and empower groups and individuals to work on their own behalf (Butterfield, 2002). Clearly, trust is a major factor in medication adherence in Blacks.

Coping. Coping is the way an individual responds to stress or as described by Shorter-Gooden (2004), coping is a method of solving problems to reduce stress. According to McEwen and Seeman (1999), Black women frequently experience recurring stressors that overtax their coping skills. These stressors may include social confrontations of racism, poor income, sexism, and lower socioeconomic status. Conversely, Carlson and Chamberlain (2005) write that the more powerful predictors that activate the stress response are mental representations of individual expectations and interpretations of events, unlike previous beliefs that emphasize environmental stressors such as racism, sexism, and classism as reasons for variation in health outcomes, especially in Black women. Nevertheless, mental representations offer inadequate explanations for the realism of negative health outcomes resulting from stress related illness such as HTN.

Coping with excessive stressors may contribute to allostatic load, defined as the persistent wear and tear on the body and brain, resulting in the inefficient turning-on or shutting-off of the autonomic nervous system. Repeated, unrelieved, or unremitting stress that occurs frequently over a long period of time causes illness that could affect almost every body system, especially, the cardiovascular system. Hence, constant stress may contribute to allostatic load and eventually lead to an allostatic overload that predisposes an individual to chronic diseases such as HTN (B. McEwen & Seeman, 1999; B. S. McEwen, 2005). Further, McEwen and Lasley (2003) noted that individuals with excessive stress tend to show earlier aging, more depression, insulin resistance, immunosuppression, cognitive impairment, and premature decline in physical

functioning. Researchers agree that stress affects quality life in Blacks with a strong relationship to HTN (Lehman et al., 2009; Schneider et al., 2001). Thus, coping with stress is important to understand in Blacks with HTN treatment adherence issues.

According to James (1996), the legend of John Henry may explain how coping with difficult psychosocial environmental stressors increases the susceptibility of marginalized people to increased morbidity and mortality rates. Based on this folktale, there was a contest between a Black man named John Henry and a machine; he defeated the machine and suffered mental and physical exhaustion that resulted in death. James (1996) purports that John Henry symbolizes the relentless struggles of unskilled laborers in their effort to cope with psychosocial, economic, and environmental stressors that eventually erodes their health over time contributing to increased morbidity and mortality. High John Henryism in unskilled labors and its stress-related risks ignite coping mechanisms that interact with low socioeconomic status to increase the risk for HTN. Thus, low socioeconomic status is inversely associated with HTN. Because individuals with low income may be unable to afford medical care and purchase medication(s), nonadherence to the treatment regimen, including medications, may result. Thus, this unfortunate spiral of events could further complicate the HTN disease process and overtax coping mechanisms needed to deal with the resultant morbidity, disability, and eventual mortality that oftentimes occur.

It is often difficult to explicate the psychological and physiological stressors that many Black women cope with in their daily lives. One term, double jeopardy, was first conceptualized by Beal (1969) as she addressed the plight of Black women in a capitalist

society that birthed racism in an attempt to maintain the oppression of Blacks. Jones and

Shorter-Gooden (2003) describe the plight of Black women by using the metaphor of a

childhood game called double dutch jump rope. Just as the game has two ropes, Black

females have two identities, race and gender. The key to being skillful in the game is to

focus on both ropes at the same time because focusing on one rope leads to stumbling.

For Black women, race has been the primary concern, while the dualism of race and

sexism presents a double jeopardy. Sexism is often unresolved leaving Black women

with lower pay than coworkers, unreported sexual harassment, and treatment as second

class citizens when compared to White women (Jones & Shorter-Gooden, 2003). Beal

(1969) also addressed classism, thus adding a triple jeopardy to the identities assumed by

Black women. Thus bias, prejudice, and/or discrimination because of one's race, sex or

gender, and social or economic class may impart undue stressors on Black women that

contribute to chronic diseases such as HTN.

      Affective response. Because health behavior cannot be explained fully with

rational thought, cognitions should be analyzed together with emotional expression.

Perceived racism and depression are types of affective responses explored. According to

Cox (1982), affective responses can interfere with an individual's cognitive ability by

serving as distractions to internal and external cues. Affective response could serve as a

major deterrent to medication adherence in Black women with HTN.

      Perceived racism/discrimination. Interestingly, the term race originated as a

means to perpetuate slavery by using physical features to create markers of social

stratum. By inventing myths to portray Blacks as different, inferior, and less than human

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savages, laws were enacted in this country to distinguish Black people as property on the same level with livestock and beast of burden (A. Smedley, 1997; Spillers, 1987). Thus, the race ideology originated as a social invention that lacked scientific support. Genetically, the DNA sequence in all people is 99.9% identical, making race indistinguishable ("Exploring genetics issues", 2003; A. Smedley, 1997). However, despite scientific evidence, remnants of the social stratum that distinguishes groups of people as unequal continue to exist (A. Smedley, 1997).

The race category in the 2010 census questionnaire lists Black, African American, and Negro together as one group ("The 2010 census questionnaire", 2010). Oftentimes, many use the term Black as synonymous with the term African American. The term African American describes people who are descendants of slaves bought to the United States from Africa. On the other hand, Black is an inclusive term that describes the shared social and political culture of people that share physical traits such as skin color, hair texture, and distinct facial features (Barksdale, Farrug, & Harkness, 2009). Thus, Blacks may not be African Americans since Blacks include people who originated from other countries that may include the Caribbean, Central America, South America, Europe, and African. Neither the term African American or Black refers to a homogeneous group, but rather includes numerous subgroups with common physical traits (Barksdale et al., 2009; E. E. Davis & Huffman, 2007). The category Negro is rarely used except in a historical context and considered obsolete. Because this study does not specify the origin of descendants, the more inclusive term Blacks was used to reference the study population.

Since the Civil Rights movement, perceived racism and discrimination continue to be a significant source of stress (Pieterse & Carter, 2010) for Blacks. Considerable legislation was passed by congress during the Civil Rights movement to legally address segregated education, voting rights, employment discrimination, access to public housing (Byrd & Clayton, 2002) and segregated public places (Civil Rights Act, n.d.). Racial discrimination in all federally assisted programs such as Medicare and Medicaid was prohibited, and all hospitals who were recipients of federal funds were obligated to comply with civil rights legislation. While Blacks had access to hospitals throughout the nation during the 1970s and 1980s, health disparities continued to widen between Whites and racial/ethnic minorities, but the gap was more profound for Blacks (Gamble & Stone, 2006). Still, in the year 2000, laws were enacted because of minority health inequalities. A profound statement by Martin Luther King, Jr. in 1966 still resounds with truth: "Of all the forms of inequality, injustice in health care is the most shocking and most inhumane" (King, 1966, March). Unfortunately, inequalities in healthcare persist today for Blacks and other racial/ethnic groups despite the Civil Rights movement and legislative action.

Research findings confirmed the perceptions of injustices and discrimination experienced by many Blacks in various health care situations. An extensive study ("Unequal treatment", 2002) found that minority groups are less likely than Whites to receive needed services, procedures, and routine treatments for common health problems and diseases such as cancer, CVD, and diabetes. For example, cardiac care is one area of health care that consistently demonstrates disparity in health care access and delivery. When compared to Whites with similar clinical manifestations for CVD disease, Blacks

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are less likely to receive pharmacological therapy (e.g. thrombolytic therapy), diagnostic

angiography, heart transplantation, cardiac catheterization, and invasive surgical

treatments (e.g. coronary bypass surgery) even when treatments and procedures are

judged to be appropriate ("Unequal treatment", 2002). Equally perplexing is the strong

link related to finances and access to cardiac care (Mayberry, Mili, & Ofili, 2002) that

oftentimes result in discriminatory practices for poor people. It is also daunting to

consider that discriminatory practices persist even in Blacks and other minority/ethnic

groups who have the ability to pay for health care services (Kennedy, Mathis, & Woods,

2007).

Recognition of disparities in health care have been the impetus for local, state,

federal, and private efforts to address this issue (Betancourt, 2009). Disparate health care,

coupled with fear and distrust, have continued over the course of several centuries

creating a powerful motivating factor for nonadherence and result in limited use of health

care services and sicker presentations requiring emergency care (Rand & Sevick, 2000).

Understanding the historical context of Blacks in this country provides some clues about

nonadherent behaviors.

One study with normotensive Black college students examined the relationship of

BP responses to racially stressful and anger-provoking situations in a laboratory setting

(Armstead, Lawler, Gorden, Cross, & Gibbons, 1989). Students were shown neutral,

anger-provoking, and racist video segments and after each scene, their BP was taken and

data tools were completed. Results revealed that racist stimuli increased BP more than

anger-provoking stimuli. However, study participants who demonstrated higher anger

suppression had higher systolic BPs. Male and female participants differed in that the majority of females stated they respond to racism by holding their anger in whereas males were more likely to express their anger. Authors concluded that racism in society may contribute to the development of HTN (Armstead et al., 1989), especially in Black women.

In a cross-sectional study of diverse middle aged women (Black, Hispanic, White, Japanese, and Chinese women), the association between perceived unfair treatment and HTN was examined (C. Brown, Matthews, Bromberger, & Chang, 2006). Black women reported the highest levels of perceived unfair treatment followed by Chinese women. However, results did not indicate a positive correlation between perceived unfair treatment and elevated BP. Similarly, findings in several studies (Barksdale et al., 2009; Benkert et al., 2006; S. K. Davis & Quarells, 2005; Peters, 2004, 2006) found no association between BP and perceived racism.

The influence of racism on HTN was examined in a subgroup of women enrolled in the Black Women's Health Study (Cozier et al., 2006). The study indicated that Black women born outside the United States and those who grew up in predominantly White neighborhoods experienced positive associations between racism and HTN. However, the associations between racism and HTN were most evident in Black women born outside the United States, especially those from the Caribbean and Central and South America. Authors surmised that this observation may reflect cultural differences in encountering and responding to racism in the United States.

Another study examined the relationship of perceived racism and ambulatory BP in Black men and women during a typical work day. In addition to data collection instruments, study participant's BP was monitored for 24 hours with an ambulatory BP device. Perceived racism was related to increases in systolic and diastolic waking BP, while anger inhibition was related to increases in diastolic sleep BP (Steffen, McNeilly, Anderson, & Sherwood, 2003). Another study was conducted in a sample of Black and White men and women to examine everyday discrimination as related to nocturnal BP dipping whereby study participants were monitored for 48 hours with an ambulatory BP device. Participants in this study who reported more everyday discrimination demonstrated less systolic and diastolic BP dipping, a negative health outcome regardless of racial identification, and Blacks reported higher levels of everyday discrimination than Whites (Tomfohr, Cooper, Mills, Nelesen, & Dimsdale, 2010). In both studies, differences between men and women were not significantly different. A cross-sectional comparative study on perceived discrimination and HTN in older Black and White adult men and women provided support that perceived discrimination was associated with higher diastolic BP. Authors concluded that discrimination may cause adverse effects on BP levels in Blacks (T. T. Lewis et al., 2009)

The issues surrounding HTN are complex with multiple causes for the widening health disparity that results in disproportionate mortality rates. However, the exact mechanism responsible for the negative physiological and psychological health outcomes remains unclear. Research studies continue to reveal conflicting results concerning the relationship between perceived racism and HTN. Thus, elimination of racial disparities in

Blacks with HTN will substantially decrease the number of deaths from CVD. Equitable treatment and access to adequate resources could facilitate better control of HTN for Blacks and contribute to improved treatment adherence (Fiscella & Holt, 2008; Fongwa et al., 2006).

   Depression. There is an old myth that depression is rare for Blacks, especially Black women (Fakhruddin, Woolridge, & Khan, 1975; Jones & Shorter-Gooden, 2003). Because depression is oftentimes camouflaged in Black women, it may not be physically detected due to a confident, tough appearing exterior (Jones & Shorter-Gooden, 2003). In addition, depression may not be easily identified on standardized instruments because perceptions of depression are different in Black women who often complain of feeling tired or stressed out. Jones and Shorter-Gooden (2003) describe depression in Black women as the loss of self or loss of one's identity whereby self is silenced, as opposed to typical depression that is precipitated by an external loss such as death or a job. In a qualitative study on depression and violence (Nicolaidis et al., 2010), Black women echoed these descriptions of depression. Participants described depression as a mask, oppressiveness on the inside, and as a strong Black woman on the outside and breaking down on the inside. According to Duckworth (2009), the avoidance of emotions among Black women originated during slavery as a survival technique that has now evolved into a cultural habit. Traditionally, Blacks have not sought treatment because depression is perceived as a personal weakness as opposed to a health problem. When treatment is sought, misdiagnosis frequently occurs. Therefore, health care providers may need

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additional training to appropriately screen Black women for depression (Schoenthaler,

Ogedegbe, & Allengrante, 2009).

Similarly, Cooper et al. (2003) conducted a telephone survey that included Whites

(*n*=659), Blacks (*n*=97) and Hispanics (*n*=73) on the acceptability of depression

treatment. The study found that Blacks and Hispanics were less likely than Whites to

think that antidepressant medication was acceptable treatment for depression. The odds of

finding counseling acceptable as a treatment option were significantly higher for

Hispanics and lower for Blacks when compared to Whites. In additions, Blacks were

more likely to believe that prayer may help heal depression and stated a preference for a

health care provider of the same race. This study supports the premise that Blacks have

different beliefs about depression and treatment modalities, and that health care providers

should address sociocultural considerations in Black clients when negotiating the

depression treatment regimen.

While the pattern of depression in Black women is not fully understood, there

appears to be a strong link between depression and HTN (Read & Gorman, 2007). In a

cross-sectional study conducted by Patten (2001) on the Canadian National Population

Health Survey data (N=11,859), HTN was associated with an elevated risk of major

depression in men, but not women. In contrast, a study of Black men with HTN and

substance abuse revealed that depression was not significantly correlated with BP, but

those with higher depression scores were not likely to adhere to antihypertensive

medication and dietary regimens (M. T. Kim, Han, Hill, Rose, & Roary, 2003). In

another study conducted by Schoenthaler et al. (2009) with Blacks who have HTN, poor

medication adherence was associated with depressive symptoms and younger age. More importantly, increases in depressive symptoms are associated with lower odds of antihypertensive medication adherence (Wang et al., 2002). Similarly, in a qualitative study conducted by Fongwa et al. (2008), depressed clients ruminated about things they could not change and failed to follow the prescribed treatment regimen. Clearly, these studies show that depression is associated with medication adherence.

A systematic review of studies published from 2002-2009 (Eze-Nliam, Thombs, Lima, Smith, & Ziegelstein, 2010) was conducted on eight research studies (44 reviewed) that met the inclusion criteria to assess the association between depression and adherence to antihypertensive medications. Study results found varied adherence rates ranging from 29% to 91%. Although all studies reported statistically significant relationships between depression and nonadherence to antihypertensive medications, six studies also reported at least one statistically insignificant result dependent on the statistical analysis (bivariate versus multivariate) and the type adherence or depression measure (such as dichotomous or continuous) used in the specific analysis. Heterogeneity between studies was related to various assessments of depression, how adherence was defined and measured, and methods employed to assess the relationship between depression and adherence. Another concern was the range of study participants (167 to 496 and one study had 40,492). These inconsistencies within and between studies resulted in the inability to draw definitive conclusions. Even though the link between depression and antihypertensive medication nonadherence is probable, the limitations of existing evidence in this review could not conclude the degree to which depression is associated with antihypertensive medication

nonadherence. Therefore, further research is warranted to objectively assess and clarify

the relationship between depression and medication nonadherence.

Interaction of Background and Dynamic Variables

The elements of client singularity (background and dynamic variables) reflect

holism and individuality of the client's interaction within their own social, physical, and

psychological environment (Cox, 1986). In the IMCHB, explanatory relationships are

postulated between client singularity and resultant health behaviors of clients.

Background variables are relatively static and interact cumulatively, simultaneously, and

oftentimes interdependently with each other to create behaviors that impact health

outcomes (Cox, 1982, 1986). For example, a client's lower educational status

(demographic characteristics) along with established cultural practices (social influence)

and lack of financial resources for health care (environmental resources) will likely

predict a different set of health outcome behaviors than one variable alone (Cox, 1982).

Unlike background variables, dynamic variables are not static and therefore, are

more readily affected by interventions (Cox, 2003). Hence, background variables serve as

precursors for dynamic variables (Cox & Roghmann, 1984). For example, a client with

limited income, no health insurance (environmental resources), and ongoing edema in the

lower extremities secondary to HTN (previous health care experience), may decide

(intrinsic motivation) to self-treat (cognitive appraisal) because of perceived

racism/discrimination (affective response), thus contributing to distrust in the health care

provider (cognitive appraisal) and forgoing follow-up medical evaluation and treatment

(Cox, 2003). Like background variables, dynamic variables may exert an influence on

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one another. For example, a client with longstanding HTN diagnosed with acute renal failure may experience intense fear of permanent kidney failure with hemodialysis (affective response). This fear may cause the client to increase his or her knowledge base of acute renal failure (cognitive appraisal) and lead to a self-determination to seek evaluation and abide by the treatment regimen in an effort to stay well (intrinsic motivation), thus reducing the client's anxiety (affective response).

The elements of client singularity represent a holistic view of the client's internal and external self. Without an assessment of these elements, health care providers literally operate without the essential knowledge necessary to establish therapeutic relationships and successfully evaluate client behavioral and health outcomes. Thus, research including background and dynamic variables are essential in explaining health behaviors and could be strong determinants of heath behaviors, such as medication adherence, and subsequent health outcomes.

Element of Health Outcome

Adherence to the Recommended Health Regimen

The health outcome of interest in this study is adherence to the recommended health regimen, specifically medication adherence in Black women with HTN. The health outcome is a reflection of the client's behavior and results in either positive or negative health outcomes.

Medication adherence. According to Cox (2003), adherence describes the extent to which a client engages in behaviors or treatments necessary for optimal health outcomes. Although many variables may contribute to a client's health care outcome,

Cox and Wachs (1985) state that it is not the contributing variables, but the client's free choice, that impact health outcomes. This study examined selected client singularity variables that contribute to client behaviors that may influence medication adherence in Black women with HTN.

Medication adherence in Blacks with HTN. One study (N=60) found a method to maximize medication adherence by providing free medication and comprehensive HTN care to low-income clients, and included 77% Black, 71% female, and mean age of 47 years, with known barriers such as poor accessibility, expensive follow-up care, costly medications, poor client education, and complex medication regimens (Applegate et al., 2000). Three physicians, internal medicine residents, pharmacist, pre-doctoral clinical psychology graduate students, registered nurse, and BP technician staffed a clinic that operated two afternoons weekly. During the initial clinic visit, a chart review and physical examination were conducted. In addition, laboratory work or procedures were done to rule out secondary HTN. All clients were treated or referred as necessary to specialty clinics, but only primary HTN clients were included in the data analysis. Treatment included antihypertensive medications according to JNC 7 guidelines that were individualized according to the client's response to treatment, side effects, and tolerability. Follow-up for each client was bi-weekly for the first four months to stabilize the BP, monitor side effects, establish health care provider-client relationship, and stress the importance of monitoring BP control. Clients were seen within one week if perceived or real problems occurred from medications and between four to six weeks after stabilization of BP. At each visit, BP checks, medication education, medication-taking

strategies, physical examination by same health care provider, assessment of nonadherence to the medication regimen and corrective action, and encouragement was provided. To foster follow-up appointments, only enough medication was dispensed to last to the next appointment, thus free medication was contingent on appointment keeping. Although appointment keeping was high (83%), those who missed appointments were telephoned the next day and scheduled for the next clinic. Study results revealed significant drops in systolic (mean of 25mm Hg) and diastolic BP (mean of 13 mm Hg) from baseline to six-month post-enrollment. Study participants meeting the criteria for JNC 7 controlled HTN increased from 12% to 63% during the study period. Individual client needs were addressed through intensive management with the provision of free medications, consistency in health care providers, relationships with providers, and HTN medication education. The results of this study prompted health care providers at this clinic to establish broader free-medication programs for other chronic illnesses. Although this study did not have a control group for comparison, it provides strong evidence that a multidisciplinary, multifaceted approach to successful medication adherence may be warranted.

Another research study on medication adherence and appointment-keeping behavior was conducted in a sample of Blacks with HTN (N=153), 87% women and a mean age of 52 years (G. Ogedegbe, Schoenthaler, & Fernandez, 2007). Although appointment-keeping may be used as a signal of medication adherence, the study results were not significant, thus concluding that medication adherence should not be equated with appointment-keeping. One reason why study participants did not keep appointments

could relate to the high unemployment rates in the majority of participants (77%) that may have resulted in an inability to afford transportation. Of the participants who missed scheduled appointments, one-third continued to take their medications according to participant self-report which may be indicative of an overestimation of adherence.

In a study conducted by Fernandez, Chaplin, Schoenthaler, and Ogedegbe (2008), the Medication Adherence Self-Efficacy Scale (MASES) was tested and revised in Blacks with HTN (N=168), 86% female, and a mean age of 54 years, along with the Morisky self-report medication adherence scale at baseline and at three months; and the electronic medication event monitoring system (MEMS) at three months. Results revealed that MASES scores were higher for participants who self-rated as adherent when compared to those who self-rated as nonadherent. In addition, the MASES and MEMS were positively correlated with statistical significance. Preliminary data from this study support the validity and reliability of the MASES tool for use in similar samples.

Several research studies investigated medication nonadherence. Shea, Misra, Ehrlich, Field and Francis (1992) found in a sample of Hispanic and Black subjects (*N*=202), 44% male, and average age of around 57, that there was an association between medication nonadherence and use of the emergency room for HTN care and lack of a primary care physician. In addition, younger age was significantly associated with nonadherence. Stanton (1987) purports that when the BP remains inadequately controlled over the course of treatment, nonadherence is the problem and not the therapeutic regimen. Fongwa, Evangelista, and Doering (2006) concurred that HTN can be controlled with current advances in medical treatment. However, access to health care, health

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behaviors (smoking, alcohol, diet, overweight/obesity, and inactivity), lack of social support, knowledge, and clinical management may influence adherence behaviors (Fiscella & Holt, 2008; Fongwa et al., 2006; Stanton, 1987). Interestingly, Munger, Tassell, and LaFleur (2007) contend that medication nonadherence could be recognized as a cardiovascular risk factor.

Research presented at the 2008 American Heart Association Scientific Sessions suggests that caring behaviors of health care providers influence adherence to prescribed treatment and therapy. A 12-month randomized controlled trial was conducted on hypertensive Blacks (N=256), 80% women, with mean age of 58, who were taking at least one antihypertensive medication and had uncontrolled BP. The study evaluated whether a client education intervention with a workbook enhanced with positive affect and self-affirmation inductions with bi-monthly telephone calls was more effective than a control group with client education in improving medication adherence assessed by electronic pill monitors and BP control. Significantly greater BP control was noted in the positive affect and self-affirmation inductions group (59%), as compared to the client education group (34%) (G. O. Ogedegbe et al., 2008). This study was effective in helping clients to affirm positive feelings while reducing negativity surrounding their health through self-affirmation and the caring phone calls of health care providers.

Medication adherence in Black women. There is a paucity of literature that primarily addresses medication adherence issues in Black women with HTN. In a literature review, one qualitative study (Fongwa et al., 2008) and one scholarly article (Fongwa et al., 2006) focused exclusively on adherence treatment factors in Black

women with HTN. Because Black women have the highest prevalence of HTN in the world (Roger et al., 2011), this lack of research is daunting. Undoubtedly, a dearth of information on medication adherence in Black women with HTN represents a significant gap in the literature that warrants further research (Fiscella & Holt, 2008; Fongwa et al., 2006; Fongwa et al., 2008).

Of the medication adherence studies found, men, older adults, or mixed samples of both men and women and diverse racial/ethnic groups with various disease processes such as HTN, CVD, stroke, heart failure, cancer, and HIV were noted. Because heart disease is the leading cause of death for women > 65 years of age (Roger et al., 2011), a concentrated amount of literature was found on older adult women with heart disease. In contrast, the literature does not produce the same volume for Black women who suffer a disproportionate burden of mortality, disability, and morbidity from HTN related complications (Roger et al., 2011).

A number of qualitative studies (Fongwa et al., 2006; Fongwa et al., 2008; L. M. Lewis et al., 2010; Lukoschek, 2003; G. Ogedegbe, Harrison, Robbins, Mancuso, & Allegrante, 2004; R. M. Peters et al., 2006; Webb & Gonzalez, 2006; Wexler et al., 2009) were found in the literature on medication adherence/compliance issues in Blacks, but these studies did not address the specific concerns of Black women. However, these qualitative studies do shed light on the many reasons for nonadherence to the prescribed treatment regimen, such as low income, lack of health insurance, low educational level, perceived racism, and lack of trust in the health care provider. The primary reason for qualitative research is to listen to those who "may be in despair, who may have given up,

or who do not have access" (Munhall, 2007, p. 20). Further, qualitative studies solicit the attention of health care providers, researchers, and policy makers to hear the cry of individuals who want to tell their story and give understanding to their world by "revealing what had been concealed" (Munhall, 2007, p. 11).

The current qualitative literature provide a holistic view of major issues that may impact medication adherence issues in Blacks with HTN, and one qualitative study was exclusively centered on Black women and HTN treatment factors. Although national data have revealed alarming statistics on the high prevalence rates of HTN in Black women (Roger et al., 2011), no quantitative studies were found that focused exclusively on Black women with HTN and problems with medication adherence. Undoubtedly this paucity of research on medication adherence in Black women with HTN denotes a significant gap in the literature that warrants further study (Fiscella & Holt, 2008; Fongwa et al., 2006; Fongwa et al., 2008).

Summary

Primarily, this study focused on the extent to which client singularity (background and dynamic variables) predicted medication adherence outcomes in Black women with HTN. To understand health outcomes, it is imperative that health care providers have insight into the individual client's background (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage) and dynamic variables (HTN knowledge, self-care of HTN, trust in health care provider, coping, perceived racism, and depression) and their influence on client health care behaviors, such as medication adherence. The interplay of these variables provide

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understanding and insight into the processes necessary for development of appropriate

nursing and other discipline specific interventions (Cox, 1986). Thus, the IMCHB is a

valuable framework to explain the need for health care providers to address the client's

unique background and dynamic variables in an effort to achieve positive health

behaviors, such as medication adherence, especially in Black women.

CHAPTER III

METHODS

Introduction

Chapter three described the methodology used to study medication adherence in Black women with hypertension (HTN). Included is a description of the research design, setting, sample, protection of human subjects, instruments, procedures, and the plan for data analysis. Lastly, the limitations of the study are addressed.

Design

A cross-sectional, correlational design was used for this non-experimental research study. In a cross-sectional design, data are measured on one occasion with the goal of describing variables or examining associations among variables (Newman, Browner, Cummings, & Hulley, 2007). For instance, a cross-sectional design allows the collection of all measurements from participants at one time point to describe their health status and examine pertinent issues that may influence medication adherence. Because this study does not examine changes in medication adherence over time, a cross-sectional design was deemed appropriate.

With correlational design, this study examined the relationship or association between variables that are not manipulated (Gliner & Morgan, 2000; Vogt, 2005). Because none of the independent variables (perceived racism, trust in health care

provider, HTN knowledge, coping, and reactance) could be ethically manipulated, the correlational design was acceptable for this study.

Setting

Participants were recruited from various settings with a majority of Black members or clients, such as churches, hair salons, and community events in the Piedmont region of North Carolina. Using a variety of settings assisted in obtaining an adequate and heterogeneous sample of adult Black women ages 18-60 who are taking antihypertensive medications. After volunteers contacted the principal investigator (PI) indicating their willingness to participate in the study, informed consent was obtained, and data were collected in a quiet private setting agreeable to the participant that included their home or another preferred location.

Sample

A non-probability convenience sample of community dwelling Black women were recruited for this study. Inclusion criteria included: (a) ages ranging from 18 to 60 years, (b) taking one or more prescription medication(s) for HTN, and (c) English speaking. Exclusion criteria included self-report of: (a) mental illness that interferes with daily functioning, (b) current pregnancy, and (c) concurrent participation in another research study.

Recruitment methods included flyers (see Appendix A) posted on bulletin boards, publicized at meetings, distributed directly to potential participants, and circulated to targeted community members or leaders in various Black churches, businesses such as hair salons, and community events. Follow-up telephone calls and face-to-face meetings

with business owners, pastors and community leaders occurred as needed to aid recruitment efforts (Ellish, Scott, Royak-Schaler, & Higginbotham, 2009; Watson & Torgerson, 2006). In addition, study participants were obtained by snowball sampling and social nomination.

Flyers contained a brief description of the study, the PI's name, and local telephone number. If interested in participating in the research study, potential participants contacted the PI and if they are unable to access a cellular or landline telephone, contact information was sent to the PI through the referral person. After an explanation of the study and providing answers to any questions, eligibility requirements were determined. Arrangements were made to individually meet with study participants in a quiet location for written consent (see Appendix B) and completion of data collection tools.

Using an adaptive algorithm to compute power (Efird, 2007), a priori power analysis was conducted to determine the sample size needed to answer the research questions for this research study. Using the exact discrete-event (proportional odds model), a sample size of 80 was required to detect a minimal relative importance score (RIS) of 4.5 (alpha of 0.05) with a power of 80% (Efird, 2007).

Human Subjects Protection

The approval for this study (see Appendix C) was obtained from The University of North Carolina at Greensboro Institutional Review Board (IRB). No other permissions were obtained except from individual study participants.

The purpose of this study was fully explained to all participants. To avoid issues related to literacy, the consent form, written at a fifth grade reading level and all forms were read to participants by the PI unless participants choose to self-administer. After all questions were addressed, the consent form was signed indicating voluntary participation prior to collecting data. Study participants received a copy of the consent form with a verbal and written statement of their right to withdraw from the study at any time without negative consequences.

Precautions were taken to eliminate risks to confidentiality on all data collection forms and computer files by using non-identifiable or random number codes to identify participants instead of names or other identifiable information. The master key of study participant's names and identification numbers were kept separately from the data collection forms and securely locked in a file cabinet accessible only to the PI and faculty sponsor. The data collection forms were also kept in a separate locked file cabinet in the PI's office.

Instruments

Data were collected using 10 self-report instruments: (a) the investigator developed Demographic Data Tool, (b) Hill-Bone Compliance to High Blood Pressure Therapy Scale, (c) Therapeutic Reactance Scale, (d) High Blood Pressure Prevention IQ, (e) Self-Care of Hypertension Index, (f) Trust in Physician Scale, (g) John Henryism Active Coping Scale, (h) Index of Race-Related Stress-Brief Version, (i) Patient Health Questionnaire-9, and (j) the Marlowe-Crowe Social Desirability Scale.

Demographic Data Tool

The Demographic Data Tool (see Appendix D) was developed by the PI to collect

information not addressed on the other instruments and important in describing the

sample. The tool included information such as socioeconomic status (education, income,

and occupation), medical history, health care coverage, housing/living arrangements, and

transportation. In addition, measured data recorded on this tool included blood pressure

(BP), height, weight, and waist circumference.

The Hill-Bone Compliance to High Blood Pressure Therapy Scale

The Hill-Bone Compliance to High Blood Pressure Therapy Scale (Hill-Bone

CHBPTS) (see Appendix E) was designed to assess medication compliance. Because

adherence reflects the conceptual basis for this study, the term adherence was

interchanged with the term compliance throughout this study. The Hill-Bone CHBPTS is

a 14 item assessment tool with three subscales: (a) reduced sodium intake, 3-items; (b)

appointment keeping, 3-items; and (c) medication taking, 8-items. Responses are scored

on a 4-point Likert scale (1=none of the time, 2=some of the time; 3=most of the time,

and 4=all the time). According to the authors (M.T. Kim et al., 2000), one or more of the

subscales may be used for research. For this study, the medication taking subscale was

chosen to assess medication taking behavior plus one item that addressed prescription

refills. Adding this one question is consistent with the use of this tool in the literature

(Hill et al., 1999; M. T. Kim et al., 2003; M.T. Kim et al., 2000; Krousel-Wood et al.,

2008). The minimal medication taking score is 9 and the maximum score is 36. Lower

scores reflect medication adherence behaviors and higher scores reflect nonadherence. Item #6 was reverse scored before analysis.

Included in the Hill-Bone CHBPTS is the four-item Medication Adherence Scale (MMAS) developed by Morisky et al. (Hill et al., 1999; Morisky, Green, & Levine, 1986). In the initial Morisky et al. (1986) study, the Cronbach's alpha for the MMAS (0.61), and concurrent validity between the MMAS and controlled BP were established ($r = 0.58$; $p < 0.01$). Data from the study indicated that 33% of the variance in BP was accounted for by medication adherence ($R^2 = 0.33$; $p = <0.01$). According to Morisky (1986), the MMAS is reliable, valid, and has reasonable predictive ability with BP. The sample in the original study was 91% Black, 70% female, with a median age of 54 years and a median 8th grade educational level (Morisky et al., 1986).

In a study conducted by M. T. Kim, Han, Hill, Rose, & Roary (2003) with Black males, ages 18-55 years, the Cronbach's alpha for the Hill-Bone CHBPTS for medication compliance subscale was acceptable at 0.77, and for the total scale was 0.75. Using five nurses and two physicians who specialized in BP clinical research and practice as a panel of experts, content validity was established (M.T. Kim et al., 2000).

The Therapeutic Reactance Scale

The Therapeutic Reactance Scale (TRS) (see Appendix F) is a is a 28-item self-reported inventory designed to measure the psychological trait, reactance (Dowd et al., 1991). Responses are scored on a 4-point Likert scale (1=strongly disagree, 2=disagree, 3=agree, and 4=strongly agree). In the initial study conducted by Dowd (1991), a sample of 130 undergraduate college students in their early 20s and composed of mostly women

(75%) were participants in a test-retest design using 112 items in each session. A total of 28-items out of 112 remained after item-total correlations and factor analysis. A two factor solution (labeled verbal and behavioral) accounted for 26% of the total variance with a correlation of 0.37 between the factors. Over three weeks, test-retest reliability ranged from 0.57 to 0.60. Cronbach's alpha ranged from 0.75 to 0.84 on the initial testing and were acceptable levels (Dowd et al., 1991). The minimum score is 28 and the maximum score is 112 with higher scores reflecting greater reactance. Eight items are reversed scored.

The High Blood Pressure Prevention IQ

The High Blood Pressure Prevention IQ (HBPPIQ) (see Appendix G) is a 12-item questionnaire designed to measure BP knowledge for laypersons ("Check your high blood pressure", 1994). The HBPPIQ uses true-false questions to assess comprehension of HTN. In a study conducted by Martins, Gor, Teklehaimanot, and Norris (2001), 397 Blacks and over half female (63%), aged 18 to 73 years, were surveyed. The total score on the HBPPIQ was calculated from the percentage of correct responses and the mean score for this sample was 83% indicating a high level of HTN knowledge. No psychometric properties were found for this measure. To evaluate this test, validity (face and content) and reliability (Cronbach's alpha) methods were employed.

The Self-Care of Hypertension Index

The Self-Care of Hypertension Index (SCHI) (see Appendix H) is a new 24-item tool designed to measure naturalistic decision-making that reflects an individual's choice of behaviors in the maintenance and management of their BP. The SCHI is adapted from

the self-care of heart failure model and consists of three subscales: self-care maintenance, management, and confidence. Each subscale stands alone to describe the study sample. Therefore, no total score exists and each subscale is standardized to a score of 100 for comparability purposes. Responses are scored on a 4-point Likert scale (never or rarely=1, sometimes=2, frequently=3, and always or daily=4). The self-care maintenance scale of the SCHI has 12 items, and both the management and confidence scales have six items. The SCHFI has a cut-point score of 70 or greater indicating self-care adequacy on the maintenance and management scales. Although confidence influences self-care, it is not part of the self-care process (Riegel et al., 2009).

According to V. V. Dickson (personal communication, December 5, 2010), preliminary Cronbach's alphas for the SCHI three subscales were good to acceptable (maintenance, 0.78; management, 0.56; and confidence, 0.85), but more data are needed to determine validity. In addition, the correlation of the maintenance scale with the medical outcomes study (MOS) specific adherence survey was 0.71 ($p = .0000$). Data from this study will contribute to the psychometrics of the SCHI.

The Trust in Physician Scale

The Trust in Physician Scale (TPS) (see Appendix I) is an 11-item instrument designed to measure client's interpersonal trust in their primary health care provider (Anderson & Dedrick, 1990). Responses are scored on a 5-point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree). "Neural" was not used as a response item. The minimal score is 11 and the maximal score is 55 with higher scores reflecting greater trust. Four items are reverse scored.

Two studies were conducted initially to generate and analyze items and to examine the validity and reliability of the TPS. The TPS was tested first in a male sample of 160 veterans who were 56% White, with a mean age of 55 years. A second study followed with 106 veterans, 62% White, with a mean age of 61 years. In the initial two studies, Cronbach's alpha for the TPS ranged from 0.85 to 0.90 (Anderson & Dedrick, 1990). The scale has demonstrated construct validity as evidenced by positive correlations with the Multidimensional Health Locus of Control indicating the client's desire of control and satisfaction in clinical interactions (Anderson & Dedrick, 1990). In a study conducted by Freburger, Callahan, Currey, and Andersen (2003), the TPS was tested with a majority female sample (77%), 86% White, and a mean age of 60 years. The Cronbach's alpha was 0.87 in this study with mostly women indicating comparable reliability with previous studies of all male samples.

The John Henryism Active Coping Scale

The John Henryism Active Coping Scale (JHACS) (see Appendix J) is a 12-item assessment tool designed to measure three mutually reinforcing themes of efficacious mental and physical vitality, strong commitment to hard work, and determination to achieve goals in life (James, Strogatz, Wing, & Ramsey, 1987). Responses are scored on a 5-point Likert scale (1=completely false, 2=somewhat false, 3=don't know, 4=somewhat true, and 5=completely true). "Don't know" was not used as a response item. The minimum score is 12 and the maximum score is 60. High and low JHACS scores are determined by a median split of total scale scores. Scores are recorded as high (above the median) or low (below the median) to reflect coping characteristics of the

study group (James, 1996; James et al., 1987). In a study conducted on Black and White

men and women (James et al., 1987), the Cronbach's alpha for all participants was 0.72,

and the Cronbach's alpha for Black women was 0.71.

According to James (1996), JHACS is most appropriate for individuals aged 18 to

60 because at age 18, active coping increases in intensity as employment and career goals

become more defined. However, by age 60 active coping begins to taper as employment

and career goals decrease in intensity. Because this tool is important in answering the

research questions, the age group of 18 to 60 was included in this study.

The Index of Race-Related Stress-Brief Version

The Index of Race-Related Stress-Brief Version-B (IRRS-B) (see Appendix K) is

a multidimensional questionnaire designed to measure stress experienced by Blacks who

have racist encounters (Utsey, 1999). The IRRS-B was adapted from the original 46-item

IRRS in an effort to address time constraints and geographically specific questions.

Supported by exploratory and confirmatory factor analysis, the IRRS-B was reduced to

22-items and three subscales: (a) cultural racism, 10-items; (b) institutional racism, 6-

items; and (c) individual racism, 6-items, omitting the collective racism subscale.

Responses are scored on a 5-point Likert scale (0=this has never happened to me,

1=event happened but did not bother me, 2=event happened and I was slightly upset,

3=event happened and I was upset, and 4=event happened and I was extremely upset).

Scores of global racism or total scale result by converting each subscale score to z scores

before summing the scores of each subscale. The Z scores are necessary because the

IRRS-B has an unequal number of items in each subscale and weighting the subscales

allows an equal distribution of each subscale to the Global Racism score. Higher scores indicate greater perceived racism than lower scores (Utsey, 1999).

In a study conducted by Utsey (1999), the 22-item questionnaire was tested on a sample of 239 Black male (n=78) and female (n=138) college students, substance abuse program clients, and an area community along with a subsample of Whites (n=25). Gender data were missing for 23 study participants. Using multivariate analysis of variance, successful discrimination of the IRRS-B was noted between Blacks and Whites with significantly higher scores by Blacks on all subscales indicating criterion-related validity. Convergent validity was supported by moderate correlations ($r = 0.33$-0.59) between the IRRS-B subscales and the Racism and Life Experience Scale-Revised subscales. The IRRS-B Cronbach's alpha was reported for cultural (0.78), institutional (0.69), and individual racism (0.78) subscales.

The Patient Health Questionnaire-9

The Patient Health Questionnaire-9 (PHQ-9) (see Appendix L) is a nine-item tool to identify depressive symptoms and the severity of depressive symptoms in the previous 2-week period. As part of the PHQ designed to screen for five of the most common mental disorders, the PHQ-9 reflects the DSM-IV criteria for depressive disorders. Responses are scored on a 4-point Likert scale (not at all=0, several days=1, more than half the days=2, and nearly every day=3). The minimal score is 0 and the maximal score is 27 (Kroenke et al., 2001). A score of 0-4 represents no depressive symptoms, 5-9 represents minimal depressive symptoms, 10-14 represents minor depressive symptoms, 15-19 represents moderately severe depressive symptoms, and 20-27 represents severe

depression symptoms. Any person scoring 5 to 9 were classified as having minimal symptoms of depression, while scores of 10 to 14 were classified as possibly clinically significant, and scores of 15 to 19 and 20 to 27 were classified as warranting active treatment (Spitzer, Williams, & Kroenke, n.d.). An additional item at the end of the tool addressed problem areas checked on the questionnaire: "How difficult have these problems made it for you to do your work, take care of things at home, or get along with other people" (Kroenke et al., 2001; Spitzer, Kroenke, & Williams, 1999)?

In a study conducted at eight primary care sites, the PHQ-9 was used to screen 3000 clients for depressive symptoms and other mental disorders. Clients had a mean age of 46 (range 18-99) and the majority were White (79%) and female (66%) with HTN (25%) as the most common physical disorder. With 585 of the 3000 participants, criterion validity was demonstrated by agreement between the PHQ-9 and the diagnosis of a mental health professional (MHP) who was blinded to the PHQ-9 results. The correlation between the PHQ-9 and the MHP was 0.84. The sensitivity of the PHQ-9 was 73% and specificity 98% with and overall accuracy of 93% (Kroenke et al., 2001).

In another study (Spitzer et al., 1999), 3000 clients from five general internal medicine and three family medicine clinics and 3000 clients from seven obstetrical-gynecology sites completed the PHQ-9 and the 20-item Short-Form General Health Survey (SF-20), a measure of functional status in six domains. Study participants in the medicine clinics had a mean age of 46 (±17), and the majority were White (79%) women (66%), while the obstetrical-gynecology participants were all women (100%) with a mean age of 31 (±11), and the majority were White (39%) and Hispanic (39%). The

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PHQ-9 Cronbach's alpha was 0.86 in the medicine clinic participants and 0.89 in the obstetrical-gynecology participants. Likelihood ratio increased as PHQ-9 scores increased indicating an association between higher PHQ-9 scores and the likelihood of major depression symptoms. The PHQ-9 correlated strongest with the mental health domain of the SF-20 at 0.73.

The Social Desirability Scale

The Marlowe-Crowe Social Desirability Scale (M-C 1[10] SDS) (see Appendix M), short form, is a 10-item instrument designed to measure socially appropriate responses to self-report measures or an individual's need for approval by responding in a manner they perceive the investigator desires (Crowne & Marlowe, 1960; Strahan & Gerbasi, 1972). The M-C 1(10) SDS was adapted from the 33-item Marlowe-Crowe Social Desirability Scale (M-C SDS) in an effort to reduce respondent burden. This scale uses true-false questions whereby higher scores reveal the tendency to provide socially desirable answers.

According to Crowne (1960), the initial study revealed a Kuder-Richardson formula 20 (K-R 20) reliability coefficient of 0.88 in a sample of 10 male and 29 female undergraduate students who were 19-46 years of age. In a study conducted by Strahan and Gerbasi (1972) to form a new scale with fewer items, a sample of 176 non-college and college males and 185 college and university females were tested. Three new shorter versions of the M-C SDS were developed, the M-C 1(10), M-C 2(10), and the M-C (20). The number of items in each scale is listed in parenthesis. Of the shorter scales, the M-C 1(10) was deemed slightly superior because reliability coefficients were similar across

diverse samples when compared to the M-C 2(10), thus, the M-C 1(10) was used for this study. Correlations between each new scale and the M-C SDS were in the 0.80s and 0.90s. For the M-C 1(10), the K-R 20 reliability coefficient ranged from 0.59 and 0.70 for non-college and college males *a*nd was 0.61 and 0.66 for college and university females (Strahan & Gerbasi, 1972).

Procedures

All potential participants were informed of the study through one or more mechanisms that included flyers, announcements, or social nomination. Those interested provided their contact information to the PI by telephone message, electronic mail, or referrals indicating interest in the research study. The PI responded by contacting the individual via telephone or other means such as electronic mail, and face-to-face meetings to provide more information about the study and ensure they meet the inclusion criteria. All questions regarding the study were answered, and if the individual met the inclusion criteria and agreed to participate in the study, an appointment was made to conduct an interview for data collection. On the day before the interview, the PI made contact with each individual to confirm the interview time and place. The PI individually met with each study participant to get informed consent and to collect data in a quiet location chosen by the participant, either their home or another preferred location.

At the interview, the PI briefly explained the purpose of the research and the data collection process. The PI read the entire consent form while asking individuals to read along with the researcher. Reading the consent form prevented any issues of illiteracy that may affect participation and cause embarrassment (Waltz, Strickland, & Lenz, 2005).

After all questions were answered, each participant was asked to sign the consent form indicating their voluntary consent to participate in the research study. The signed copy was retained by the PI and an unsigned copy was given to the participant for their personal records.

After the informed consent was obtained, each participant was assigned an identification number with a designated folder for their data tools. The study participant's BP, height, weight, and waist circumference were measured. Using a standard sphygmomanometer on participants who had been seated for at least five minutes, two consecutive BP readings were taken in their dominant arm with one minute between measurements (Pickering et al., 2005). Both BP readings were recorded and analyzed as BP 1, BP 2, and the average of the two measurements (Chobanian et al., 2003). According to JNC 7 (Chobanian et al., 2003), the PI adhered to the following protocol if the BP was elevated: (a) stage 1 HTN (BP 140/90-159/99 mm Hg), suggest follow-up with health care provider within 2 months; (b) stage 2 HTN (BP greater than or equal to 160/100 mm Hg), suggest follow-up with primary health care provider within one month; and (c) hypertensive emergency (BP greater than or equal 180/110), call 911 or have someone transport the participant to the nearest emergency department for immediate treatment (Chobanian et al., 2003). Each study participant was given their BP reading verbally and in writing along with BP educational materials (American Heart Association, 2009; Preventive Cardiovascular Nurses, 2010) at the completion of data collection.

A portable platform Seca 813 electronic scale was used to measure weight with measurements to the nearest 0.1 kilogram. Height was measured using a portable Seca 217 stadiometer with measurements to the nearest 0.1 centimeter and was converted to height in meters by dividing height in centimeters by 100. Weight and height data were used to calculate the body mass index (BMI) using the metric system formula, weight in kilograms divided by height in meters squared also express as weight (kg) / [height (m)]^2. The BMI parameters were categorized as underweight (<18.5 kg/m^2), normal weight (18.5 to 24.9 kg/m^2), overweight (25-29.9 kg/m^2), and obesity (greater than or equal to 30 kg/m^2) ("BMI classification", 2010; "Calculate your body mass index", n.d.). With a Gulick tape measure (which included a mechanism to ensure consistent tension when measuring), waist circumference was measured to the nearest 0.1 cm by circling a soft tape measure around the waist at the top of the iliac crest and slightly above the level of the umbilicus from the "0" end of the tape to the intersection of the waist measurement number. The participant stood in an upright position without sucking in the abdomen while the tape was pulled taut without squeezing into the skin. Waist circumference body fat of more than 35 inches (89 cm) for women and more than 40 inches (102 cm) for men increases the risk of heart disease (Heaner, n.d.; Rhoads & Kim, 2009).

After anthropometric measures, the PI inspected all prescribed and over-the-counter medications the participant had used during the past two weeks preceding the interview. Direct visualization of all medications allowed for accurate documentation of medication names, dosages, and time frequencies for administration. In addition, direct

visualization minimized embarrassment if names of medications were not known or pronounced correctly.

Depression is often unrecognized and therefore not treated, especially in Black women (Artinian, Washington, Flack, Hockman, & Jen, 2006). The treatment recommendations for the PHQ-9, a screening tool for depression, include: (a) scores of 5 to 9=minimal symptoms of depression, suggesting support; (b) scores of 10 to 14=minor depression symptoms and is possibly clinically significant, suggesting support, watchful waiting, and/or active treatment (antidepressant or psychotherapy) if dysthymia or mild major depression; (c) scores of 15 to 19=moderately severe major depression symptoms, suggesting active treatment; (d) scores of 20 to 27=severe major depression symptoms, suggesting active treatment of both antidepressant and psychotherapy ("The patient health questionnaire", 2009); and (e) if suicide ideations are detected, call 911 or have someone transport the participant to the nearest emergency department for immediate treatment (Spitzer et al., n.d.).

Participants were asked to answer questions on the 10 self-report instruments: (a) the investigator developed Demographic Data Tool, (b) Hill-Bone Compliance to High Blood Pressure Therapy Scale, (c) Therapeutic Reactance Scale, (d) High Blood Pressure Prevention IQ, (e) Self-Care of Hypertension Index, (f) Trust in Physician Scale, (g) John Henryism Active Coping Scale, (h) Index of Race-Related Stress-Brief Version, (i) Patient Health Questionnaire-9, and (j) the Marlowe-Crowe Social Desirability Scale.

There was a strong possibility that some study participants may not be able to read because of illiteracy or low literacy skills (Flack et al., 2010; Waltz et al., 2005). In

an effort to be sensitive to participants with illiteracy or low literacy skills and ensure

consistency of data collection, the PI read all instruments to each participant in an

interview style unless the participant chose to self-administer. This process helped to

prevent embarrassment and ensure clarity and understanding of the questions. Directives

were given prior to the administration of each tool. When instruments had Likert scale

responses, the scale was provided to participants as a visual aid during the interview.

Respondent fatigue was addressed by alternating the various types of scales, keeping the

participant's interest by rotating between dull and interesting questions, and controlling

the number of questions. In addition, participants were offered a break to prevent fatigue

during data collection. No known burdens were place on participants. Each data

collection session lasted approximately 45 to 60 minutes.

After completion of the data collection tools, the PI thanked participants for their

time and effort. Participants were given $15 cash as a token of appreciation for their time

and effort along with their BP reading and BP education materials from the American

Heart Association and Preventive Cardiovascular Nurses Association. Overall results of

the research study will be shared with participants upon request while ensuring

confidentiality of individual responses.

Data Analyses

Descriptive statistics were used to describe the demographic characteristics of the

sample population. The Shapiro-Wilk test was used to assess normality of all independent

variables (Norusis, 2008). In addition, all continuous data had calculated means, ranges,

standard deviations, frequencies, skewness, kurtosis, and graphic plots to examine the

distribution and cause of nonnormal data. Differences in adherent and non-adherent participants' demographic characteristics were analyzed using the *t*-test for normally distributed continuous variables (age, mean systolic and mean diastolic BP, and BMI). The Mann-Whitney U test was used for non-normally distributed continuous variables (number of medications), and cross-tabulations with Chi-Square test was used for categorical variables (education and type of health coverage). Cronbach' alpha was calculated for each instrument. All descriptive statistics were analyzed with SPSS (version 19.0.0) software.

The Fisher's exact test was used to examine the significance of association (contingency) between background and dynamic variables on medication adherence in place of a phi correlation coefficient because data were sparse. A semi-parametric regression procedure, exact discrete-event (proportional-odds) model, was used to examine the association between a set of predictor variables and an ordinal scale outcome variable. Statistical analysis for the Fisher's exact test and the exact discrete-event (proportional-odds) model was conducted with SAS (version 9.1.3) software.

Spearman rank-order correlation (Spearman rho) was used to describe the linear relationship between reactance and the outcome variable, medication adherence that was measured on an ordinal scale. Statistical analysis for Spearman rho was conducted with SPSS (version 19.0.0) software.

Data Analysis for Specific Aims

The specific aims and associated questions were outlined for data analysis.

1. Describe Black women who adhere to antihypertensive medication treatment and those who do not adhere.

    Q1: Are there differences in background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage) in Black women who adhere to antihypertensive medication treatment as compared to Black women who do not?

    Basic descriptive statistics were used to answer this research question. Descriptive statistics included the mean, standard deviation, and range to summarize background variables. Percentage frequency distributions described nominal and categorical data variables. The t-test was used to investigate differences in background variables between sub-groups in the sample, such as adherent and nonadherent participants.

2. Examine the influence of background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage), and dynamic variables (HTN knowledge, self-care of HTN, trust in health care provider, coping, perceived racism, and depression) on medication adherence in Black women with HTN.

    Q2. Are the background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage) and dynamic variables (HTN knowledge, self-care of HTN, trust in health care provider, coping, perceived racism, and depression) associated with medication adherence in Black women with HTN?

Q3. Do the background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage), and dynamic variables (HTN knowledge, self-care of HTN, trust in health care provider, coping, perceived racism, and depression) predict medication adherence in Black women with HTN on an ordinal scale?

The Fisher's exact test was used to answer research question 2. The Fisher's exact test examines the significance of association (contingency) between background and dynamic variables on medication adherence. The procedure follows a hypergeometric distribution under the null hypothesis of independence with fixed margins and is frequently used in place of a phi correlation coefficient when data are sparse (Bower, 2003; Huck, 2008). Fisher's exact test does not rely on normality assumptions and uses the exact distribution instead of a normal approximation (Polit, 1996).

Exact discrete-event (proportion odds model) was used to answer research question 3. A semi-parametric regression procedure, exact discrete-event (proportional-odds) model, was used to examine the association between a set of predictor variables and an ordinal scale outcome variable. Similar to a log-binomial or Poisson regression model, the adjusted relative effect size of association, referred to as the relative importance score (RIS), was computed by exponentiating the regression beta-coefficient for the variable of interest (Breslow & Day, 1980). The adjusted RISs determine the contribution each independent variable makes in combination with other independent variables in predicting the value of the dependent variable. The higher scores represent the importance of the dimension (LeBreton & Tonidandel, 2008; Sachdev & Verma,

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2004). The ordinal outcome for this study, medication adherence, used a four-point Likert scale with ordered categories (1=never, 2=some of the time, 3=most of the time, and 4=all of the time). This study built a model to describe the relationship between the outcome variable medication adherence and the predictors, background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage), and dynamic variables (HTN knowledge, self-care of HTN, trust in health care provider, coping, perceived racism, and depression).

3. Explore the relationship between reactant behaviors and antihypertensive medication adherence and in Black women.

Q4. Is there a relationship between reactant behaviors and medication adherence in Black women with HTN?

Spearman rho was used to answer this research question. The correlation between reactance and medication adherence was examined to determine the strength and direction of the relationship. Both variables were rank ordered to compute the Spearman's correlation coefficient (Polit, 1996). If a relationship existed between the two variables, reactance and medication adherence, Spearman rho, determined the strength of that relationship. The Spearman rho correlation coefficient ranged from -1.00 to +1.00. A positive or negative correlation indicates a linear relationship between two variables and zero shows no relationship between the variables (Polit, 1996).

Limitations

The limitations of this study deserve recognition. Study participants were in the 18-60 age group, thus restricting the ability to study medication adherence issues in older

adults with HTN. A convenience sample from various settings with a majority of Black

members or clients such as churches, hair salons, and community events provided a self-

selected group who volunteered in response to recruitment efforts. Instrumentation is a

limitation because using self-report measures can introduce personal bias into the study.

Hence, the subjective nature of the instruments may not accurately reflect client

behaviors. In addition, those who agreed to be study participants may differ from those

who declined as well as differ from those in other parts of the country. Thus, the results

of this study may only be generalized to this study sample because random sampling was

not used. Lastly, changes over time cannot be assessed since this is a cross-sectional

study that examines one point in time using a nonprobability sample of Black women

with HTN (Vogt, 2005).

Summary

This study was conducted to examine medication adherence in Black women with

HTN and the relationship of HTN knowledge, self-care of HTN, trust in health care

provider, coping, perceived racism, and depression using a cross-sectional, correlational,

non-experimental design. This study also described the differences within the sample

population studied and explored the relationship between reactant behaviors and

medication adherence. Black women with a diagnosis of HTN were recruited from

various communities in the Piedmont region of North Carolina. Approval from individual

participants and the IRB of The University of North Carolina at Greensboro was

obtained. The PI collected and analyzed all data for this research study.

CHAPTER IV

RESULTS

Introduction

Chapter four includes the results of the statistical analyses. First, the final sample is described in detail. Then the outcomes of study data, instrument testing, and an analysis of each research question are examined. Lastly, several different models are explored based on initial study findings.

Sample

Participants were recruited by distributing flyers in settings with a majority of Black members or clients, such as churches, hair salons, and community events in the Piedmont region of North Carolina. In addition, snowball sampling or social nominations were employed. The principal investigator (PI) provided potential participants with detailed information regarding the study via telephone or face-to-face. A total of 87 persons were contacted by the PI, and three did not meet the eligibility requirement because two did not take antihypertensive medications, and one was over the age of 60. Four people did not return the PI's telephone call when contact was made from information provided by social nomination. Thus, 80 persons comprised the sample. All data were collected by the PI in one session lasting approximately 45 to 60 minutes. The majority of participants completed the interview at their private residence (n=52), while

others completed the interview at the home of a family member (*n*=11), friend (*n*=7), their place of employment (*n*=5), the PI's home (*n*=3), or their church (*n*=2).

Preliminary Examination of Data

Data for research questions 1 and 5 were analyzed by using the International Business Machines Statistical Package for the Social Sciences (IBM SPSS) software, version 19.0.0 and research questions 2, 3, and 4 were analyzed by using the Statistical Analysis Software (SAS) version 9.1.3. Nine instruments required scores to be calculated. Each instrument's author provided scoring guidelines to calculate scale totals. To check for internal reliability, Cronbach's alpha statistic was computed for each instrument and selected subscales. Cronbach's alpha values are an indication of scale reliability, whereby values of .70 or higher are considered to be acceptable, and values of .60 or higher are marginally acceptable (Gliner & Morgan, 2000). Only those scales with alpha values of .60 or higher were retained for further analysis. Scores were unacceptable to excellent and ranged from .026 - .920 (see Table 1).

The reliability of all subscales was reported. Both the Hill-Bone sodium intake and appointment-keeping subscales had low Cronbach's alphas, but neither was used in data analysis. Only the outcome variable, represented by the Hill-Bone medication subscale was used in data analysis, and the Cronbach's alpha was good (.843). The High BP Prevention IQ Scale had the second lowest Cronbach's alpha of .067. The questionnaire measured different types of knowledge (heredity, symptoms, stress, weight, physical activity, diet, and alcohol) relative to high blood pressure, and the response pattern was inconsistent indicating that while participants knew some things about HTN,

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knowledge was limited in other areas. The Self-Care of Hypertension Index management

subscale also had a low Cronbach's alpha of .491. This subscale was applicable to 34 of

the 80 participants who reported trouble controlling their blood pressure in the past

month. Again, the response pattern was inconsistent as participants did not answer

similarly in how they managed their blood pressure. Lastly, the Therapeutic Reactance

total scale and behavioral subscale had acceptable Cronbach's alphas, while the verbal

subscale had low Cronbach's alpha related to a variance in participants' response pattern

consistency**.**

All data were checked for accuracy. Frequencies were run on all variables to

check for missing data and extreme values. There were no missing data, however, outliers

were consistently found in most of the variables of study. The majority of the variables in

this study were discrete with the exception of age, blood pressure (BP), and body mass

index (BMI). Income was coded as a categorical valuable. Outliers were noted in each of

the continuous variables except the mean diastolic BP. To limit outlier influence,

variables not previously categorized were divided into quartiles prior to statistical

analysis (Mertler & Vannatta, 2010; Vogt, 2005). Because outliers do not follow the

normal distribution, statistical models that do not require distribution assumptions, such

as nonparametric and semiparametric models, were used for data analyses. Although

nonparametric models avoid restrictive assumptions of normality, they may yield difficult

interpretations and inaccurate estimates for a large number of regressors. However,

semiparametric models combine components of both parametric and nonparametric

models while retaining the flexibility of nonparametric models and providing the easy

interpretation of parametric models (Hardle, Muller, Sperlich, & Werwatz, 2004). Thus,

nonparametric and semiparametric models were ideal statistical models for data analyses.

Table 1

Internal Reliability of Instruments

Instrument	Cronbach's Alpha
Hill-Bone Compliance to High BP Pressure Therapy Scale (14 items)	.740
Medication taking subscale (9 items)	.843
Reducing sodium intake subscale (3 items)	.598
Appointment keeping subscale (2 items)	.026
John Henryism Active Coping Scale (12 items)	.645
Patient Health Questionnarie-9 (9 items)	.845
Index of Race-Related Stress-Brief Version (22 items)	.920
Cultural racism subscale (10 items)	.886
Institutional racism subscale (6 items)	.749
Individual racism subscale (6 items)	.809
Trust in Physician Scale (11 items)	.835
High BP Prevention IQ (12 items)	.067
Self-Care of HTN Index (No total score)	NA
Maintenance subscale (12 items)	.694
Management subscale (6 items)	.491
Confidence subscale (6 items)	.790
Therapeutic Reactance Scale (28 items)	.724
Behavioral subscale (17 items)	.685
Verbal subscale (11 items)	.550
Marlowe-Crowne Social Desirability Scale (10 items)	.641

Note. HTN=hypertension; BP=blood pressure.

Sample Demographics

      The sample was comprised of 80 Black women who were taking antihypertensive prescription medications. Over half of the participants were not married (56%) and had a single, divorced, or widowed status. Ages ranged from 19 to 60 with a mean age of 47.8 ($SD \pm 9.2$). The majority of the sample was employed (67%), physically inactive (89%), overweight/obese (88%), and had a history of smoking (54%). Table 2 provides categorization of demographic data and risk factors.

Table 2

Sample Demographic Statistics and Risk Factors (N=80)

Background variables	*N*	(%)*
Marital Status		
Single (Never Married)	22	(27)
Married	26	(33)
Separated	9	(11)
Divorced	16	(20)
Widowed	7	(9)
Employment Status		
Employed	54	(67)
Unemployed/Disabled	24	(30)
Retired	2	(3)
Family History of HTN	75	(94)
Physically Inactive[a]	71	(89)
Overweight/Obese[b]	70	(88)
Overweight[b]	10	(13)
Obese[b]	60	(75)
Smoker (current or past)	43	(54)
Drink Alcohol	23	(29)

Note. *percentages rounded.

HTN=hypertension.

[a]Less than recommended levels of moderate intensity physical activity for 30 minutes at least 5 times per week.

[b]BMI for: Overweight = 25-29.9 kg/m^2; Obese = $\geq$ 30 kg/m^2.

Cox's Interaction Model of Client Health Behavior Variables

The adapted Cox interaction model of client health behavior (IMCHB) consisted of two major elements, client singularity (background and dynamic variables) and health outcome (See Figure 3). Descriptive statistics in the form of percentages or means and standard deviations are displayed for the background variables (see Table 3), dynamic variables (see Table 4), and the health outcome, medication adherence (see Table 5).
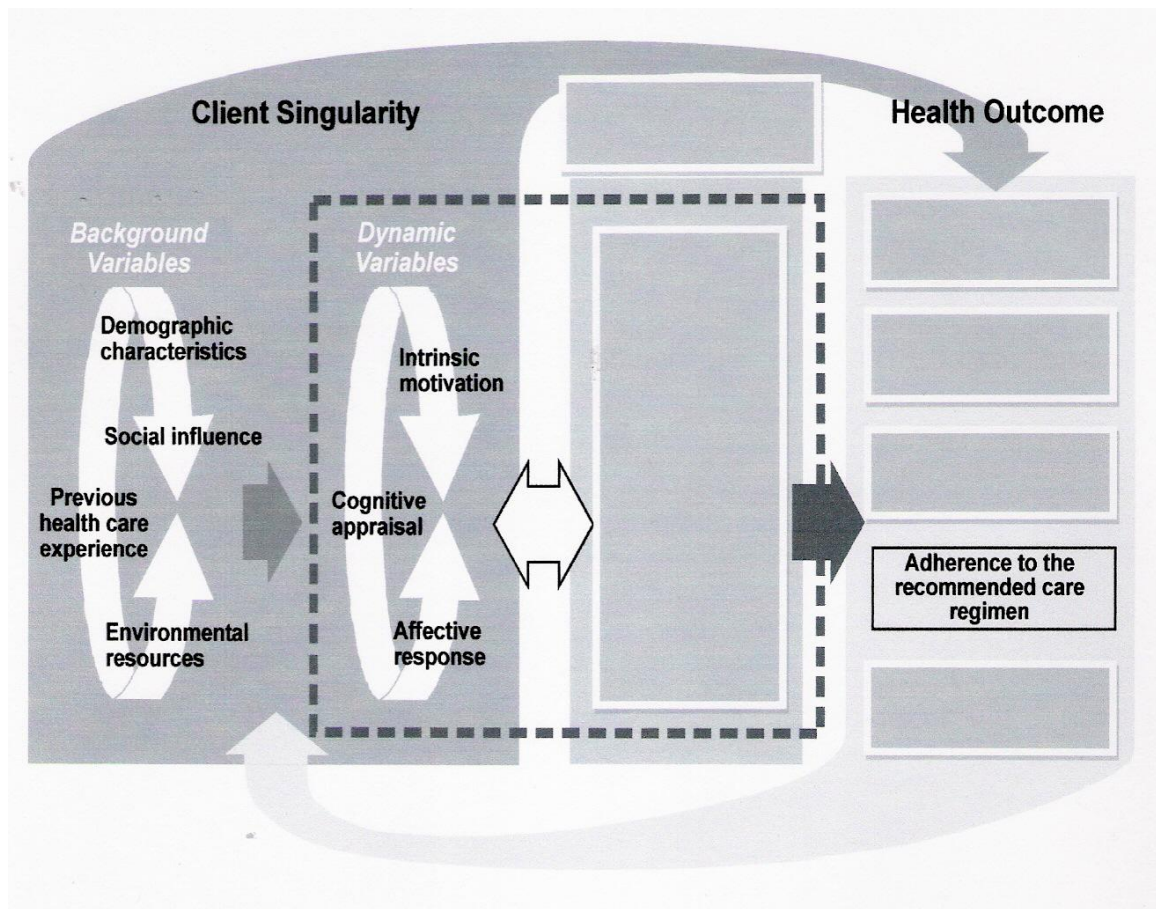
Figure 3. Conceptual Guide to Predict Black Women's Medication Adherence Behaviors. Adapted from the interaction model of client health behavior (Cox, 2003).

Table 3

Cox Interaction Model of Client Health Behavior: Background Variables (N=80)

Background Variables	Mean (±SD) or N (%)	Median	Possible Range
Age	47.8 (± 9.2)	50.0	19 - 60
Comorbidities	2.8 (± 1.6)	2.0	1 - 9
Number of Medications	5.1 (± 3.6)	4.0	1 - 18
BP			
SBP Mean	135.2 (±19.8)	134.5	99 - 209
DBP Mean	81.3 (±12.6)	81.5	51 - 114
BMI	36.8 (±10.4)	35.8	17 - 69
Subscales:			
Underweight (<18.5 kg/m^2)	1 (1)		
Normal Weight (18.5-24.9 kg/m^2)	9 (11)		
Overweight (25-29.9 kg/m^2)	10 (13)		
Obesity (≥ 30 kg/m^2)	60 (75)		
Weight			
Kilograms	97.7 (±27.7)	96.0	43 - 165
Pounds	214.9 (±60.9)	211.2	95 - 363
Waist Circumference			
Centimeters	107.5 (±18.5)	106.0	71 - 152
Inches	42.3 (± 7.3)	41.7	28 - 60
<89 cm	14 (18)		
>89cm	66 (83)		

Table 3 (continued)

Cox Interaction Model of Client Health Behavior: Background Variables (N=80)

Background Variables	*N*	(%)*
Education		
Less than 12th Grade	13	(16)
High School Graduate	16	(20)
GED or Equivalent	1	(1)
Some Community College	11	(14)
Graduated Community College	6	(8)
Some 4-year College	5	(6)
Graduated 4-year College	10	(12)
Some Graduate School	2	(3)
Completed Graduate School	6	(8)
Completed Trade or Vocational School	10	(12)
Religion		
Baptist	57	(71)
Christian	7	(9)
Non-denominational	6	(8)
African-Methodist Episcopal Zion	5	(6)
Other	5	(6)
Family History of HTN		
Yes	75	(94)
Unsure	5	(6)
Income		
Less than $10,000	15	(18)
$10,000 to $14,999	4	(5)
$15,000 to $19,999	10	(12)
$20,000 to $24,999	8	(10)
$25,000 to $34,999	10	(12)
$35,000 to $44,999	12	(15)
$45,000 to $54,999	6	(8)
$55,000 to $64,999	6	(8)
$65,000 to $74,999	3	(4)
$75,000 to $99,999	3	(4)
$100,000 and Over	2	(3)
Refused	1	(1)
Type of health coverage		
Through Work	46	(57)
Medicaid/Medicare/Veteran	20	(25)
Uninsured	14	(18)

Note. *percentages rounded
BP=blood pressure; SBP=systolic blood pressure; DBP=diastolic blood pressure;
BMI=body mass index; HTN=hypertension.

Table 4

Cox Interaction Model of Client Health Behavior: Dynamic Variables (N=80)

Dynamic Variables	Mean (±*SD*)	Median	Range	Possible Range
Therapeutic Reactance Scale	66.8 (± 7.0)	67.0	46 - 85	28 - 112
Subscales:				
Verbal	29.7 (± 3.3)	30.0	20 - 38	11 - 44
Behavioral	37.1 (± 5.1)	37.0	21 - 47	17 - 68
High BP Prevention IQ	65.2 (±10.2)	66.7	33 - 92	0 - 100
Self-Care of HTN Index				
Subscales:				
Maintenance	45.9 (±14.7)	47.2	14 - 78	0 - 100
Management*	42.3 (±20.6)	41.7	6 - 89	0 - 100
Confidence	60.7 (±19.0)	61.1	17 - 100	0 - 100
Trust in Physician Scale	43.9 (± 6.3)	45.0	20 - 55	11 - 55
John Henryism Active Coping Scale	50.4 (± 5.1)	51.0	31 - 59	12 - 60
Index of Race-Related Stress-Brief Version Global (Z-scores)	0 (± 2.6)	0.21	-4.93 - 6.04	-
Subscales:				
Cultural	23.4 (± 9.7)	25.0	2 - 40	0 - 40
Institutional	7.7 (± 5.9)	6.0	0 - 23	0 - 24
Individual	12.6 (± 6.0)	13.0	1 - 24	0 - 24
Patient Health Questionnarie-9	6.9 (± 5.4)	6.0	0 - 27	0 – 27

Note. ***** *n*=34.
BP=blood pressure; HTN=hypertension.

Table 5

Cox Interaction Model of Client Health Behavior: Health Outcome Elements (N=80)

Health Outcome Element	Mean (±*SD*)	Median	Range	Possible Range
Hill-Bone Compliance to High BP Therapy Scale	22.7 (±5.0)	23.0	15 - 43	14 - 56
Subscale:				
Medication Taking (Adherence)	13.1 (±4.2)	12.5	9 - 33	9 - 36
Reducing Sodium Intake	6.5 (±1.9)	6.0	4 - 12	3 - 12
Appointment Keeping	3.1 (±1.2)	3.0	2 - 6	2 - 8

Research Question #1

Are there differences in background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage) in Black women who adhere to antihypertensive medication treatment as compared to Black women who do not?

The medication subscale of the Hill-Bone Compliance to High Blood Pressure Therapy Scale (Hill-Bone CHBPTS) has a 4-point Likert scale ranging from a minimal of 9 (perfect adherence) to a maximum of 36 (perfect nonadherence). Medication subscale scores were used to determine adherent and nonadherent groups. The adherent group consisted of 20 (25%) participants (score of 9) and the nonadherent group consisted of 60 (75%) participants (score 10-36).

Both groups were analyzed in relation to antihypertensive medication adherence or nonadherence and background variables associated with adherence. The Shapiro-Wilk test was used to assess normality (Norusis, 2008) of independent variables. In addition, calculated means, ranges, standard deviations, frequencies, skewness, kurtosis, and graphic plots were analyzed on all continuous data to assess distributions. The results of the Shapiro-Wilk test indicated that there were no significant differences in the DBP ($p = .495$) and BMI ($p = .215$). This was suggestive of a normal distribution allowing use of the independent sample t-test (Gliner & Morgan, 2000; Polit, 1996) to determine if there was a significant difference between the adherent and nonadherent antihypertensive medication groups. Because the sample size was not equal, Levene's test (Polit, 1996) for homogeneity of variance was conducted, and there was no significant difference in the

variance of the adherent group and the nonadherent group for the mean DBP ($F = .405$, p = .526) and BMI ($F = .061$, $p = .806$). The independent samples t-test failed to reveal a statistically reliable difference between the groups for the DBP and BMI (see Table 6).

The distribution of the variables age, SBP, comorbidities, and number of medications were not normal. Because there was evidence of nonnormality, a two-tailed Mann-Whitney U-test (Gliner & Morgan, 2000) was used to investigate differences between the adherent and nonadherent groups. The Mann-Whitney U-test revealed no significant differences between the adherent and nonadherent groups for age, SBP, comorbidities, and number of medications (see Table 6).

To assess whether there were differences in the adherent and nonadherent antihypertensive medication groups on the background variables (education, religion, family history of HTN, income, and type of health coverage), a Chi-squared analysis was conducted to compare the groups (Huck, 2008) and no significant difference was noted in the adherent and nonadherent antihypertensive medication groups.

In summary, there were no significant differences in the background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage) of Black women who adhered to antihypertensive medication treatment as compared to Black women who did not adhere (see Table 6).

Table 6

Group Differences in Background Variables

Variable	Mean $\pm SD$ or N(%)		P value of difference
	Adherent *(n=20)*	Nonadherent *(n=60)*	
Age	51.15 ± 7.38	46.70 ± 9.51	$.072^b$
Education High School or less	5 (25)	25 (41.7)	
More than High School	15 (75)	35 (58.3)	$.182^c$
Religion Baptist	15 (75)	42 (70)	
All Other	5 (25)	18 (30)	$.669^c$
Family History of HTN Yes	18 (90)	57 (95)	
No	2 (10)	3 (5)	$.424^c$
Comorbidities	2.75 ± 1.33	2.82 ± 1.75	$.788^b$
Number of Medications	5.45 ± 3.59	4.97 ± 3.59	$.564^b$
SBP_1 and SBP_2	132.55 ± 14.44	136.02 ± 21.32	$.714^b$
DBP_1 and DBP_2	78.70 ± 11.73	82.15 ± 12.83	$.291^a$
HTN during study ↑ SBP_1 and SBP_2 ↑ DBP_1 and DBP_2	7 (35) 7 (35) 4 (20)	27 (45) 23 (38) 19 (32)	

(continued)

Table 6 (continued).

Group Differences in Background Variables

Variable	Mean ± *SD* or *N*(%)		*P* value of difference
	Adherent *(n=20)*	Nonadherent *(n=60)*	
BMI	37.95 ± 11.31	36.38 ± 10.21	.564[a]
Income			
<20,000	8 (40)	21 (35)	
≥20,000 - <35,000	3 (15)	15 (25)	
≥35,000 - <55,000	6 (30)	12 (20)	
≥55,000	2 (10)	12 (20)	
Refused	1 (5)	0 (0)	.258[c]
Type of Health Coverage			
Through Work	13 (65)	33 (55)	
Medicare, Medicaid, or VAMC	3 (15)	17 (28.3)	
Uninsured	4 (20)	10 (16.7)	.491[c]

Note. p-values were obtained by different tests.
[a]t tests for continuous normally distributed variables.
[b]Mann-Whitney *U*-test for continuous nonnormally distributed variables.
[c]chi-square tests for discontinuous variables.
HTN=hypertension; SBP=systolic blood pressure; DBP=diastolic blood pressure;
BMI=body mass index; VAMC=Veterans Affairs Medical Center.

Research Question #2

Are the background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage) and dynamic variables (HTN knowledge, self-care of HTN, trust in health care provider, coping, perceived racism, and depression) associated with medication adherence in Black women with HTN?

The Fisher's exact test was used to examine the significance of association (contingency) between background and dynamic variables on medication adherence. The procedure follows a hypergeometric distribution under the null hypothesis of independence with fixed margins and is frequently used in place of a phi correlation coefficient when data are sparse (Bower, 2003; Huck, 2008). Fisher's exact test does not rely on normality assumptions and uses the exact distribution instead of a normal approximation (Polit, 1996). Variables not previously categorized were divided into quartiles (Q) prior to statistical analysis. Quartile derivations is advantageous because it limits outlier influence (Mertler & Vannatta, 2010; Vogt, 2005). In addition, Fisher's exact test could test the significance of the difference in proportions of background and dynamic variables on medication adherence when some of the expected cell frequencies fell below 5 (Polit, 1996).

All background variables were examined except family history of HTN and mean systolic and diastolic BP. Family history of HTN was excluded from analysis because nearly all of the participants (94%) had a family history of HTN leaving no variability. In addition, the BP variable was considered to be on the causal pathway because

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nonadherence to antihypertensive medications may cause increases in BP. Exclusion of this variable was related to the strong association of controlled BP to medication adherence outcomes. All other dynamic variables were examined.

The results displayed in Table 7 show counts and frequencies of all variables as related to the outcome variable medication adherence and provide results of the Fisher's exact test. In summary, no background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage) or dynamic variables (HTN knowledge, self-care of HTN, trust in health care provider, coping, perceived racism, and depression) were associated with medication adherence in Black women with HTN (see Table 7). However, the lack of a statistically significant association in a simple contingency table analysis does not rule out ordinal effects or trends that may predict outcome. All results pertaining to this research question are listed in Table 7.

Table 7

Influence of Background and Dynamic Variables on Medication Adherence

Characteristics	Compliant None of the time (>14) n(%)	Compliant Some of the time (13-14) n(%)	Compliant Most of the time (10-12) n(%)	Compliant All of the time (9) n(%)	Fisher's Exact Test
Age					
Q1 <40	3 (16)	6 (29)	4 (20)	2 (10)	
Q2 40-49	9 (47)	5 (24)	3 (15)	6 (30)	
Q3 50-55	6 (32)	6 (29)	8 (40)	4 (20)	
Q4 >55	1 (5)	4 (19)	5 (25)	8 (40)	0.20
Education					
≥ High school	14 (74)	12 (57)	9 (45)	15 (75)	
< High school	5 (26)	9 (43)	11 (55)	5 (25)	0.17
Religion					
Other	6 (32)	5 (24)	7 (35)	5 (25)	
Baptist	13 (68)	16 (76)	13 (65)	15 (75)	0.86
# of Comorbidities					
Q1 1	2 (11)	5 (24)	6 (30)	4 (20)	
Q2 2	9 (47)	5 (24)	6 (30)	6 (30)	
Q3 3-4	4 (21)	8 (38)	5 (25)	8 (40)	
Q4 5-9	4 (21)	3 (14)	3 (15)	2 (10)	0.75
# of Medications					
Q1 1-2	7 (37)	6 (29)	4 (20)	4 (20)	
Q2 3-4	7 (37)	5 (24)	4 (20)	7 (35)	
Q3 5-7	1 (5)	6 (29)	6 (30)	5 (25)	
Q4 8-18	4 (21)	4 (19)	6 (30)	4 (20)	0.61
BMI (WHO)					
Q1 <18.5	0 (0)	1 (5)	0 (0)	0 (0)	
Q2 18.5-24.99	3 (16)	1 (5)	3 (15)	2 (10)	
Q3 25.0-29.99	2 (11)	4 (19)	2 (10)	2 (10)	
Q4 ≥30	14 (74)	15 (71)	15 (75)	16 (80)	0.92

(continued)

Table 7 (continued).

Influence of Background and Dynamic Variables on Medication Adherence

Characteristics	Compliant None of the time (>14) n(%)	Compliant Some of the time (13-14) n(%)	Compliant Most of the time (10-12) n(%)	Compliant All of the time (9) n(%)	Fisher's Exact Test
Income					
Q1 <20,000	7 (37)	7 (33)	7 (35)	8 (40)	
Q2 ≥20,000- <35,000	1 (5)	7 (33)	7 (35)	3 (15)	
Q3 ≥35,000- <55,000	6 (32)	4 (19)	2 (10)	6 (30)	
Q4 ≥55,000	5 (26)	3 (14)	4 (20)	3 (15)	0.39
Insurance					
Through work	11 (58)	13 (62)	9 (45)	13 (65)	
Medicaid/Medicare	3 (16)	8 (38)	6 (30)	3 (15)	
Uninsured	5 (26)	0 (0)	5 (25)	4 (20)	0.10
HTN Knowledge (HBPPIQ)					
Q1 (58.3)	2 (11)	1 (5)	1 (5)	2 (10)	
Q2 (58.3-<66.6)	4 (21)	9 (43)	7 (35)	8 (40)	
Q3 (66.6-<75)	12 (63)	9 (43)	9 (45)	10 (50)	
Q4 (≥75)	1 (5)	2 (10)	3 (15)	0 (0)	0.70
Self-Care of HTN Index					
Maintenance (SCHI)					
Q1 (<36.1)	6 (32)	5 (24)	6 (30)	1 (5)	
Q2 (36.1-<47.2)	8 (42)	9 (43)	4 (20)	7 (35)	
Q3 (47.2-<56.9)	3 (16)	4 (19)	3 (15)	4 (20)	
Q4 (≥56.9)	2 (11)	3 (14)	7 (35)	8 (40)	0.21
Management					
Q1 (<27.8)	2 (15)	3 (38)	1 (14)	1 (17)	
Q2 (27.8-<41.7)	3 (23)	4 (50)	1 (14)	2 (33)	
Q3 (41.7-<50.0)	2 (15)	0 (0)	2 (29)	0 (0)	
Q4 (≥50.0)	6 (46)	1 (13)	3 (43)	3 (50)	0.56
Missing	6	13	13	14	
Confidence					
Q1 (<50.0)	6 (32)	9 (43)	6 (30)	1 (5)	
Q2 (50.0-<61.1)	8 (42)	4 (19)	5 (25)	7 (35)	
Q3 (61.1-<72.2)	3 (16)	2 (10)	5 (25)	6 (30)	
Q4 (≥72.2)	2 (11)	6 (29)	4 (20)	6 (30)	0.14

Table 7 (continued)

Influence of Background and Dynamic Variables on Medication Adherence

Characteristics	Compliant None of the time (>14) n(%)	Compliant Some of the time (13-14) n(%)	Compliant Most of the time (10-12) n(%)	Compliant All of the time (9) n(%)	Fisher's Exact Test
Trust (TPS)					
Q1 (<41) (Low)	5 (26)	5 (24)	3 (15)	4 (20)	
Q2 (41-45)	9 (47)	10 (48)	8 (40)	5 (25)	
Q3 (46-52)	5 (26)	6 (29)	8 (40)	7 (35)	
Q4 (>52) (High)	0 (0)	0 (0)	1 (5)	4 (20)	0.30
Coping (JHACS)					
Q1 (32-46)	3 (16)	7 (33)	5 (25)	3 (15)	
Q2 (47-50)	7 (37)	5 (24)	1 (5)	6 (30)	
Q3 (51-53)	5 (26)	2 (10)	9 (45)	3 (15)	
Q4 (54-59)	4 (21)	7 (33)	5 (25)	8 (40)	0.11
Perceived Racism (IRRS-B)					
Q1 (<2.9)	3 (16)	5 (24)	8 (40)	4 (20)	
Q2 (2.9-<5.1)	5 (26)	8 (38)	3 (15)	4 (20)	
Q3 (5.1-<6.8)	8 (42)	3 (14)	1 (5)	8 (40)	
Q4 (≥6.8)	3 (16)	5 (24)	8 (40)	4 (20)	0.074
Depression (PHQ-9)					
No depression (0-4)	5 (26)	7 (33)	11 (55)	10 (50)	
Minimal/Minor (5-14)	11 (58)	12 (57)	7 (35)	9 (45)	
Major (>14)	3 (16)	2 (10)	2 (10)	1 (5)	0.52

Note. BMI=body mass index; WHO=World Health Organization; HTN=hypertension; Q=Quartile; HBPPIQ=High Blood Pressure Prevention IQ; SCHI=Self-Care of Hypertension Index; TPS=Trust in Physician Scale; JHACS=John Henryism Active Coping Scale; IRRS-B=Index of Race-Related Stress-Brief Version; PHQ-9=Patient Health Questionnaire-9.

Research Question #3

Do the background variables (age, education, religion, family history of HTN, comorbidities, number of medications, BP, BMI, income, and type of health coverage), and dynamic variables (HTN knowledge, self-care of HTN, trust in health care provider, coping, perceived racism, and depression) predict medication adherence in Black women with HTN on an ordinal scale?

The data were analyzed using an exact discrete-event (proportional-odds) model. This is a semi-parametric regression procedure that examines the association between a set of predictor variables and an ordinal scale outcome variable. Similar to a log-binomial or Poisson regression model, the adjusted relative effect size of association [herein referred to as the relative importance score (RIS)], was computed by exponentiating the regression beta-coefficient for the variable of interest (Breslow & Day, 1980). The adjusted RISs determine the contribution each independent variable makes in combination with other independent variables in predicting the value of the dependent variable. The higher scores represent the importance of the dimension (LeBreton & Tonidandel, 2008; Sachdev & Verma, 2004). Conditional maximum likelihood parameter estimates were determined iteratively using an integral approximation (Gail, Lubin, & Rubinstein, 1981). Model fit was assessed using standard regression deviance-based diagnostic plots (Pregibon, 1981). Normal theory was used to compute test-based confidence intervals (CIs) for estimated relative importance scores (RISs). Continuous variables were categorized into quartiles based on the distribution among referent

participants. An "optimal predictive model" was identified by retaining variables in a multivariable analysis only if, for at least for one level, $p<0.025$ and RIS>2.5 or RIS<0.4.

The univariable background variables that predicted medication adherence were participant age and number of medications (see Table 8). All age groups were less likely to be adherent but participants in the 40-49 age group (Q3) had the highest RIS score and were 3.6 fold less likely to be adherent to antihypertensive medications than baseline (Q1) (P for trend=0.028). In contrast participants who reported taking five to seven medications (Q3) were 3.8 fold more likely to be adherent than baseline (Q1) (p=0.001). However, a significant linear trend was not observed for "number of medications."

The univariable dynamic variables that predicted medication adherence were self-care of HTN maintenance and confidence, trust in health care provider, and depression (see Table 8). Participants who scored in the self-care of HTN maintenance Q4 ($\geq$56.9) were 2.7 fold likely to be adherent to antihypertensive medications (P for trend=0.0046) and those who scored in the self-care of HTN confidence Q3 (61.1-<72.2) were 2.2 fold likely to be adherent to antihypertensive medications (P for trend=0.045). Participants who scored in the highest trust group Q4 (>52) were 16.7 fold more likely to be adherent than baseline (Q1) (P for trend=0.010). However, participants who manifested major depressive symptoms were less likely to be adherent to antihypertensive medications as observed by a significant linear trend (P for trend=0.046).

Variables retained in the "optimal predictive model" included participant age, number of medications, and trust in health care provider (see Table 8). Again all age groups were less likely to be adherent , but participants in the 40-49 age group (Q3) had

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the highest RIS score and were 3.7 fold less likely to be adherent to antihypertensive medications than baseline (Q1) (P for trend=0.0036). Whereas participants who reported taking five to seven medications (Q3) were 3.6 fold more likely to be adherent than baseline (Q1) (p=0.0048). However, similar to the univariable case, a significant linear trend was not observed for "number of medications." Participants who scored in the highest trust group Q4 (>52) were 33.3 fold more likely to be adherent than baseline (Q1) (P for trend=0.015).

In summary, participant age was the only background variable that independently predicted nonadherence to antihypertensive medications in our "optimal predictive model." While the only dynamic variable that independently predicted adherence to antihypertensive medications in the "optimal predictive model" was trust. Univariable predictors and the optimal predictive model for medication adherence are listed in Table 8.

Table 8

Exact Discrete-Event Model (Proportional Odds) for Compliance Scale from High (33) to Low (9)

Characteristics	Univariable Predictors			Optimal Predictive Model[†]		
	RIS	95% CI		RIS	95% CI	
Age						
Q1 >55	1.0	Referent		1.0	Referent	
Q2 50-55	2.3	1.1 -4.9	(p=0.029) *	2.9[†]	1.3-6.5 (p=0.011)[†]	
Q3 40-49	3.6	1.6 -8.0	(p=0.001) *	3.7[†]	1.6-8.6 (p=0.0028)[†]	
Q4 <40	2.4	1.02-5.4	(p=0.044) *	3.2[†]	1.3-8.2 (p=0.013)[†]	
		P for trend=0.028[§*]			P for trend =0.0036[§†]	
Education						
≥ High school	1.0	Referent		---	---	
< High school	.94	0.56-1.6	(p=0.83)	---	---	
Religion						
Other	1.0	Referent		---	---	
Baptist	0.98	0.57-17	(p=0.98)	---	---	
# of Comorbidities						
Q1 1	1.0	Referent		---	---	
Q2 2	1.9	0.90-4.0	(p=0.092)	---	---	
Q3 3-4	1.1	0.51-2.2	(p=0.87)	---	---	
Q4 5-9	2.0	0.83-4.7	(p=0.12)	---	---	
		P for trend =0.49[§]				
# of Medications						
Q1 1-2	1.0	Referent		1.0	Referent	
Q2 3-4	0.56	0.28-1.1	(p=0.11)	0.47	0.22-0.99 (p=0.047)	
Q3 5-7	0.26	0.12-0.59	(p=0.001) *	0.28[†]	0.12-0.68 (p=0.0048)[†]	
Q4 8-18	0.65	0.31-1.4	(p=0.25)	0.73	0.34-1.6 (p=0.45)	
		P for trend =0.11[§]			P for trend =0.35[§]	
BMI (WHO)						
Q1 <18.5	1.0	Referent		---	---	
Q2 18.5-24.99	1.2	0.12-13	(p=0.87)	---	---	
Q3 25.0-29.99	1.1	0.10-11	(p=0.95)	---	---	
Q4 ≥30	1.3	0.13-12	(p=0.84)	---	---	
		P for trend =0.77[§]		---	---	

(continued)

Table 8 (continued)

Exact Discrete-Event Model (Proportional Odds) for Compliance Scale from High (33) to Low (9)

Characteristics	Univariable Predictors			Optimal Predictive Model[†]	
	RIS	95% CI		RIS	95% CI
Income					
Q1 <20K	1.0	Referent		---	---
Q2 ≥20K - <35K	0.64	0.31-1.3	(p=0.21)	---	---
Q3 ≥35K - <55K	1.2	0.62-2.4	(p=0.56)	---	---
Q4 ≥55K	0.94	0.46-1.9	(p=0.87)	---	---
		P for trend =0.79[§]		---	
Insurance					
Through work	1.0	Referent		---	---
Medicaid/Medicare	0.83	0.45-1.5	(p=0.56)	---	---
Uninsured	0.99	0.49-2.0	(p=0.97)	---	---
HTN Knowledge (HBPPIQ)					
Q1 (<58.3)	1.0	Referent		---	---
Q2 (58.3-<66.6)	0.95	0.34-2.6	(p=0.92)	---	---
Q3 (66.6-<75)	1.1	0.40-2.9	(p=0.90)	---	---
Q4 (≥75)	1.8	0.46-6.8	(p=0.41)	---	---
		P for trend =0.38[§]		---	---
Self-Care of HTN Index (SCHI)					
Maintenance Q1 (<36.1)	1.0	Referent		---	---
Q2 (36.1-<47.2)	0.78	0.40-1.5	(p=0.48)	---	---
Q3 (47.2-<56.9)	0.48	0.21-1.1	(p=0.079)	---	---
Q4 (≥56.9)	0.37	0.17-0.79	(p=0.010) *	---	---
		P for trend =0.0046[§]*		---	---
Management					
Q1 (<27.8)	1.0	Referent		---	---
Q2 (27.8-<41.7)	0.53	0.17-1.7	(p=0.28)	---	---
Q3 (41.7-<50.0)	0.95	0.24-3.8	(p=0.95)	---	---
Q4 (≥50.0)	0.87	0.29-2.6	(p=0.80)	---	---
		P for trend =0.84[§]		---	---
Confidence					
Q1 (<50)	1.0	Referent		---	---
Q2 (50-<61.1)	0.74	0.39-1.4	(p=0.38)	---	---
Q3 (61.1-<72.2)	0.45	0.21-0.97	(p=0.042) *	---	---
Q4 (≥72.2)	0.54	0.26-1.1	(p=0.098)	---	---
		P for trend =0.045[§]*		---	---

Table 8 (continued)

Exact Discrete-Event Model (Proportional Odds) for Compliance Scale from High (33) to Low (9)

Characteristics	Univariable Predictors		Optimal Predictive Model[†]	
	RIS	95% CI	RIS	95% CI
Trust (TPS)				
Q1 (<41) (Low)	1.0	Referent	1.0	Referent
Q2 (41-45)	0.86	0.44-1.7 (p=0.66)	0.84	0.40-1.8 (p=0.65)
Q3 (46-52)	0.57	0.28-1.2 (p=0.12)	0.64	0.29-1.4 (p=0.26)
Q4 (>52) (High)	0.06	0.01-0.39 (p=0.003)*	0.03[†]	0.004-0.23 (p=0.0006) [†]
		P for trend =0.010[§]*		P for trend =0.015[§†]
Coping (JHACS)				
Q1 (32-46)	1.0	Referent	---	---
Q2 (47-50)	1.6	0.73-3.3 (p=0.25)	---	---
Q3 (51-53)	0.93	0.44-1.9 (p=0.84)	---	---
Q4 (54-59)	1.0	0.51-2.1 (p=0.92	---	---
		P for trend =0.66[§]	---	---
Perceived Racism Stress (IRRS-B)				
Q1 (<2.9)	1.0	Referent	---	---
Q2 (2.9-<5.1)	1.6	0.78-3.3 (p=0.20)	---	---
Q3 (5.1-<6.8)	1.6	0.79-3.4 (p=0.18)	---	---
Q4 (≥6.8)	1.0	0.49-2.1 (p=0.96)	---	---
		P for trend =0.96[§]	---	---
Depression (PHQ-9)				
No depression (0-4)	1.0	Referent	---	---
Minimal/Minor (5-14)	1.5	0.89-2.6 (p=0.12)	---	---
Major (>14)	2.2	0.89-5.3 (p=0.088)	---	---
		P for trend =0.046[§]*	---	---

Note. [†]Variable retained in model if, for at least for one level, $p<0.025$ and RIS>2.5 or RIS<0.4.

[§]Likelihood ratio trend test.

*$p<0.05$, Univariable predictors.

RIS=Relative Importance Scores; CI=Confidence Intervals.

Research Question #4

Is there a relationship between reactant behaviors and medication adherence in Black women with HTN?

Spearman's rho was used to determine the correlation between therapeutic reactance and medication adherence. Results produced a Spearman's rho of .186, and this statistic was not significant ($p=.098$) indicating that there was no relationship between total therapeutic reactance score and medication adherence. In addition, the Spearman's rho for the reactance verbal subscale (.176) and the behavioral subscale (.122) were not significant ($p=.118$ and $p=.283$ respectively). Based on the results of the Shapiro-Wilk test, there was no significant difference in the verbal subscale ($p=.599$) and the total scale score ($p=.108$) of the therapeutic reactance scale suggestive of a normal distribution allowing use of the independent sample t-test (Gliner & Morgan, 2000; Polit, 1996) to compare reactance in adherent and nonadherent antihypertensive medication groups. Because the sample size was not equal, Levene's test (Polit, 1996) for homogeneity of variance was conducted, and there was no significant difference in the variance of the adherent group and the nonadherent group for the mean verbal subscale ($F=.471$, $p=.495$) and the total scale score ($F=2.86$, $p=.095$) of the therapeutic reactance scale. The independent sample t-test revealed no significant difference in the verbal subscale for the adherent ($M=29.35$, $SD=3.69$) and nonadherent ($M=29.83$, $SD=3.21$) groups: t (78)= -.562, $p=.576$) and there was no significant difference in the total reactance score for the adherent ($M=66.25$, $SD=4.80$) and nonadherent ($M=66.98$, $SD=7.63$) groups: t (78)= -.403, $p=.688$).

Additional Analyses

Because all data were collected using self-report measures, participants completed the 10-item Marlowe-Crowne Social Desirability (M-C 1[10] scale to assess the degree of socially desirable answers. The basic assumption of the M-C 1[10] is that participants who answer in a socially desirable manner are highly likely to answer in a similar manner on all self-report measures. Low scores on the M-C 1[10] scale reflect socially undesirable or honest answers, high scores reflect socially desirable or dishonest answers, and middle scores reflect a combination of both ("Social desirability scale"). Scores on the M-C 1[10] ranged from 0-10 with a mean of 5.5 (± 2.1) and a median of 6.0. Of all the participants, 63% (*n*=51) scored in the middle range (4-7) while 19% (*n*=15) scored in the low range (0-3), and 18% (*n*=14) scored in the high range (8-10). Participants who engaged in significant amounts of socially desirable responding were not discarded from the study. These data were used to provide a measure to gauge the likelihood that participants were providing honest responses to the self-report measure.

Marlowe-Crowne Social Desirability (M-C 1[10] scale was significantly associated with three of the instruments used in this study (see Table 9). A weak negative association was noted with the verbal subscale and total scale of the Therapeutic Reactance Scale. This correlation implies that participants who demonstrated higher verbal and total scale reactance scores tend to be honest. A weak negative association was also noted with the Hill-Bone Compliance to High BP Pressure Therapy medication-taking subscale and the Patient Health Questionnarie-9 depression instrument. These data imply that participants who reported nonadherence to medication-taking and those who

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reported depressive symptoms were truthful. No relationship was noted between the (M-

C 1[10] and the other instruments.

Table 9

Correlations between Instruments and Social Desirability Scale

Instruments	Marlowe-Crowne Social Desirability Scale (*N*=80)	
	Spearman's rho Correlation	*P*-value
Hill-Bone Compliance to High BP Pressure Therapy Scale	-.307	.006*
Medication taking subscale (adherence outcome)		
John Henryism Active Coping Scale	.194	.085
Patient Health Questionnarie-9	-.296	.008*
Index of Race-Related Stress-Brief Version	-.138	.222
Cultural racism subscale	-.097	.391
Institutional racism subscale	-.132	.244
Individual racism subscale	-.072	.525
Trust in Physician Scale	.103	.363
High BP Prevention IQ)	-.200	.075
Self-Care of HTN Index		
Maintenance subscale	.178	.114
Management subscale	.251	.151
Confidence subscale	.119	.294
Therapeutic Reactance Scale	-.287	.010*
Behavioral subscale	-.183	.104
Verbal subscale	-.349	.002*

Note. *p<0.05

Summary

Eighty Black women who were taking antihypertensive prescription medications were interviewed to determine factors that influence medication adherence. Participants were mostly single or married, with a mean age of 48 years and employed full-time. Cardiovascular disease risk factors such as physical inactivity, overweight/obese, and a history of smoking were prevalent in the sample. Univariable predictors of medication adherence included age, number of medications, self-care of HTN maintenance and confidence, trust in health care provider, and depression. In the optimal predictive model, only age and trust in health care provider significantly predicted medication adherence.

CHAPTER V

DISCUSSION

Introduction

The purposes of this study were to describe the differences in adherent and

nonadherent Black women who have hypertension (HTN) and examine issues that

influence medication adherence. In addition, this study explored the relationship between

reactant behaviors and medication adherence. This chapter provides an interpretation of

the findings and implications for nursing practice. Also, recommendations for future

research are discussed.

Interpretation of Findings

Cox's Interaction Model of Client Health Behavior (IMCHB) includes three

major elements, of which, two were used to guide this study: client singularity

(background and dynamic variables) and health outcome. Included in the background

variables are demographic characteristics (age and education), social influence (religion),

previous health care experience (family history of HTN, comorbidities, number of

medications, blood pressure [BP], and body mass index [BMI]), and environmental

resources (income and type of health coverage). Dynamic variables included intrinsic

motivation (reactance), cognitive appraisal (HTN knowledge, self-care of HTN, trust in

health care provider, and coping), and affective response (perceived racism and

depression). All data collected were a good fit for this model. The comprehensiveness of

the IMCHB allowed for the examination of multiple determinants of health behavior pertinent to Black women with HTN that aided in explaining and/or predicting the outcome variable, medication adherence. Discussion was organized around the IMCHB beginning with the outcome variable, medication adherence, and concluding with client singularity (background and dynamic variables).

Element of Health Outcome: Adherence to the Recommended Health Regimen

Medication adherence. Black women have the highest prevalence rate of HTN in the world (Roger et al., 2011). Several studies found that factors contributing to HTN in Blacks were multifaceted and rooted in historical and socioeconomic determinants, such as racism (Webb & Gonzalez, 2006), experimental exploitation (Washington, 2006), unequal treatment (B. D. Smedley et al., 2003), lower education, poor social support, cost factors, lack of health insurance (Fongwa et al., 2006), distrust of health care providers (Lukoschek, 2003), and poor communication with health care providers (Kressin et al., 2007). In several qualitative studies (Fongwa et al., 2008; L. M. Lewis et al., 2010; Lukoschek, 2003), another factor contributing to HTN was medication nonadherence. Of all the identified qualitative studies on HTN in Blacks (Fongwa et al., 2008; L. M. Lewis et al., 2010; Lukoschek, 2003; Webb & Gonzalez, 2006), only one study (Fongwa et al., 2008) dealt specifically with adherence treatment factors in Black women with HTN. However, no quantitative studies were found on Black women with HTN that examined factors influencing adherence to antihypertensive medications. Although it is well documented that antihypertensive medications have proven efficacy in lowering BP when clients adhere to the treatment regimen (Chobanian et al., 2004; Fongwa et al., 2006;

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Mabotuwana et al., 2009; Martins et al., 2001), the rationale for medication nonadherence in Black women is not fully understood (Benjamin et al., 2005; Smith et al., 2005; Webb & Gonzalez, 2006). Thus, Black women suffer a disproportionate burden of HTN with resultant morbidity, disability and mortality (Roger et al., 2011), along with a substantial cost burden to individuals, families, and society (Dragomir et al., 2010; Piette et al., 2006; Rand & Sevick, 2000). This paucity of research is daunting considering the high prevalence rate and health consequences of HTN in Black women. This study sought to identify factors that influenced medication adherence. Describing factors that contribute to medication adherence is an essential precursor to developing and implementing successful treatment approaches to HTN that are unique to Black women.

In the current study, one-fourth of the sample reported total adherence to their antihypertensive medication regimen as indicated by a perfect adherence score (9) on the medication subscale of the Hill-Bone Compliance to High Blood Pressure Therapy Scale. Of the study participants who claimed total adherence to their antihypertensive medications, over one-third had BPs indicative of HTN according to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) guidelines (Chobanian et al., 2004). Although these women professed they were following the health care providers instructions precisely in taking their medications, unknown factors may have been responsible for their uncontrolled BP, such as white coat syndrome, time of BP measurement, or self-neglect (Chobanian et al., 2004). In comparison, almost half of the nonadherent group reported they were not faithful in taking their antihypertensive medications consistently. High rates of

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uncontrolled BP in both the adherent and nonadherent groups is astounding and warrants further attention. In addition to adherence issues, the appropriateness of pharmacological management should be evaluated. Hence, more studies are needed that target BP control in Black women.

There was no significant difference between the totally adherent and nonadherent group's mean systolic and diastolic BP in this study. These results are similar to a study of older (M=63.6) adults with HTN after Hurricane Katrina that found no significant difference in uncontrolled BP for those who reported perfect adherence as compared to those with less than perfect adherence to antihypertensive medications (Krousel-Wood et al., 2008). Similarly, in a five year randomized clinical trial with Black men with HTN, there was no significant difference in BP improvements between the treatment (more intensive educational, behavioral, and pharmacologic intervention) and control (less intensive information and referral intervention) groups (Dennison et al., 2007). These findings may indicate that individuals engage in varying levels of adherence because there are no differences noted in the BP readings of adherent and nonadherent groups.

Univariable predictors of medication adherence in this study were age, number of medications, self-care of HTN maintenance and confidence, trust in health care provider, and depression. However, in the optimal predictive model, only age and trust in health care provider significantly predicted medication adherence. Each of these predictors is discussed in more detail under the elements of client singularity.

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Elements of Client Singularity: Background Variables

      Demographic characteristics.

      Age. As age, a nonmodifiable risk factor for HTN, increases, the risk for HTN increases. The pattern of HTN differs in men and women as they age. According to American Heart Association statistics (Roger et al., 2011), men tend to have a greater risk for HTN than women until age 45, and then from age 45 to 64, the risk of HTN is similar for both men and women. After age 64 and the onset of menopause, women tend to develop a higher risk for HTN than men. More importantly, in Blacks HTN is more severe and noted earlier in life. The American Heart Association statistics and JNC 7 guidelines do not clearly define age recommendations that are specific for Blacks. Black men tend to develop HTN around age 45. If we use these guidelines for Black women, almost one-third of the participants in this study would meet this criterion. The current guideline that HTN risk for women increases after age 55 may not be acceptable for Black women. Thus, research is needed to determine specific guidelines that address the early age risk for Blacks with HTN.

      Research findings regarding age and medication adherence are diverse. Results of this study found that age was both a univariable predictor of medication adherence and a predictor in the final model. Though all age groups were less likely to be adherent to their antihypertensive medications, the greatest predictor was participants aged 40 to 49. These findings differed from other studies. Schoenthaler et al. (2009) reported that younger aged Blacks (range 25-98 years) exhibited more nonadherent medication behaviors. In contrast, Weingarten & Cannon (1988) reported that lower adherence to antihypertensive

medications was associated with younger clients up to age 55 and older clients over age 65. In the current study, one explanation for less adherence to antihypertensive medications among those aged 40 to 49 could be related to the fact that these women were more likely to be married or separated, work full- or part-time, and live in households with more people (1 to 8) than those in the other age groups. The stressors of marriage, working, and family responsibilities may be all consuming to the point where women in this age group may overlook their own self-care needs, thus contributing to nonadherence to the treatment regimen. Other reasons for these varied findings are the measurements of medication adherence. While the gold standard for measurement of adherence is the medication event monitoring system (MEMS), even the gold standard may not reflect reality when medications are provided to participants. Thus multiple factors may be associated with varied results when looking at age and adherence. Several studies show that clients self-reporting high medication adherence may not be reflective of their actual medication-taking (Choo et al., 1999; Choo et al., 2001; Zeller, Ramseier, Teagtmeyer, & Battegay, 2008). Methods of measuring medication adherence, such as the MEMS, indicate that clients are usually adherent while being monitored, and adherence is not sustained once the monitoring period increases or has ended (Braverman & Dedier, 2009).

Education. The high school completion rate for this sample was slightly higher than the national average of 80% for Blacks (Crissey, 2009), and more than half of this sample had greater than a high school education. Though the highest rates of HTN are

usually noted in clients who are less educated (Roger et al., 2011), other factors may be associated with higher educational attainment and nonadherence in clients with HTN.

In the current study, there was no statistically significant association between education and medication adherence. Results of this study suggest that educational level does not necessarily have an effect on antihypertensive medication adherence. In contrast, a study on medication adherence to antihypertensive medication in a Nigerian population found that higher education predicted medication adherence (Ikechuwku, Obinna, & Ogochukwu, 2010). The relationship between education and medication adherence may also vary by sex. In a study of Blacks with HTN (Braverman & Dedier, 2009), men with less than a high school education were more adherent than men with higher education. In contrast, women with less than a high school education were less adherent than women with higher education. These results suggest that there may be a disconnect between educational obtainment and adherence. Increased levels of education may not necessarily provide an assurance of adherence. In fact, Braverman and Dedier (2009) reported that clients with higher education may better understand content only to become argumentative and resistive to the information provided. This perspective closely resembles reactance behaviors whereby if a client is told what to do; he/she is likely to do the opposite (J. W. Brehm, 1966). However, no studies were found that examined the association of reactance behaviors to higher educational levels.

One issue that may help to explain medication nonadherence is illiteracy and education, in those with less than and greater than a high school education. Flack et al. (2010) maintain that the inability to read and amply follow health care directions and

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prescription instructions results in nonadherence to the treatment regimen, especially among Blacks with HTN. With the advent of inflated grades in the educational system, illiteracy may be problematic for clients with low educational levels as well as those with higher education. Thus, educational level may not be a good surrogate model of a client's intelligence and ability to learn, apply knowledge, and choose appropriate lifestyle modifications. Therefore, other models of educational attainment may be necessary to assess literacy, especially as it pertains to a client's basic medical knowledge.

Social influence.

Religion. The current study examined the relationship between medication adherence and religion. Religion and spirituality are frequently used interchangeably but are different terms. Whereby religion is overtly expressed in adherence behaviors to prescribed religious beliefs, spirituality is inwardly expressed but not tangible (L. M. Lewis & Ogedegbe, 2008). Just as God allows people to freely choose to adhere or not adhere to His laws, the same freedom to adhere or not adhere to the treatment regimen is available. While nonadherence to God's laws has consequences, the same holds true for nonadherence to the health care regimen. Both religion and health promoting behaviors employ similar characteristics in that both require people to be doers of prescribed beliefs or the prescribed treatment regimen to achieve optimal benefits.

In the current study, there was no statistically significant association between religion and medication adherence. These results suggest that religion does not necessarily have an effect on antihypertensive medication adherence. The majority of the sample was recruited by snowball or social nomination from church members. Therefore,

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all participants reported affiliation with a religious denomination even though a small

percentage of the sample did not identify membership in a church or place of worship.

According to two studies (Gillum & Griffith, 2010; Naewbood et al., 2010, March)

religious activity and social support from the church resulted in positive health behaviors.

Other studies found that religiosity was associated with lower BP (Bell et al., 2010;

Seeman et al., 2003). These findings may be related to the support clients receive from

religion. For example, a qualitative study of Blacks with HTN noted participants were

highly committed to taking their antihypertensive medications, and their religious beliefs

served as a protective mechanism to manage stress, exert control over HTN management,

and increase their ability to cope with having HTN (C. M. Brown, 2000). However, no

studies were found that explored if adherence to religious activity is associated with

adherence to the prescribed treatment regimen. A study of this nature may help clarify the

true nature of a client's claim to religiosity or spirituality versus an affiliation with a

religious group that serves as a social club. Because Blacks have a strong connection to

the church and are deemed the most religiously devout group in the United States (Vu,

2009, February), it seems plausible that clients who are faithful in their religious practices

may be amenable to develop consistent adherence practices to the health care regimen for

adequate BP control.

Conversely, if a client is not truly adherent to their religious practice, this may be

evident in other areas of their lives. Yet, there is an underlining assumption that reported

adherence to religious activity equates to adherence to other activities. Because religious

principles and medication adherence are both predicated on the multifaceted nature of

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human behavior that is impacted by social, psychological, physical, and environmental stimuli, oftentimes the rationale and mechanisms that drive free choice are not easily understood, predicted, or responsive to change. This may provide an explanation why spirituality is rarely recognized or encouraged by health care providers even though they claim to provide holistic health care (Black et al., 2006). It is imperative that appropriate assessment methods, such as longitudinal studies, are developed to capture an accurate depiction of religiosity and spirituality over time to uncover predictors of adherence that can be conveyed to other activities. Once mechanisms are devised to measure religious fidelity, the true impact of religion in other areas such as medication adherence may be determined.

Previous health care experience.

Family history of HTN. Those with a family history of HTN may have experiences that facilitated adherence to medications. However, when examining the relation between adherence to antihypertensive medication and family history in this study, the relation between these variables was not significant. These results suggest that family history does not necessarily have an effect on antihypertensive medication adherence. Almost all of the participants in this study had a family history of HTN, thus little variability in this sample. Family history is a well-known nonmodifiable risk factor for HTN, however, gene research to discover appropriate treatment for HTN has had limited success (Arnett, 2000; Ferdinand & Welch, 2007). These results are similar to an internet-based research study of Blacks with HTN ("The pressure is on", 2009) that found three out of four (75%) were aware of a family member with HTN, but three out of five

(60%) with this knowledge choose not to engage in preventive health behaviors before their own diagnosis of HTN. When aware of a family history of HTN, men (46%) were more likely than women (38%) to make an effort to control their BP before their own diagnosis of HTN. Black women with HTN reported they did not give their health adequate attention and were less likely to be proactive about their health than men. These results indicate that health does not take precedence over other life issues until a serious health calamity occurs, especially for Black women. This laissez-faire attitude of Black women in relation to their health deserves further exploration.

Although the risk for HTN is greater for Blacks, those who develop HTN can effectively manage it by participating in risk reduction behaviors such as physical activity and diet, along with adherence to antihypertensive medication therapy (Douglas et al., 2003). Although it is not fully understood why Blacks, particularly Black women, have not readily participated in risk reduction behaviors to manage and prevent HTN (Benjamin et al., 2005; Smith et al., 2005; Webb & Gonzalez, 2006), it seems plausible that high risk behaviors have been perpetuated through family history from one generation to the next.

One method used by Blacks to preserve family behaviors is oral cultural traditions. Oral traditions, while common to West African literary and cultural expressions, were rooted in slavery as a mechanism to educate, enlighten minds, and free souls because reading, writing, and speaking in native languages were forbidden (Papa, Gerber, & Mohamed, 2008). In a qualitative study of Black women with HIV (Bueno, 2009), self-talk, a form of oral culture was practiced to promote successful adherence to

the medication regimen. Self-talk aided in building confidence, self-esteem, and in the adoption of healthy practices and positive behavior change. The study also noted that self-talk could hinder health promotion if it was stimulated by fear, negativism, and criticism. Thus, Black families could unknowingly use oral traditions to perpetuate negative health practices.

Because Black women with HTN may interpret their lives as busy with no time for self and always putting the needs of family first, they may use the "busy life" and feeling "stressed out" as a camouflage for depressive feelings of hopelessness and despair. Thus, neglecting self-care needs with an "it does not matter" or "it's all in God's hands" attitude is not easily understood. Wexler, Elton, Pleister, & Feldman (2009) describe this behavior as fatalistic in nature whereby many Blacks tend to believe that HTN is inevitable, so why do anything about it. Fatalistic attitudes about HTN are alarming and could be rooted in oral family traditions. Similarly, in a study of cancer fatalism, Powe and Finnie (2003) reported that as families experience cancer diagnosis and death over time, fatalism is reinforced and perpetuated like a self-fulfilling prophecy. Those diagnosed with cancer direct their efforts toward daily survival rather than healthy behaviors, especially if asymptomatic, and by the time symptoms manifest, treatment options are limited and the prognosis is poor. To the client, fatalism is viewed as a rational behavior because their interpretation of reality is that the treatment regimen is not beneficial. Black women with high cancer fatalism also had high perceptions of spirituality that are believed to serve as a coping strategy. The parallels between cancer fatalism and HTN fatalism warrants further study. Fatalism could present a major

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challenge to the management of HTN because of the client's reluctance to fully adhere to the treatment regimen, and nonadherence may contribute to a myriad of subsequent health problems for Blacks, especially Black women.

Comorbidities. Hypertension is associated with a number of cardiovascular diseases (CVD) such as coronary artery disease, stroke, and heart failure, as well as other comorbidities such as kidney disease, diabetes, and metabolic syndrome (Wong et al., 2007). In terms of morbidity and mortality, HTN and other CVD comorbidities are considered to be serious conditions (Headen, Manton, & Woodbury, 2004). One study (Headen et al., 2004) suggests that initiatives to reduce racial health disparities may be more successful if the focus were targeted to disease clusters rather than single disease states, especially CVD related comorbidities. For Blacks, multiple CVD comorbidities are usually the result of multiple risk factors (Roger et al., 2011). Thus, better monitoring and aggressive management of CVD risk factors, such as obesity and physical inactivity, is indicated especially for Black women with HTN.

The presence of HTN and comorbidities support the importance of adherence to the treatment regimen (Munger et al., 2007) to better control and manage disease processes. While over 65% of clients with HTN require two or more antihypertensive medications to achieve adequate BP control, the diagnosis of one or more comorbidities also requires further medication, thus more costs (Chobanian et al., 2004; Munger et al., 2007). In addition, older age is associated with less income and more comorbidities. The costs of medications may be a burden for clients with CVD comorbidities because co-payments are required for those enrolled in health insurance plans and government

sponsored programs such as Medicaid or Medicare. Although these co-payments seem modest, they quickly become costly as the number of health care provider visits and medications increase. One study found that the presence of CVD comorbidities in Black clients with Medicaid was associated with not filling antihypertensive prescription medications (Lagu et al., 2009). Thus, examining both the number of comorbidities and the number of medications is important when exploring adherence.

According to Munger et al. (2007), those with HTN have one or more comorbidities that require additional medications. Consistent with this finding, clients in the current study had an average of three comorbidities. As comorbidities increase, clients tend to get sicker and the likelihood of taking prescribed medications may decrease. Excluding medication cost factors, sicker clients may select only those medications that allow them a reasonable ability to function and feel better. However, when examining the relationship between comorbidities and medication adherence in the current study, there was no significant association between the variables.

Oftentimes, the effects of CVD comorbidities and related comorbidities present major problems for clients that often go unnoticed by health care providers. For instance, many clients with CVD comorbidities have poorer health and quality of life, physical inactivity, overweight/obesity, mental impairment (e.g. depression and anxiety), physical impairment, disability, decreased capacity to work, polypharmacy, excessive medical services use, higher rates of hospitalization, and increased communication with multiple health care providers, health care costs, and risk for death ("Cardiovascular disability",

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2010). These challenges may contribute to nonadherence to the treatment regimen as the client struggles to maintain an adequate quality of life.

Number of medications. Because most clients with HTN require two or more antihypertensive medications for adequate BP control (Chobanian et al., 2004), health care providers should pay close attention to the total number of medications a client is prescribed. Increased medication use, or polypharmacy, is one issue that may affect medication adherence. With polypharmacy, medication interactions may cause untoward side effects (Moss & Crane, 2010; West et al., 2010). In addition, many clients may have difficulty organizing complex medication regimens. Also, polypharmacy could create a substantial cost burden (Munger et al., 2007).

Because multiple antihypertensive medications and multiple doses are often required, fixed-dose combinations (two or different medicine classifications in one tablet or pill form) aid adherence (Chobanian et al., 2004). Gradman et al. (2010) reported that combination medications can be advantageous in leading to better adherence whereby two pills are replaced with one, lower dosage minimizes adverse effects, and less time is required to achieve adequate BP control. However, cost of fixed-dose combinations may be an issue that affects adherence because many third party payers will either not pay for combination medications that are not available in the generic form or substantially increase the copay (Chobanian et al., 2004; Gradman et al., 2010; Pitt, 2004). Disputes over the more expensive fixed-dose combinations may become a future policy issue.

In the current study, clients took an average of five medications. Both the univariable predictors and the optimal predictive model revealed that participants who

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took five to seven medications were more likely to be adherent to their medication regimen, but a significant linear trend was not observed for either of the predictors. This medication adherence finding was not consistent with the literature that purports fewer medications equate with better adherence (Gradman et al., 2010; Munger et al., 2007). Perhaps those with a higher number of medications in this study perceived themselves as sicker and were more adherent. Further, the increased number of medications may have serendipitously contributed to frequent visits to the health care provider that fostered better communication, trust, and engagement in self-care/medication adherence.

Clients tend to be more adherent to their antihypertensive medications when they are actively engaged in their own care. Because random office visits may be the client's only BP measuring tool, they may feel disconnected and identify less with their HTN diagnosis (Friedewald et al., 2010). To facilitate active participation of clients in their own care, Friedewald et al. (2010) described a technique used in their practice that is worthy of summation. Client education is first used to help clients understand their HTN diagnosis and how medications work in their body to control BP. Because education alone does not increase adherence to antihypertensive medications, clients are made active participants in their care to assist them in taking ownership of their BP through self-monitoring. Initially, clients are taught how to use BP monitoring equipment in the office while comparing their results with the office equipment. As clients take their own BP as prescribed, they electronically transmit the results to the health care provider or keep the results in a BP diary that is brought to office during visits. These activities serve to keep the client actively involved in their BP care as they experience firsthand how

their BP fluctuates with stress, emotions, time of day, and diets high in sodium and fat. Although this method of actively involving the client in BP self-care may be time consuming initially, the end result of adequate BP control is rewarding. This method may not work for all clients, but it does create an atmosphere where the client owns their diagnoses of HTN and works to maintain BP control. Further research to verify how medication adherence is affected by this intervention is needed.

Blood pressure. According to Friedewald et al. (2010), Blacks tend to experience a longer duration of the hemodynamic stresses of HTN long before they meet the JNC 7 criteria for HTN. The authors contend that it is the long duration of HTN that contribute to higher mortality rates in Blacks when compared to Whites. Friedewald, et al. (2010) concur with the recommendation of the International Society on Hypertension in Blacks (ISHIB) (Flack et al., 2010) to lower the target BP from less than 140/90 to less than135/85 for Black clients with uncomplicated HTN (e.g. no target organ damage or CVD) and continue with the JNC 7 criteria of less than 130/80 for Black clients with complicated HTN. However, the complications to monitor have expanded from those only with diabetes or chronic kidney disease to include those with diabetes, prediabetes, high Framingham risk, left ventricular hypertrophy, metabolic syndrome, or glomerular filtration rate <60. Flack, et al. (2010) report that these BP recommendations followed an extensive review of clinical trials and treatment guidelines. The ISHIB recommendations were criticized by Wright et al. (2010) who claimed that sufficient evidence was not available to support the lower BP treatment goals. This lack of clarity is of concern because no consistent recommendations exist for Blacks.

Currently Blacks, especially Black women, have the highest rates of HTN in the world (Roger et al., 2011). Lowering the BP in Blacks requires a multifaceted approach and the guidelines from both JNC 7 and ISHIB warrant an aggressive health focus at the client, medical, and community levels to combat this vexing health problem. At the time of this study, over 40% of the participants were hypertensive, despite being prescribed and filling antihypertensive medications.

Of those study participants who claimed total adherence to their antihypertensive medications, over one-third had HTN. These results may be indicative of unknown factors that could contribute to increases in BP. Another consideration is that participants may not have been completely truthful in their claim of total adherence to their antihypertensive medications. No matter what the cause, HTN in over one-third (35%) of those claiming total adherence to their antihypertensive medications is alarming. Similarity, over one-third (38%) of those study participants who reported nonadherence to their antihypertensive medications experienced HTN. This may suggest that many in the nonadherent group were engaging in a partial level of adherence to their antihypertensive medications. Of great concern is that over 40% of all participants in this study were not adequately controlled with their current antihypertensive medications. These data are similar to the 45.7% prevalence rate of HTN among Black women according to the American Heart Association statistics (Roger et al., 2011). If the suggested ISHIB recommendations for HTN were followed, the prevalence rate of HTN in Black women would be considerable higher. The results of this study add support to the JNC 7 statement that HTN will only be controlled if clients are motivated to adhere to

the treatment plan (Chobanian et al., 2004). Hence, further investigation into other areas such as the psychological impact of fatalism may be in order.

Body mass index. Body mass index is commonly used to assess obesity that is caused by an energy imbalance ("Overweight and obesity", n.d.). This energy imbalance occurs when the amount of "energy in" is not balanced with the amount of "energy out" of the body. For instance, excess caloric intake from food and drinks along with physical inactivity over time will result in overweight/obesity ("Overweight and obesity", n.d.).

It is well documented that Black women (79.6%) have the highest prevalence of overweight/obesity when compared to White (57.5%) and Hispanic (74.1%) women (Flack et al., 2010; Roger et al., 2011). Black women (24.1%) also have the lowest prevalence of regular leisure-time physical activity as compared to White (36.2%) and Hispanic (25.9) women (Roger et al., 2011). This lack of energy expenditure is reflected in higher BMIs and larger waist circumferences both of which are predictors of obesity-related health risk, such as CVD (Roger et al., 2011). The current study findings of this Black female sample are consistent with the literature (Roger et al., 2011), whereby the majority were overweight or obese with a waist circumference greater than or equal to 88 cm. Study findings indicated that there was no statistically significant association between BMI and medication adherence. This result suggests that BMI and medication adherence are not related concepts although antihypertensive medications are more effective with lifestyle modifications such as weight control. Lack of weight control may be indicative of lack of control in other aspects of life. This perception may create bias toward overweight/obese clients. In fact, clients with higher BMIs were less likely to be

perceived as adherent to medications by their health care providers (Huizinga, Bleich, Beach, Clark, & Cooper, 2010). Perceived discrimination because of physical characteristics toward overweight/obese clients is similar to prejudices held against women due to race or gender. In comparison to Blacks, perceptions of this nature may be a reality as evidenced by disparate health care. Therefore, this issue deserves further exploration.

Environmental resources.

Income. The cost of medications has been reported as a frequent barrier to medication adherence, especially for low income clients. Even low prescription copayments can be problematic for Medicare and Medicaid recipients (Munger et al., 2007). One study (Applegate et al., 2000) found that the cost of antihypertensive medications was the primary reason for nonadherence to the treatment regimen, and the initiation of free medication and health care was significantly related to BP control.

Contrary to popular opinion, Blacks are thought to value other items, such as cellular telephones, as more affordable than antihypertensive medications. Many are not aware that cellular telephones are essentially free to low-income consumers through a federal program that subsidizes providers to supply up to 250 free minutes of cellular telephone use monthly. The Federal Communications Commission's Lifeline Assistance and Link-Up program was initiated in 1996 to provide discounts for landline telephones and upgraded to mobile telephones during the G. W. Bush's administration (Free government cell phones, 2011). Biased information concerning the client's use or misuse

of economic resources that could aid adherence to the treatment regimen may contribute to stereotypes that may ultimately influence the quality of health care delivered.

When clients cannot afford to purchase medications, it is not an uncommon practice to alter the medication dosage or schedule to make medications last a longer period of time. Low income and high out of pocket cost contribute to this behavior (Steinman, Sands, & Covinsky, 2001). According to a study conducted by Steinman, et al.(2001), elderly clients, particularly minorities, engaged in medication restriction behaviors when they lacked health insurance.

This study found no statistically significant association between income and medication adherence. Over 75% of participants in this study reported they could afford their medications all of the time. Only one participant stated they could not afford any of their medications. Interestingly, nonadherence to antihypertensive medications was noted among one fifth of participants who reported income levels ranging from $45,000 to an excess of $100,000. Despite adequate resources participants were nonadherent to their antihypertensive medications. Thus, a sufficient income level with the ability to afford medications was not an assurance of medication adherence in this sample. Nonadherence was also noted in a randomized controlled intervention study (Martin et al., 2011). A population of predominately low income Black clients (95%) living in a rural setting were nonadherent to medication-taking even though free antihypertensive medications were provided. Although individual-level factors, such as confidence building and modification of beliefs and behaviors were implemented, the authors noted this was not enough to improve adherence to antihypertensive medications. The authors concluded

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that there are factors other than the ability to afford medications that influence medication adherence behaviors. Barriers cited to nonadherence were forgetfulness and transportation. This study suggests that health care providers need to assess individual client dynamics to determine the factors that contribute medication adherence.

Type of health coverage. For those who are employed, the type of health care coverage is primarily limited to the policy offered by employers. One type of plan, high-deductible health plan, attracts those who are young, healthy, and low-cost users. Clients who are older and sicker generally choose the traditional plans that become more expensive with long term use or the high-deductible health plan resulting in less care initially, then higher morbidity and increased overall health care costs later (Waters, Chang, Cecil, Kasteridis, & Mirvis, 2011). Government health programs, such as Medicaid and Medicare, were created primarily to cover single parent families and the elderly. However, services in both of these programs have expanded to provide indigent care (Kovner & Knickman, 2008). People who are uninsured generally rely on free clinics, health departments, and hospital emergency departments for health care (Kovner & Knickman, 2008) and may be less adherent to a medication regimen.

In the current study, there was no statistically significant association between type of health coverage and medication adherence. Study results indicated that over 80% of participants had health insurance through employers or were covered through health programs such as Medicaid and Medicare. The economic recession in the United States affected employment opportunities for 15% of the participants in this study. If government health plans were nonexistent, one-fourth of this sample would not have had

a health care plan. This would have increased the number of uninsured persons and increased the burden of indigent health care to emergency departments.

Consumer expenditures for health care in the form of insurance premiums, co-payments, and out-of-pocket cash have increased immensely with advances in medical technology and the treatment of chronic diseases, such as HTN. Medications are one of the primary treatments for chronic diseases and the costs continue to escalate. In one study (Domino et al., 2011), Medicaid policy changes restricted medication refills to a 30-day supply and increased the co-pay for brand medications. The effects of these policy changes 18 months later revealed a substantial decrease in medication adherence in clients with chronic diseases. The most pronounced barrier to adherence was frequent trips to the pharmacy for refills, not cost of medications. Although these policy changes resulted in government cost savings, the long-term clinical effects of medication nonadherence with worsening disease states requiring increased hospitalizations have not yet been realized.

Elements of Client Singularity: Dynamic Variables

Intrinsic motivation.

Reactance. Because treatment of HTN involves lifestyle changes such as taking medications, altering the diet, and increasing physical activity, personal freedoms are impacted. Clients may be motivated to preserve those freedoms (Fogarty, 1997) by not adhering to the treatment regimen. Because of their historical legacy of slavery and racial discrimination, Blacks may view freedoms differently than other races and make greater efforts to reserve those freedoms. For instance, when a Black woman with HTN is told

she must adhere to the medication regimen, she may choose to preserve her freedom and do the opposite of what she is told to do. This behavior is consistent with psychological reactance (J. W. Brehm, 1966). Studies (Seemann et al., 2004; Woller et al., 2007) indicated that Blacks have higher levels of reactance than Whites in the areas of distrust, stress, hostility, and depressive symptoms. In addition, men were noted to have higher reactance scores than women possibly due to women's socialization to be more submissive. Thus, reactance may be an intrinsic variable associated with medication adherence.

The relationship between reactance and medication adherence was not statistically significant in this study. One explanation for the lack of reactant behaviors was that the design of the tool may not have captured the intrinsic motivation that Black women possess due to their unique psychological complexities. Although the reactance tool was designed to identify clients who may need additional help in adhering to the treatment regimen, its use with Black women was not previously established. No known studies have investigated reactant behaviors in Black women as related to medication adherence. Because very little is known about the psychology make-up of Black women and the challenges they face in various aspects of their lives, they are oftentimes misjudged, misunderstood, and even labeled as mythical creatures (Jones & Shorter-Gooden, 2003). Behind the tough appearing façade of many Black women lurks the trauma of racism, sexism, and classism with resultant psychological and physiological stressors that manifest in diseases such as HTN. Although this tool has merit, further development and research are needed to capture psychological reactance in Black women.

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Another explanation for the lack of reactant behaviors in this study is the older age of participants ($M = 47.8$) as compared to previous studies using younger men and women participants ($M = 21.9 – 23.6$) (Seemann et al., 2004; Woller et al., 2007). In the current study, no significant correlations were found in the reactance scores of younger women or older women. Only 6% ($n=5$) of the women in this study were aged 30 or less. A study conducted by Hong et al. (Hong, Giannakopoulos, Laing, & Williams, 1994) that included men and women aged 18-40, found that younger people displayed higher reactance levels than older people. Hong et al. (1994) concluded that maturity and life experiences may decrease motivations to preserve personal freedoms, thus decreasing reactant behaviors. Studies focused on refining the instrument and including increased numbers of younger women may provide clarity on the role of reactance to medication adherence.

Cognitive appraisal.

Hypertension knowledge. According to the American Heart Association statistics (Roger et al., 2011), the overall percentages of those aware of and treated for HTN is about 80% and the percentages were higher among Blacks than Whites. Low scores on the 12-item High BP Prevention IQ questionnaire (HBPPIQ) suggest several misconceptions about HTN. Almost all of the participants in this study believed stress causes HTN, and the vast majority thought that HTN has symptoms. In addition, over two-thirds believed that there is a cure for HTN, and over half held that a person has to exercise vigorously every day to improve their BP and heart health. Also, over half thought they would get HTN if their parents were diagnosed with HTN. Based on the

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current study of Black women with HTN, increased awareness was not associated with a better knowledge of HTN as reflected in the low HTN knowledge scores.

Low health literacy may be one explanation for the low HBPPIQ scores, although health literacy was not assessed in the current study. Those who had not completed a high school education could have contributed to the low HBPPIQ scores. However, no statistically significant correlations were found between education and HTN knowledge. Nevertheless, the participants' low HBPPIQ scores indicate the need for further education concerning HTN to increase knowledge and contribute to better medication adherence. Even though knowledge in itself is not enough to ensure adherence, it is necessary for adherence to occur (Pascucci et al., 2010).

Kim et al. (2007) found that intentional nonadherence to antihypertensive medication regimens in middle-aged Korean Americans with HTN was significantly associated with a lack of HTN knowledge. In contrast, a Cochrane review concluded that education alone was not associated with large BP reductions in clients on prescribed medications (Glynn et al., 2010). Therefore, in addition to education, interventions to affect HTN in Black women may need to be multifaceted and inclusive of strategies that include pertinent aspects of the client's physiological, psychological, sociodemographic, and environmental characteristics (Cox, Sullivan, & Roghmann, 1984) along with the inclusion of the client as an active participant in the treatment regimen.

Self-care of HTN. Self-care knowledge is educational information a client has learned to independently take care of their personal needs. According to Becker (1985), clients who are motivated to adhere to the treatment regimen must have adequate

knowledge to succeed. Riegel, Lee, Dickson, and Carlson (2009) developed a model of self-care for HTN. This model describes the client's naturalistic decisions that reflect his or her choice of behaviors in self-care maintenance and self-care management. The client engages in self-care between visits to their health care provider. Maintenance refers to the physiological stability of BP that is achieved with routine activities such as medication adherence, eating a diet rich in fruits and vegetables, participating in physical activity, and regular check-ups with the health care provider. Management differs in that it refers to recognizing, responding, making decisions about appropriate treatment, implementing the treatments, and evaluating the response to the treatment. The goal of management is adequate BP control. Self-care confidence, though not part of the model, is the ability to perform a task comfortably to achieve the desired outcome.

Of the self-care of HTN subscales, only the self-care maintenance and self-care confidence subscales were significant univariable predictors of medication adherence suggesting that participants were likely to be adherent to antihypertensive medications. The management subscale not a significant univariable predictor of medication adherence.

Riegel, et al. (2009) found that clients who had above-average scores (≥70) on the management subscale, indicating self-care, had a lower risk of an adverse health event during follow-up than those with below-average scores (<70). However, the authors noted that benefits of self-care, such as lower health care costs, effective relationships with health care providers, and client satisfaction may be evident in some clients with below-average scores on the subscales. In the current study, only a small percentage of

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participants achieved a cut-off score of 70 or greater on the Self-Care of HTN Index subscales to indicate self-care adequacy; maintenance (3.8%), management (11.8%), and confidence (28.8%). These low self-care scores may be reflective of low HTN knowledge scores previously discussed. While knowledge is nice, it is not sufficient evidence of medication adherence. Therefore avenues to augment HTN knowledge may include BP self-monitoring and participation in HTN self-help and support groups.

Clients who possess knowledge, experience, and skill of their disease process are expertly engaged in self-care (Riegel et al., 2009). One factor that may enhance the self-care of HTN model is motivation. While it is advantageous for client's to have knowledge, experience, and skill to conduct self-care, if the client is not motivated to adhere to the treatment regimen, they are unlikely to improve (Becker, 1985).

Trust in health care provider. The literature indicates that many Black clients generally distrust White health care providers because of their historical legacy of slavery and oppression that contributed to perceptions of injustices and discriminatory experiences in various health care situations (Gamble, 1997; Spillers, 1987; "Unequal treatment", 2002; Washington, 2006). This lack of trust in White health care providers may result in a lack of adherence to the treatment regimen (Greer, 2010). Consequently, many Black clients may have a preference for care and treatment from Black health care providers (Flack et al., 2010; Greer, 2010; B. D. Smedley et al., 2003; Watkins & Terrell, 1988). However, the scarcity of Black health care providers is concerning and limits the Black clients' inclination to choose a provider based on race. Also, inappropriate cultural competence and awareness to treat the holistic needs of Black clients by health care

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providers of other races and ethnicities may further complicate the trust issue and

medication adherence outcomes (Barksdale, 2009; Yancy et al., 2005).

The optimal predictive model in this study revealed that the dynamic variable that

had a statistically significant relationship with medication adherence was trust. As trust in

the health care provider increased, adherence to medications increased. That is,

participants who reported the most trust in their health care providers were more willing

to adhere to the prescribed treatment regimen. This finding is congruent to expectations

that trust promotes better medication adherence (Benkert et al., 2009; Schoenthaler,

Chaplin, et al., 2009). Similarly, another study (Nguyen et al., 2009) that used these same

instruments to measure trust and medication adherence as did the current study found that

higher adherence was associated with greater trust in the health care provider in a sample

of Black and Whites with inflammatory bowel disease (IBO). Because the sex of

participants in the study was not reported, it is unclear whether Black women were

included. Further, because IBO has symptoms and HTN is silent, this may be a major

difference between these two diagnostic groups.

Although the findings of the current study support currently held beliefs regarding

trust and medication adherence, there is reason to consider an alternative viewpoint for

clients who may not trust their health care providers. In the age of time-constrained office

visits, health care providers may tend to engage Black clients with HTN in chit-chat

instead of meaningful dialogue relative to their health status. Clients who are distrustful

may recognize that their health needs are not satisfied when they are left with superficial

directives that are virtually meaningless and impossible to follow. Over time, the clients

become symptomatic and gain the label of being nonadherent to the treatment regimen that they may have had no knowledge. In essence, health care providers may not be providing Black clients with the health care information and services necessary to promote healthy lifestyle changes, thus increasing distrust of the health care provider.

Although medications are the mainstay of HTN therapy (Chobanian et al., 2004), other treatment strategies may be necessary to maintain trust and adherence to the treatment regimen. According to Cox, Sullivan, and Roghmann (1984), multifaceted interventions to manage health problems are required from health care providers. These interventions include combining the client's physiological, psychological, sociodemographic, and environmental characteristics to achieve the desired health outcome, such as adherence to antihypertensive medication. Cox (2010, August 4) contends that clients must be involved as participants in the self-care of their health and initially, ample time must be spent to clear up misperceptions, misunderstandings, and misknowledge. Barksdale (2009) concurs and recommends a client-centered approach to delivering health care. Thus, increasing client knowledge, involvement in the treatment process, and devising interventions pertinent to the client's needs may be vital to establishing trust and maintaining medication adherence.

Coping. Coping is the way an individual uses thoughts and actions to deal with stress. Stress on the other hand refers to how the body reacts to internal and external experiences. All people experience a measure of stress. Black women, unlike other racial/ethnic groups, are confronted with the triple jeopardy of racism, sexism, and classism that may overtax coping mechanisms and contribute to insurmountable

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psychological and physiological stressors (Beal, 1969; Jones & Shorter-Gooden, 2003). Empirical evidence suggests that persistent stress in the absence of adequate coping mechanisms may predispose an individual to chronic diseases such as HTN (Lehman et al., 2009; B. McEwen & Seeman, 1999; B. S. McEwen, 2005; Schneider et al., 2001). The John Henryism hypothesis predicts that low socioeconomic status (SES) clients with chronic psychosocial, economic, and environmental stressors who continuously engage in active coping through hard work will increase their likelihood of developing sustained physiological reactions over time that contribute to HTN (Bennett et al., 2004; James, 1996). It is well known that when people actively cope with difficult stressors in the environment, the body experiences a recurrent sympathetic arousal that leads to an elevated BP. With John Henryism, those who believe they can master or actively cope with difficult or prolonged psychosocial or environmental stressors by trying to overcome the stressor with inadequate coping strategies are at greater risk for chronic diseases such as HTN than those who are more reserved about stressors. When John Henryism active coping is repeatedly elevated, an inverse relationship exists between SES and BP whereby SES is decreased and BP is increased (James et al., 1987).

The variables frequently used to examine SES are wealth related (education, income, and health insurance). In the current study, 16.3% of this sample had less than a high school education, about a third of the participants lived below the federal poverty level, and only 17.5% were without health care coverage. In addition, 18.8% reported inadequate finances or unemployment as a stressor. Almost one-third of this sample was poverty stricken and almost half had HTN despite having prescribed antihypertensive

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medications. The John Henry inverse relationship between low SES (income) and high BP was true for almost half of the study participants, and the High John Henry scores above the median (>50) were noted in those whose income was less that the poverty level. Further, 21% of those below the poverty level reported total medication adherence with a perfect Hill-Bone Compliance score. In this study, coping was not significantly related to medication adherence.

Other studies found no relationship between coping and HTN (Jackson & Adams-Campbell, 1994; James, Keenan, Strogatz, Browning, & Garett, 1992). In contrast, two studies showed that coping was associated with mean arterial changes (R. Clark, Adams, & Clark, 2001) and increased BP (James et al., 1987). According to James (1992), the inverse association between coping and high BP is more apparent with the presence of a low SES which signifies increased psychosocial stressors that overwhelm coping mechanism. In a study conducted by Shorter-Gooden (2004) on mechanisms to identify coping strategies in Black women, results indicated that those who were resistant to the damaging effects of stress-related health consequences tended to engage in various coping strategies, such as spirituality, social support, and valuing oneself. In the current study, results suggest that the low SES of some participants was not a persistent stressor that taxed coping resources.

Affective response.

Perceived racism/discrimination. Research findings note that perceptions of

racism/discrimination experienced by many Blacks in health care settings is related to

disparate care for diseases, procedures, and pharmacological care, especially as related to

CVD ("Unequal treatment", 2002). Behavioral and emotional responses to

racism/discrimination is associated with an elevated BP in Blacks (Armstead et al., 1989;

T. T. Lewis et al., 2009), including less nocturnal systolic BP and diastolic BP dipping,

indicating a consistently increased BP (Tomfohr et al., 2010). In contrast, several studies

including the current study, found no correlation between BP and perceived

racism/discrimination in Blacks (Barksdale et al., 2009; C. Brown et al., 2006; S. K.

Davis & Quarells, 2005; Peters, 2004, 2006).

The age of participants in the current study may have been an influencing factor

on their perceptions of racism/discrimination. Since the average age of the participants

was 47.8, around 63% of the participants were around the age of 10 when the Civil

Rights era ended in 1968. Therefore, many participants were not directly exposed to the

harsh realities of racism/discrimination and may only have experienced subdued forms of

racism/discrimination. However, since the election of the nation's first Black President,

"silent racism" has evolved (Rossing, 2011, p. 429). The term racism has become

distorted and downplayed, especially in the political arena, because it signifies racial

disunity. Therefore, any racist attacks on the President or other people of color are

virtually ignored in the mainstream public discourse (Rossing, 2011). These events could

have a major impact on the health status of racial/minority groups with a potential increase in stress related illnesses, such as HTN.

In the current study, perceived racism/discrimination was not related to medication nonadherence. In contrast, several qualitative studies found that perceived racism/discrimination was identified as a factor in nonadherence to antihypertensive medications (L. M. Lewis et al., 2010; Lukoschek, 2003; Webb & Gonzalez, 2006). Clients who feel they are treated unfairly may respond with anger and hostility and be less likely to follow the health care providers' treatment advice. Consequently, the impact of racism/discrimination may reflect mistrust and rejection of health care providers and services offered, contributing to poor medication adherence and subsequent poor health outcomes (Chakraborty, King, Leavey, & McKenzie, 2010).

Depression. Depression in Black women is not fully understood (Read & Gorman, 2007) and may be difficult to detect (Jones & Shorter-Gooden, 2003). Typically, Black women deny depressive symptoms (Duckwork, 2009) and describe depression differently, such as feeling stressed or tired (Jones & Shorter-Gooden, 2003). Therefore, treatment for depression is either not readily sought by Black women, or depression is oftentimes misdiagnosed (Duckwork, 2009). Therefore, capturing the true clinical picture and prevalence of depression in Black women may be elusive.

The relationship between depression and HTN is not clear. The results of one study found that depression was related to higher diastolic BP and stress in Black women (Artinian et al., 2006). Hypertension was associated with a greater risk of depression in Canadian men, but not women (Patten, 2001). In contrast, another study (M. T. Kim et

al., 2003) noted that depression was not significantly related to BP in Black men, although medication nonadherence was associated with increased systolic BP.

Medication adherence is also associated with depression and HTN. One study (Schoenthaler, Chaplin, et al., 2009) of Blacks who have HTN found that poor medication adherence was associated with depressive symptoms and younger age. Another study in clients with HTN noted that increases in depressive symptoms were associated with lower odds of antihypertensive medication adherence (Wang et al., 2002). A qualitative study (Fongwa et al., 2008) including those with HTN noted that depressed clients ruminated about things they could not change and failed to follow the treatment regimen including medication adherence. These studies clearly show that depression is associated with medication adherence in clients with HTN. In the current study, as medication adherence decreased, depression increased. Depression was a significant univariable predictor of medication adherence. Consistent with this finding, other studies concur that poor medication adherence is associated with depression in clients with HTN (Fongwa et al., 2008; Read & Gorman, 2007; Schoenthaler, Chaplin, et al., 2009; Wang et al., 2002). Despite the association of depression and medication adherence, depression was not in the optimal predictive model.

Implications for Nursing

Hypertension is rampant among Blacks, especially Black women. The effects of HTN are noted earlier in the life of Blacks when compared to Whites and other racial/ethnic groups. Therefore, education of young Black elementary and middle school children about the devastating effects of HTN is imperative. In addition, HTN education

and screening in pre-adolescent youth will assist in making young Blacks cognizant of HTN, its risk factors, and the importance of lifestyle modifications. Targeting this population may help break the cycle of cultural practices that negatively impact HTN. Nursing is in a pivotal role to implement these primary prevention strategies.

Nurses must get involved in organizations, scientific study groups, and other mechanisms to encourage resources to fully understand HTN in Blacks, especially Black women. Nurses must lead in advocating for awareness of HTN which should be as important as breast cancer awareness and the Go Red for Women campaign. It is vital to actively engage organizations, such as the American Heart Association, in the education of Black youth. Interventions aimed at Black at-risk youth may help to prevent the long term effects of HTN that contribute to increased morbidity, disability, and mortality. Equally important is the necessity for research to define the early age that HTN risk is most likely to be noted in Blacks. Without clear direction in the incidence of HTN, healthcare providers may miss opportunities to screen for HTN due to their lack of awareness.

Depression in Black women is oftentimes difficult to detect because many have been socialized to appear strong, tough, and confident even when falling apart on the inside. More psychometrically sound assessment and screening tools are needed that target depression in Black women. Because Black women tend to report they are stressed and cannot name their feeling as depression, help sought from health care providers is usually futile as it addresses stress, not depression. As a result, Black women are oftentimes misdiagnosed. Frustration develops from a lack of sensitivity to their needs

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and fatalistic attitudes may evolve that hinder their ability to follow the treatment regimen. Oftentimes depression in the Black community is viewed as a weakness and thought to be overcome by reliance on prayer, family, and friends. Support from policymakers is needed for public education programs to aid in dispelling long held beliefs about depression in Black women. Nurses must be diligent in assessing clinical factors, such as depression and fatalism, and in conducting research to identify other factors that may be associated with nonadherence to antihypertensive medications.

Increased number of prescribed medications was related to adherence to antihypertensive medications in this study. Participants taking five to seven prescribed medications were likely to be adherent. During assessments, nurses should not only ask clients to name their prescribed medications, but should rate the effect that prescribed medications have on the client's daily lives. This evaluation may help nurses determine risk for antihypertensive medication nonadherence.

Currently, a critical need exists for research strategies to improve adherence in Black women with HTN. Because HTN occurs earlier in life for Blacks, the likelihood of HTN-related complications may contribute to increased hospitalization and health care costs. According to a recent study (Abel, Crane, Efird, & Sherer, 2011, February) on predictors of readmission rates in heart failure clients, data revealed that the higher the number of comorbidities, the greater the risk of readmission. With the economic recession in the United States, policymakers are penalizing hospitals with excessive readmission rates in an effort to curve health care costs and decrease government

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spending. Developing and targeting interventions to those with more comorbidities may be important in controlling risking health care costs.

Nurses are in a unique position to impact the health care system at the local, state, and national level in the achievement of positive health care outcomes for clients with chronic illnesses such as HTN. The current study suggested that Black women with HTN who tend to trust their health care provider are willing to adhere to the prescribed antihypertensive medications. This finding is congruent with previous research (Benkert et al., 2009; Schoenthaler, Chaplin, et al., 2009) that trust promotes medication adherence. As trusted professionals, nurses have experienced success in the control of HTN through nurse managed clinics. This places nurses in a unique position to take the lead in managing care of clients, especially Black women with HTN. Research studies found that client education and management by nurses improves clients' treatment adherence, self-care, clinical outcome, and medical costs (Albert, 2008; Greveson, 2008; Velez, Rahko, & Westerfeldt, 2008). In addition, nurse directed intervention programs are pivotal assets for improving disease management, client and family education, adherence (with clients as decision-makers in the treatment process), and long term follow-up post discharge. Because nurses have demonstrated success in improving adherence to the treatment regimen, the health care reform bill (Patient Protection and Affordable Care Act 2010) promotes nurse managed clinics and intervention programs to manage chronic diseases and long term medication adherence. Continuing to advocate for nurse led programs as well as clearly disseminating the outcomes of nurse managed clinics are essential in improving the health of Black women with HTN.

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Recommendations for Future Research

There are gaps in the literature related to factors that contribute to HTN in Black women as well as gaps in knowledge on how to increase adherence to the antihypertensive medication and treatment regimen. The unanswered question remains: Why are Black women disproportionately affected by HTN? Although medication adherence research in clients with HTN has been in existence for more than 30 years (Hill et al., 2010), a paucity of research has been dedicated to medication adherence from a Black woman's perspective. In fact, only one qualitative study was found in the literature (Fongwa et al., 2008) that specifically addressed adherence factors in Black women. Thus, further studies focusing on Black women with HTN of various ages are essential in developing knowledge important in decreasing disparity in HTN and associated outcomes.

This study supports current literature that increased trust in the health care provider is associated with adherence to the medication treatment regimen. This finding is noteworthy because Black women who trust their health care providers are more likely to follow their treatment advice. It is important that health care providers spend adequate time cultivating relationships with Black women to discern reasons for the high prevalence of HTN in this population. The unknown factors that continue to frame inadequate BP control are disturbing because subsequent heart and kidney damage contribute to increased morbidity, disability, and mortality. Hence, the causes of these disastrous effects of HTN in Black women deserve further study. Both quantitative and qualitative studies may provide data to explore and explain these unknown factors.

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A paucity of measurement instruments exist that are specific to Black women. Many Blacks have unique psychosocial, cultural, and environmental factors that are not homogenous with other racial/ethnic groups. Therefore, further examination of the psychometric properties of instruments used primarily in other racial/ethnic groups is needed prior to use in Blacks. In addition, instrument development for specific use in Blacks, especially Black women, is warranted.

Longitudinal research studies on Black women with HTN are warranted to capture dynamic factors that may contribute to HTN and medication adherence. Another topic for further research is the impact of perceived racism/discrimination on medication adherence in Black women with HTN. Several qualitative studies have alluded to this topic, but no known studies have fully examined this issue. In addition, there are no known conceptual frameworks or models that consistently explain or predict medication adherence. Because nurses interface with clients at all levels of care, nurses are in a good position to develop a model of adherence. Lastly, future research must impact public policy with sustainable and reproducible methods that reduce the HTN disparity and improve medication adherence outcomes in Black women. Research in these areas is desperately needed to help reduce the burden of HTN in Black women.

Summary

The purposes of this study were to describe the differences in adherent and nonadherent Black women who have HTN and examine issues that influence medication adherence. In addition, this study explored the relationship between reactant behaviors and medication adherence. The study results did not show a difference between Black

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women who adhere to antihypertensive medications and those who do not adhere. Also,

there was no relationship between reactant behaviors and medication adherence.

However, in the optimal predictive model, age and trust in the health care provider had

the greatest influence on medication adherence. Therefore it is important to target those

in the 40-49 age group and individuals who take five to seven medications. Further, the

client-health care provider relationship should foster trust, actively involve the client in

decision-making, and support the client in the adherence process. Future research should

continue to identify factors that influence adherence to the treatment regimen and develop

interventions that facilitate the client's ability to better manage their HTN and maintain

BP control, especially for Black women with HTN.

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HIGH BLOOD PRESSURE STUDY FLYER

High Blood Pressure Study

- **Are you a Black woman?**
- **Have you been told by your health care provider that you have high blood pressure?**
- **Are you 18 to 60 years of age?**
- **Do you want to know more about how to manage your blood pressure?**

You can be part of an important high blood pressure (hypertension) research study.

The purpose of this study is to see how Black women manage their blood pressure.

A benefit of this study may be taking better care of yourself and your blood pressure. This study may also help other Black women better manage their blood pressure.

This research study can be done in the privacy of your home or at the location of your choice. Your blood pressure, height, weight, and waist will be measured. You will be asked some general questions about your health. It may take up to one hour to answer the questions. All those who finish answering the questions will receive $15.00 to thank you for your time!

Please call Willie Mae Abel at 704-638-0693 for more information or to join this important study.

This is a research study conducted as part of the requirement for a PhD in Nursing at the University of North Carolina at Greensboro.

APPROVED IRB
APR 1 2 2011

APPENDIX B

CONSENT FORM

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO

CONSENT TO ACT AS A HUMAN PARTICIPANT: LONG FORM

Project Title: Issues Influencing Medication Adherence in Black Women with Hypertension

Project Director: Willie Abel, RN, MSN

Participant's Name: _____

What is the study about?

This is a research project. The purpose of this study is to look at how you are taking care of your blood pressure.

Why are you asking me?

You have been asked to be a part of this research study for Black women with high blood pressure because you heard or read the information about this study and provided your name and contact information to the researcher. To be included, you must be (a) age of 18 to 60, (b) take one or more medications for high blood pressure, and (c) English speaking. Because I will be asking questions about things that happened in the past 2 weeks, you cannot have any memory problems that keep you from doing your daily activities. Also, those who are pregnant at this time or part of another research study at this time cannot be a part of this study.

What will you ask me to do if I agree to be in the study?

The researcher will meet individually with you to collect information by asking you questions in a quiet location of your choosing, either your home or another preferred location. The researcher will read the questions for you, unless you tell the researcher you prefer to read them by yourself. Directions will be given before each set of questions. You are to answer all questions honestly. Your blood pressure, height, weight, and waist size will be taken. All of this will take about 60 minutes. If you have immediate questions about this study, feel free to ask the researcher before signing the consent form. For further questions about this study, feel free to contact the researcher, Willie Mae Abel at 704-638-0693 or by email at wmabel@uncg.edu.

Is there any audio/video recording?

There is no audio/video recording in this study.

What are the dangers to me?

The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to participants   The possible dangers with this study may

UNCG IRB
Approved Consent Form
Valid 4/12/11 to 4/10/12

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be emotional such as getting embarrassed or upset from telling the researcher about some health care behaviors or situations.

If you have any concerns about your rights, how you are being treated or if you have questions, want more information or have suggestions, please contact Eric Allen in the Office of Research Compliance at UNCG at (336) 256-1482. Questions, concerns or complaints about this project or benefits or risks associated with being in this study can be answered by name of principal investigator Willie Mae Abel who may be contacted at (704) 638-0693 or by email at wmabel@uncg.edu.

Are there any benefits to me for taking part in this research study?

You will receive your blood pressure numbers and blood pressure reading information. This may help you better manage your blood pressure.

Are there any benefits to society as a result of me taking part in this research?

This study may help other Black women better manage their blood pressure.

Will I get paid for being in the study? Will it cost me anything?

When you finish answering all questions and have your blood pressure, height, weight, and waist size done, you will receive $15 cash as a thank you along with your blood pressure numbers and blood pressure reading information. If you stop the study and do not finish answering all questions and have your blood pressure, height, weight, and waist size done, you will not receive the money or reading information.

How will you keep my information confidential?

All information that identifies you will be kept separately from the forms and locked in the researcher's file cabinet. Only the researcher can get into this file cabinet. You will not be identified by name when study results are reported. All information obtained in this study is strictly confidential unless disclosure is required by law. All questionnaires and identifying information will be destroyed in five years.

What if I want to leave the study?

'You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.'

What about new information/changes in the study?

'If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.'

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Results of the research study will be shared with you upon request while keeping all individual responses confidential.

Voluntary Consent by Participant:
By signing this consent form you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by Willie M. Abel.

Signature: _____ Date: _____

Would you be willing to be contacted about another study? Yes____ No_____

UNCG IRB
Approved Consent Form
Valid 4/12/11 to 4/10/12

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APPENDIX C

APPROVAL LETTER

THE UNIVERSITY of NORTH CAROLINA
GREENSBORO

OFFICE OF RESEARCH COMPLIANCE
2718 Beverly Cooper Moore and Irene Mitchell Moore
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Federalwide Assurance (FWA) #216

To: Patricia Crane
Adult Health
220 Moore Building

From: UNCG IRB

Authorized signature on behalf of IRB

Approval Date: 4/12/2011
Expiration Date of Approval: 4/10/2012

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Initial
Expedited Category: 7.Surveys/interviews/focus groups,4.Noninvasive clinical data
Study #: 11-0161

Study Title: Issues Influencing Medication Adherence in Black Women with Hypertension

This submission has been approved by the IRB for the period indicated. It has been determined that the risk involved in this research is no more than minimal.

Study Description:

The purpose of this study is to 1) describe the differences in adherent and nonadherent black women who have hypertension; 2) examine traditional and culturally specific issues that influence medication adherence; and 3) explore the relationship of reactant behaviors and medication adherence.
Investigator's Responsibilities

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

Signed letters, along with stamped copies of consent forms and other recruitment materials will be scanned to you in a separate email. These consent forms must be used unless the IRB hasgiven you approval to waive this requirement.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented (use the modification application available at http://www.uncg.edu/orc/irb.htm). Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB using the "Unanticipated Problem/Event" form at the same website.

CC:Willie Abel, School Of Nursing, Chris Farrior, (ORED), Non-IRB Review Contact, (ORC), Non-IRB Review Contact

APPENDIX D

DEMOGRAPHIC HEALTH DATA COLLECTION TOOL

I'd like to ask you some questions about your health and different things that may affect your health, especially your blood pressure. I am going to read several statements to you, and after I read each statement, I want you to answer as honestly as you can with the one answer that best describes you. It is important that you give honest answers based on your health status and not answer how you think I may want you to respond.

1. Ethnicity: a. _____ African American
                   b. _____ Central American
                   c. _____ South American
                   d. _____ Caribbean Countries
                   e. _____ Africa
                   f. _____ Biracial
                   g. _____ Other

2. Age on last birthday: _____

3. Current Marital Status: a. _____ Single (never married)
                                b. _____ Married
                                c. _____ Separated
                                d. _____ Divorced
                                e. _____ Widowed
                                f. _____ Other

4. Education: a. _____ Less than 12th grade- list grade completed _____
                  b. _____ 12th Grade, No Diploma
                  c. _____ High School Graduate
                  d. _____ GED or Equivalent
                  e. _____ Some Community College
                  f. _____ Graduated Community College
                  g. _____ Some 4-year College
                  h. _____ Graduated 4-year College
                  i. _____ Some graduate school
                  j. _____ Completed graduate school
                  k. _____ Other

5. Are you currently attending school? a. _____ Full-time student
                                         b. _____ Part-time student
                                         c. _____ Not a student

6. Current Occupation: _____
   a. _____ Full-time
   b. _____ Part-Time
   c. _____ Not employed/unemployed
   d. _____ Disability
   e. _____ Other

7. Retired: a. _____ Yes,
                b. ____ Pensioner
                c. Position before retired _____
                d. _____ No

8. Annual Household Income:
                a. ____Less than $10,000
                b. ____$10,000 to $14,999
                c. ____$15,000 to $19,999
                d. ____$20,000 to $24,999
                e. ____$25,000 to $34,999
                f. ____$35,000 to $44,999
                g. ____$45,000 to $54,999
                h. ____$55,000 to $64,999
                i. ____$65,000 to $74,999
                j. ____$75,000 to $99,999
                k. ____$100,000 and Over
                l. ____Below $30,000
                m. ____Above $30,000
                n. ____ Refused

9. _____ Number of years with High Blood Pressure

10. Family History of High Blood Pressure
    a. _____ Yes
    b. _____ Mother
    c. _____ Father
    d. _____ Sibling ____ # of siblings
    e. _____ Grandparents ____ # grandparents
    f. _____ No
    g. _____ Unsure

11. 1st Blood Pressure (5 minutes after arrival)	
12. 2nd Blood Pressure (one minute between measurements)	
13. Weight	
14. Height	
15. Waist Circumference	

16. Medical problems/ Comorbidities:	Self	Mother	Father	Grand-parents	Siblings	Other: Aunt/Uncle
a. Hypertension/high blood pressure						
b. Irregular heartbeat						
c. Heart attack (Myocardial infarction)						
d. Heart failure						
e. Peripheral vascular disease						
f. Stroke (Cerebrovascular disease)						
g. Lung disease: Type:						
h. Diabetes						
i. Ulcer disease						
j. Liver disease						
k. Kidney disease: Type:						
l. Cancer: Type:						
m. Depression						
n. Other:						

The researcher will need to inspect all prescribed and over-the-counter medications used during the past two weeks preceding the interview.

17. Current Medications	NO	YES	Drug/Dose/Number of times taken each day
a. Antihypertensive (to lower blood pressure			
b. Cholesterol			
c. Angina/chest pain			
d. Regulate heartbeat			
e. Aspirin			
f. Water pill/Diuretic			
g. Insulin or oral diabetic pill			
h. Arthritis			
i. Thyroid pill			
j. Stomach pill			
k. Nerve pill			
l. Hormone pill			
m. Vitamin			
n. Herbal products			
o. Other medications:			

18. What is the worst side effect you have experienced from taking blood pressure medication?_____
    a. _____ Does not apply

19. Name one thing that keeps you from taking your blood pressure medication the way your health care provider/doctor told you to take it

    _____
    a. _____ Does not apply

20. Do you have everything you need to take good care of your high blood pressure?
    a. _____ Yes
    b. _____ No, if not, name one thing that will improve your blood pressure management _____

21. Does your high blood pressure affect your ability to do every day activities?
   a. _____ Yes
   b. _____ No

22. Who do you talk to about your high blood pressure? (check all that apply):
   a. _____ Spouse
   b. _____ Children
   c. _____ Family member
   d. _____ Friend
   e. _____ Health care provider
   f. _____ Other, _____

23. Do you currently smoke, dip, or chew tobacco?
   a. _____ Yes,
   b. Number of cigarettes you presently smoke per day _____
   c. No of times for dip or chew _____
   d. _____ No

24. Have you ever smoked, dipped, or chewed tobacco?
   a. _____ Yes; _____ How many years
   b. _____ No

25. Do you or did you live around people who smoke(d) every day?
   a. _____ Yes
   b. _____ No

26. Do you drink alcohol?
   a. _____ Yes
   b. _____ No

27. Do you use illicit drugs?
   a. _____ Yes
   b. _____ No

28. Has your health care provider/doctor put you on a special diet?
   a. _____ Yes, type

   _____
   b. _____ No

29. Do you engage in physical activity such as walking for at least 30 minutes each week?
    a. _____ Yes, how often?
    b. _____ 1 day per week
    c. _____ 2-3 days per week
    d. _____ 4-5 days per week
    e. _____ 6-7 days per week
    f. _____ No

30. Type of Health coverage (check all that apply):
    a. _____ Health Insurance
    b. _____ Through Work
    c. _____ Self-pay
    d. _____ Medicare
    e. _____ Medicaid
    f. _____ No Health Insurance
    g. _____ Free Clinics
    h. _____ Other, list _____

31. Are the total costs of your medications
    a. _____ Covered by your health care plan
    b. _____ Partially covered with a co-pay
    c. _____ Paid for by you
    d. _____ Provided free through clinic or drug program

32. Are you able to afford
    a. _____ All of your medications
    b. _____ 75% of your medications
    c. _____ 50% of your medications
    d. _____ 25% of your medications
    e. _____ None of your medications

33. If you are not able to afford all of your medications, how do you decide which medications are most important for you to get?
    a. _____
    b. _____ Does not apply

34. What pharmacy do you usually use?

    _____

35. Why did you choose this pharmacy? (check all that apply)
    a. _____ Close to your home
    b. _____ Convenient (such as has a grocery store)
    c. _____ Low prices
    d. _____ Hours open for business

36. Where do you usually go to see your health care provider?
    a. _____ Private office
    b. _____ Emergency room
    c. _____ Health department
    d. _____ Free clinic
    e. _____ Other, List _____

37. Family size:
    a. _____ # of persons living in your household, including self
    b. _____ Children < 18 years of age
    c. _____ #Adults > 50 years of age, including self

38. Are you responsible for the care of a person who is
    a. _____ Disabled
    b. _____ Handicapped
    c. _____ Mentally challenged
    d. _____ Elderly person
    e. _____ Other, list _____
    f. If yes, how many hours a day _____
    g. _____ No, I am not responsible.

39. In the past year, have you experienced any stressful events (check all that apply):
    a. _____ Death
    b. _____ Job Change
    c. _____ Marriage
    d. _____ Divorce
    e. _____ Personal Injury
    f. _____ Illnesses
    g. _____ Unemployment
    h. _____ Other: _____

40. Residential setting:
    a. _____ Primarily Black neighborhood
    b. _____ Primarily White neighborhood
    c. _____ Mixed, list _____
    d. ____Other, list _____

41. Zip Code: _____

42. Housing/Living Arrangements (check all that apply):
    a. _____ Live Alone
    b. _____Living with Family/Friends
    c. _____Not Living with Family/Friends
    d. _____ Apartment
    e. _____ House
    f. _____ Other

43. How do you travel:
    a. _____ Private car
    b. _____ Rely on Family/Friends
    c. _____ Public Transportation
    d. _____ Other, list _____

44. Do you believe that God exists?
    _____ Yes
    _____ No

45. Religious Denomination or Spiritual Beliefs:

    _____

46. Do you belong to a Church, religious group, or other place of worship as a
    member?
    a. _____ Yes
    b. _____ No

47. How often did you attend Church, religious services, or other place of worship
    this past year?
    a. _____ More than once a week
    b. _____ Every week
    c. _____ Twice a month
    d. _____ Once a month
    e. _____ Once or twice a year
    f. _____ Never
    g. _____ Other, list _____

48. Do you pray?
   a. _____ No
   b. _____ Yes, how often?
   c. _____ More than once a day
   d. _____ Once a day
   e. _____ Once per week
   f. _____ At least twice month
   g. _____ A few times a year
   h. _____Other, list _____

49. Do you read the Bible or other religious material?
   a. _____No
   b. _____Yes, how often?
   c. _____ More than once a day
   d. _____ Daily
   e. _____ Weekly
   f. _____ Monthly
   g. _____ Other, list _____

50. How strong are your spiritual beliefs?
   a. _____ Weak
   b. _____ Somewhat weak
   c. _____ Somewhat strong
   d. _____ Strong

51. Do you believe spiritual health is as important as physical health?
   a. _____ Yes
   b. _____ No

52. How do you rate your physical health?
   a. _____ Poor
   b. _____ Fair
   c. _____ Good
   d. _____ Very good
   e. _____ Excellent

APPENDIX E

HILL-BONE COMPLIANCE TO HIGH BLOOD PRESSURE THERAPY SCALE
(HILL-BONE CHBPTS)

	None of the time	Some of the time	Most of the time	All of the time
1. How often do you forget to take your HBP medicine?	1	2	3	4
2. How often do you decide not to take your HBP medicine?	1	2	3	4
3. How often do you eat salty food?	1	2	3	4
4. How often do you shake salt on your food before you eat it?	1	2	3	4
5. How often do you eat fast food?	1	2	3	4
6. *How often do you make the next appointment before you leave the doctor's office?	1	2	3	4
7. How often do you miss scheduled appointments?	1	2	3	4
8. How often do you forget to get prescriptions filled?	1	2	3	4
9. How often do you run out of HBP pills?	1	2	3	4
10. How often do you skip your HBP medicine before you go to the doctor?	1	2	3	4
11. How often do you miss taking your HBP pills when you feel better?	1	2	3	4
12. How often do you miss taking your HBP pills when you feel sick?	1	2	3	4
13. How often do you take someone else's HBP pills?	1	2	3	4
14. How often do you miss taking your HBP pills when you are careless?	1	2	3	4

*=Reverse score before analysis

Hill-Bone Compliance to High Blood Pressure Therapy Scale (Hill-Bone CHBPTS)

Willie Abel <wmabel@uncg.edu>   **Wed, Nov 3, 2010 at 5:02 PM**
To: mkim@son.jhmi.edu

Dr. Kim,

My name is Willie Mae Abel. I am PhD student in Nursing at The University of North Carolina at Greensboro. I will be conducting a non-funded research study on issues influencing adherence among Black women with hypertension on a sample size of 140 study participants during spring semester 2011.

I am requesting permission to use the Hill-Bone Compliance to High Blood Pressure Therapy Scale. I believe this tool will provide valuable information to measure medication-taking behavior among Black women with hypertension.

I look forward to hearing from you and I appreciate your prompt response.

Willie Mae Abel, MSN, RN, ACNS-BC
PhD Student, School of Nursing
The University of North Carolina at Greensboro
Phone: 704-638-0693
Fax: 704-636-1612
Email: wmabel@uncg.edu

Kim, Miyong <mkim@son.jhmi.edu>   **Wed, Nov 3, 2010 at 5:08 PM**
To: Willie Abel <wmabel@uncg.edu>
Cc: "Hill, Martha N." <mnhill@son.jhmi.edu>

Dear Willie,

On behalf of Dr. Hill, the original developer of the scale, I give you a permission to use the tool. Please kindly let us know your study results after the study.
Best wishes of your research,

Miyong-

Miyong Kim RN, Ph.D, FAAN
Professor and Chair
Department of Health Systems and Outcomes
School of Nursing
Johns Hopkins University
525 North Wolfe Street
Baltimore, Maryland 21205-2110
Tel: 410-614-1443
Fax: 410-502-5481

APPENDIX F

THERAPEUTIC REACTANCE SCALE (TRS)

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. If I receive a lukewarm dish at a restaurant, I make an attempt to let that be known.	1	2	3	4
2. I resent authority figures who try to tell me what to do.	1	2	3	4
3. I find that I often have to question authority.	1	2	3	4
4. I enjoy seeing someone else do something that neither of us supposed to do.	1	2	3	4
5. I have a strong desire to maintain my personal freedom.	1	2	3	4
6. I enjoy playing "Devil's Advocate" whenever I can.	1	2	3	4
7. *In discussions, I am easily persuaded by others.	1	2	3	4
8. Nothing turns me on as much as a good argument!	1	2	3	4
9. It would be better to have more freedom to do what I want on a job.	1	2	3	4
10. If I am told what to do, I often do the opposite.	1	2	3	4
11. *I am sometimes afraid to disagree with others.	1	2	3	4
12. It really bothers me when police officers tell people what to do.	1	2	3	4
13. *It does not upset me to change my plans because someone in the group wants to do something else.	1	2	3	4
14. *I don't mind other people telling me what to do.	1	2	3	4
15. I enjoy debates with other people.	1	2	3	4
16. If someone asks a favor of me, I will think twice about what this person is really after.	1	2	3	4

	Strongly Disagree	Disagree	Agree	Strongly Agree
17. I am not very tolerant of others' attempts to persuade me.	1	2	3	4
18. *I often follow the suggestions of others.	1	2	3	4
19. I am relatively opinionated.	1	2	3	4
20. It is important to me to be in a powerful position relative to others.	1	2	3	4
21. *I am very open to solutions to my problems from others.	1	2	3	4
22. I enjoy "showing up" people who think they are right.	1	2	3	4
23. I consider myself more competitive than cooperative.	1	2	3	4
24. *I do not mind doing something for someone even when I don't know why I am doing it.	1	2	3	4
25. *I usually go along with others' advice.	1	2	3	4
26. I feel it is better to stand up for what I believe than to be silent.	1	2	3	4
27. I am very stubborn and set in my ways.	1	2	3	4
28. *It is very important for me to get along well with the people I work with.	1	2	3	4

*=Reverse score before analysis

Therapeutic Reactance Scale (TRS)

Willie Abel <wmabel@uncg.edu>   **Wed, Jun 2, 2010 at 5:28 PM**
To: edowd@kent.edu

Dr. Dowd,

My name is Willie Mae Abel. I am PhD student in Nursing at The University of
North Carolina at Greensboro. I will be conducting a non-funded research study on
issues influencing adherence among African American women with hypertension on
a sample size of 60 study participants during fall semester 2010.

I am requesting permission to use the Therapeutic Reactance Scale (TRS). I believe
this tool will provide valuable information to assess the impact of psychological
reactance on compliance with medication adherence among African American
women with hypertension.

I look forward to hearing from you and I appreciate your prompt response.

Willie Mae Abel, MSN, RN, ACNS-BC
PhD Student, School of Nursing
The University of North Carolina at Greensboro
Phone: 704-638-0693
Fax: 704-636-1612
Email: wmabel@uncg.edu

DOWD, E THOMAS <edowd@kent.edu>   **Sun, Jun 6, 2010 at 2:36 PM**
To: Willie Abel <wmabel@uncg.edu>

Yes, you have my permission to use the scale. It is in the Summer 1991 issue of the
Journal of Counseling and Development, along with scoring and reliability data. I
can, if you wish, provide you with additional references on research using the scale.

Tom

E. Thomas Dowd, Ph.D., ABPP, DSNAP
Board Certified in Cognitive & Behavioral Psychology and Counseling Psychology
Professor Emeritus, Department of Psychology,
Kent State University

Kent, Ohio 44242, USA
phone - 330.672.7664, Fax - 330.672.3786
Professor, Postdoctoral International Institute for Advanced Studies of Psychotherapy and Applied Mental Health, Babes-Bolayi University, Cluj Napoca, Romania
Vice President, American Board of Cognitive & Behavioral Psychology
President, American Academy of Cognitive & Behavioral Psychology
Secretary/Treasurer and Cognitive & Behavioral Psychology representative, Council of Specialties
International Editor, Journal of Cognitive Psychotherapy

APPENDIX G

HIGH BLOOD PRESSURE PREVENTION IQ (HBPPIQ)

Test your knowledge of high blood pressure with the following questions.
Circle each true or false.

1. There is nothing you can do to prevent high blood pressure.	True	False
2. If your mother or father has high blood pressure, you'll get it.	True	False
3. Young adults don't get high blood pressure.	True	False
4. High blood pressure has no symptoms.	True	False
5. Stress causes high blood pressure.	True	False
6. High blood pressure is not life threatening.	True	False
7. Blood pressure is high when it's at or over 140 mm Hg / 90 mm Hg.	True	False
8. If you're overweight, you are two to six times more likely to develop high blood pressure.	True	False
9. You have to exercise vigorously every day to improve your blood pressure and heart health.	True	False
10. Americans eat two to three times more salt and sodium than they need.	True	False
11. Drinking alcohol lowers blood pressure.	True	False
12. High blood pressure has no cure.	True	False

HIGH BLOOD PRESSURE PREVENTION IQ (HBPPIQ)

Answers

1. F
2. F
3. F
4. T
5. F
6. F
7. T
8. T
9. F
10. T
11. F
12. T

The High Blood Pressure Prevention IQ (HBPPIQ) is published by the National Heart, Lung, and Blood Institute and is in the public domain. No further permission is required to reproduce or reprint the information in whole or in part.

APPENDIX H

SELF-CARE OF HYPERTENSION INDEX (SCHI)

All answers are confidential.

Think about how you have been feeling in the last month.

SECTION A:

Listed below are common instructions given to persons with high blood pressure. How routinely do you do the following?

	Never or rarely	Sometimes	Frequently	Always or daily
1.Check your blood pressure?	1	2	3	4
2.Eat a diet rich in fruits and vegetables?	1	2	3	4
3.Do some physical activity?	1	2	3	4
4.Keep doctor or nurse appointments?	1	2	3	4
5.Eat a low salt diet?	1	2	3	4
6.Exercise for 30 minutes?	1	2	3	4
7.Take your medicines?	1	2	3	4
8.Ask for low salt items when eating out or visiting others?	1	2	3	4
9.Use a system (pill box, reminders) to help you remember your medicines?	1	2	3	4
10. Limit your alcohol intake	1	2	3	4
11. Eat a diet low in saturated fat and cholesterol?	1	2	3	4
12. Try to lose weight or control your body weight?	1	2	3	4

SECTION B:

Many patients have difficulty controlling their blood pressure.

In the past month, has your blood pressure gotten out of control, even briefly? Circle <u>one</u>.

    0) No

    1) Yes

13. If you had trouble controlling your blood pressure in the past month…

(circle **one** number)

	Have not had these	I did not recognize it	Not Quickly	Some what Quickly	Quickly	Very Quickly
How quickly did you recognize that your blood pressure was elevated?	N/A	0	1	2	3	4

Listed below are remedies that people will use to control their blood pressure. If your blood pressure goes up, how likely are you to try one of these remedies?

(circle **one** number for each remedy)

	Not Likely	Somewhat Likely	Likely	Very Likely
14. Reduce the salt in your diet	1	2	3	4
15. Reduce your stress level	1	2	3	4
16. Take an extra blood pressure pill	1	2	3	4
17. Call your doctor or nurse for guidance	1	2	3	4

18. Think of a remedy you tried the last time your blood pressure was up,

(circle **one** number)

	I did not try anything	**Not Sure**	**Somewhat Sure**	**Sure**	**Very Sure**
How <u>sure</u> were you that the remedy helped or did not help?	0	1	2	3	4

SECTION C:

In general, how confident are you that you can:

	Not Confident	**Somewhat Confident**	**Very Confident**	**Extremely Confident**
19. Keep your <u>blood pressure in control</u>?	1	2	3	4
20. <u>Follow the treatment advice</u> you have been given?	1	2	3	4
21. <u>Evaluate the importance</u> of your blood pressure changes?	1	2	3	4
22. <u>Recognize changes</u> in your health if they occur?	1	2	3	4
23. <u>Do something</u> that will lower your blood pressure?	1	2	3	4
24. <u>Evaluate</u> how well a remedy works?	1	2	3	4

Self-Care of Hypertension Index (SCHI)

Willie Abel <wmabel@uncg.edu>   **Mon, Nov 22, 2010 at 11:43 PM**
To: vdickson@nyu.edu

Dr. Dickson,

It was nice meet you at the AHA Scientific Session in Chicago. Dr. Patricia Crane, my advisor introduced us.

I will be conducting a non-funded research study on issues influencing medication adherence among Black women with hypertension on a sample size of approximately 80 study participants during spring semester 2011.

You mentioned that you are seeking researchers to conduct psychometric testing on your adherence instrument and hypertension index. I would love to examine those tools before finalizing my dissertation methods.

I look forward to hearing from you and I appreciate your prompt response.

Willie Mae Abel, MSN, RN, ACNS-BC
PhD Student, School of Nursing
The University of North Carolina at Greensboro
Phone: 704-638-0693
Fax: 704-636-1612
Email: wmabel@uncg.edu

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vd30@nyu.edu <vd30@nyu.edu>   **Tue, Nov 23, 2010 at 9:50 AM**
Reply-To: vd30@nyu.edu
To: Willie Abel <wmabel@uncg.edu>, briegel@nursing.upenn.edu

Hi Willie - it was great to meet you at AHA! I am traveling so will send you info later this week. Also I am copying Dr. Riegel as the instrument and conceptual model is posted on her Self-Care website.

Dr. Riegel- Willie Mae is a student of Tricia Crane's and I told her about the SC-HI.

V

Sent from my Verizon Wireless BlackBerry

Riegel, Barbara <briegel@nursing.upenn.edu>   **Tue, Nov 23, 2010 at 10:18 AM**
To: "vd30@nyu.edu" <vd30@nyu.edu>, Willie Abel <wmabel@uncg.edu>

Hi Willie Mae, we would love to have you test the Self-Care of Hypertension Index.
It's not posted on the website because validity has not yet been demonstrated; we
need more data to accomplish that.

Our usual approach is to offer co-authorship for anyone providing complete and
usable data on a minimum of 50 subjects. If that sounds like something you are
interested in please let me know.

I will attach the article describing the self-care of heart failure index; the SC-HI was
developed on the same model. Barbara

Dr. Barbara Riegel
Professor, University of Pennsylvania
NewCourtland Center for Transitions and Health
School of Nursing, Claire M. Fagin Hall
418 Curie Boulevard
Philadelphia, PA 19104-4217
briegel@nursing.upenn.edu
215-898-9927 Phone
240-282-7707 eFax
Editor, *The Journal of Cardiovascular Nursing*
http://journals.lww.com/jcnjournal/pages/default.aspx
Guest Professor, Linköpings Universitet, Linköping, Sweden
http://www.self-careofheartfailureindex.com/

📄 **SCHFI_2009 update.pdf**
678K

[Quoted text hidden]

Victoria Vaughan Dickson <vdickson@nyu.edu>   **Wed, Nov 24, 2010 at 2:03 PM**
To: Willie Abel <wmabel@uncg.edu>

Hi Willie Mae - Are you interested in using the SC-HI (self-care of hypertension

index) for your work? If so, please let me know and I will send you a copy. I know Dr. Riegel sent you one of the papers; and now that I am back and re-connected...I would be happy to schedule some time to talk with you and Dr. Crane about the instrument. Thanks much!

Victoria Vaughan Dickson, PhD, CRNP
Assistant Professor
Brookdale Leadership in Aging Fellow
New York University
College of Nursing
726 Broadway, 10th Floor
New York, NY
212-992-9426 (phone)
212-995-4679 (fax)
vdickson@nyu.edu

Willie Abel <wmabel@uncg.edu>   **Fri, Nov 26, 2010 at 3:13 PM**
To: Victoria Vaughan Dickson <vdickson@nyu.edu>
Cc: Patricia Crane <patriciab.crane@gmail.com>

Dr. Dickson,

I read the article on an update of the SCHFI. Dr. Riegel mentioned that the HTN index was developed on the same model. Since HTN is often silent, I am trying to visualize the symptom recognition piece of the model. My outcome variable is medication adherence. In looking at the SCHFI, it looks as if adherence is part of all three self-care items, maintenance, management, and confidence.

Before I give a definite yes, is it possible for us to view the HTN index to ensure that it is a good fit for my study? After reviewing it, then we can discuss the specifics with you.

Thanks and I look forward to hearing from you.

Willie Mae Abel, MSN, RN, ACNS-BC
PhD Student, School of Nursing
The University of North Carolina at Greensboro

Victoria Vaughan Dickson <vdickson@nyu.edu>   **Fri, Nov 26, 2010 at 5:54 PM**
To: Willie Abel <wmabel@uncg.edu>
Cc: Patricia Crane <patriciab.crane@gmail.com>

Hi Willie Mae -
Attached is the Self-Care of Hypertension Index - So far we have pretty good Cronbach's alpha for the scales. Scoring is transformation to a scale of 1 to 100 for

each subscale. If you are interested in using this and helping us test it, let me know! Thanks - Hope you had a great Thanksgiving.
Vicky

Victoria Vaughan Dickson, PhD, CRNP
Assistant Professor
Brookdale Leadership in Aging Fellow
New York University
College of Nursing
726 Broadway, 10th Floor
New York, NY
212-992-9426 (phone)
212-995-4679 (fax)
vdickson@nyu.edu

SCH-HI_version1_4-21-09.doc
61K

Willie Abel <wmabel@uncg.edu>   **Sat, Dec 4, 2010 at 5:05 PM**
To: Victoria Vaughan Dickson <vdickson@nyu.edu>
Bcc: Patricia Crane <patriciab.crane@gmail.com>

Dr. Dickson,

I met with Dr. Crane and I would like to use the HTN index in my dissertation. You mentioned that you have good Cronbach's alpha for the scales. I would like to summarize any instrumentation results you have thus far for my methods section.

Thanks and I look forward to working with you.

Willie Mae Abel, MSN, RN, ACNS-BC
PhD Student, School of Nursing
The University of North Carolina at Greensboro

APPENDIX I

TRUST IN PHYSICIAN SCALE (TPS)

Each item below is a statement with which you may agree or disagree. Beside each statement is a scale that ranges from strongly agree to strongly disagree. For each item please circle the number that represents the extent to which you agree or disagree with the statement. Please make sure that you answer every item and that you circle only one number per item. It is important that you answer according to what you actually believe and not according to how you feel you should believe or how you think I may want you to respond.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. *I doubt that my doctor really cares about me as a person.	1	2	3	4	5
2. My doctor is usually considerate of my needs and puts them first.	1	2	3	4	5
3. I trust my doctor so much I always try to follow his/her advice.	1	2	3	4	5
4. If my doctor tell me something is so, then it must be true.	1	2	3	4	5
5. *I sometimes distrust my doctor's opinion and would like a second one.	1	2	3	4	5
6. I trust my doctor's judgments about my medical care.	1	2	3	4	5
7. *I feel my doctor does *not* do everything he/she should for my medical care.	1	2	3	4	5
8. I trust my doctor to put my medical needs above all other considerations when treating my medical problems.	1	2	3	4	5
9. My doctor is a real expert in taking care of medical problems like mine.	1	2	3	4	5

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10. I trust my doctor to tell me if a mistake was made about my treatment.	1	2	3	4	5
11. *I sometimes worry that my doctor may not keep the information we discuss totally private.	1	2	3	4	5

*=Reverse score before analysis

Trust in Physician Scale (TPS)

Willie Abel <wmabel@uncg.edu>

Wed, June 02, 2010 5:26 PM

To: Anderson, Lynda (CDC/ONDIEH/NCCDPHP)

Dr. Anderson,

My name is Willie Mae Abel. I am PhD student in Nursing at The University of North Carolina at Greensboro. I will be conducting a non-funded research study on issues influencing adherence among African American women with hypertension on a sample size of 60 study participants during fall semester 2010.

I am requesting permission to use the Trust in Physician Scale (TPS). I believe this tool will provide valuable information to measure interpersonal trust in primary care providers among African American women with hypertension.

I look forward to hearing from you and I appreciate your prompt response.

Willie Mae Abel, MSN, RN, ACNS-BC
PhD Student, School of Nursing
The University of North Carolina at Greensboro
Phone: 704-638-0693
Fax: 704-636-1612
Email: wmabel@uncg.edu

Anderson, Lynda (CDC/ONDIEH/NCCDPHP) <laa0@cdc.gov>

Wed, Jun 2, 2010 at 5:29 PM

To: wmabel@uncg.edu
Cc: "Anderson, Lynda (CDC/ONDIEH/NCCDPHP)" <laa0@cdc.gov>

I am attaching a copy of the Trust in Physician scale with the instructions that have been used in written surveys. If you need me to fax you a copy, please let me know. You have my permission to use the Anderson/Dedrick Trust in Physician Scale in your research. Please cite the original citation in any work you publish using the scale: Anderson, L.A., & Dedrick, R.F. (1990). Development of the trust in physician scale: A measure to assess interpersonal trust in patient-physician relationships. Psychological Reports, 67, 1091-1100.

Please note that this scale was used recently in study of persons with arthritis (see Freburger, J.K., Callahan, L.F., Currey, S.S., & Anderson, L.A. (2003). Correlates of trust in the rheumatologist among patients with rheumatic disease. Arthritis & Rheumatism 49(1):51-58.). Please note another recent publication validating my Trust in Physician scale (Thom et al. Stanford Trust Physician Study. Medical Care 1999; 37(5), 510-17.).

The Trust in Physician Scale is copyrighted with the journal of Psychological Reports so if you use the scales in your work, please cite that reference by Anderson, L.A., & Dedrick, R.F. (1990). Development of the trust in physician scale: A measure to assess interpersonal trust in patient-physician relationships. Psychological Reports, 67, 1091-1100.

I would be very interested in your findings and I do try to monitor the use and findings from studies. If you have any questions, please let me know.

My contact information is at the end of this message.

Lynda

Lynda A. Anderson, PhD
Director, Health Aging Program
Division of Adult and Community Health (MS K45)
National Center for Chronic Disease Prevention and Health Promotion
Centers for Disease Control and Prevention
(770) 488-5360 (Healthy Aging Program)
(770) 488-5998 (Direct line)
Email: Landerson4@cdc.gov
Healthy Aging Program: www.cdc.gov/aging

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3 attachments

SCALE.DOC
6K

freburger article.pdf
84K

LA RD Trust in Physician Scale article.pdf
305K

262

APPENDIX J

THE JOHN HENRYISM ACTIVE COPING SCALE (JHACS)

I'd like to ask you some questions about how you see yourself right now, today, as a woman living and doing things in the real world. I am going to read several statements to you, and after I read each statement, I want you to tell me if what I've just said is either TRUE or FALSE for you, personally. Then I will ask to what degree (i.e. completely true or false, or somewhat true or false).

	Completely False	Somewhat False	Don't Know	Somewhat True	Completely True
1. I've always felt that I could make of my life pretty much what I wanted to make of it.	1	2	3	4	5
2. Once I make up my mind to do something, I stay with it until the job is completely done.	1	2	3	4	5
3. I like doing things that other people thought could not be done.	1	2	3	4	5
4. When things don't go the way I want them to, that just makes me work even harder.	1	2	3	4	5
5. Sometimes I feel that if anything is going to be done right, I have to do it myself.	1	2	3	4	5
6. It's not always easy, but I manage to find a way to do the things I really need to get done.	1	2	3	4	5

	Completely False	Somewhat False	Don't Know	Somewhat True	Completely True
7. Very seldom have I been disappointed by the results of my hard work.	1	2	3	4	5
8. I feel that I am the kind of individual who stands up for what he believes in, *regardless of the consequences.*	1	2	3	4	5
9. In the past, even when things got *really* tough, I never lost sight of my goals.	1	2	3	4	5
10. It's important for me to be able to do things the way I want to do them rather than the way other people want me to do them.	1	2	3	4	5
11. I don't let my personal feelings get in the way of doing a job.	1	2	3	4	5
12. Hard work has really helped me to get ahead in life.	1	2	3	4	5

Willie Abel <wmabel@uncg.edu>

John Henryism Scale (JHACS)

Willie Abel <wmabel@uncg.edu>   Wed, Jun 2, 2010 at 5:27 PM
To: sjames@duke.edu

Dr. James,

My name is Willie Mae Abel. I am PhD student in Nursing at The University of North Carolina at Greensboro. I will be conducting a non-funded research study on issues influencing adherence among African American women with hypertension on a sample size of 60 study participants during fall semester 2010.

I am requesting permission to use the John Henryism Scale. I believe this tool will provide valuable information to measure active coping with psychosocial environmental stressors among African American women with hypertension.

I look forward to hearing from you and I appreciate your prompt response.

Willie Mae Abel, MSN, RN, ACNS-BC
PhD Student, School of Nursing
The University of North Carolina at Greensboro
Phone: 704-638-0693
Fax: 704-636-1612
Email: wmabel@uncg.edu

Sherman James, Ph.D. <sjames@duke.edu>   Wed, Jun 2, 2010 at 5:45 PM
To: Willie Abel <wmabel@uncg.edu>

Ms. Abel,

Per your request, attached is a copy of the JHAC12. Sometimes the pagination suffers with the electronic transfer, but I think you'll be able to correct that without a problem.

Good luck with your research.

Best wishes,

Sherman James

Sherman A. James, PhD, FAHA
Susan B. King Professor of Public Policy
Duke Sanford School of Public Policy
Room 213, Box 90245
Duke University
Durham, NC 27708-90245
Tel: (919) 613-7338
Fax: (919) 681-8288
www.sanford.duke.edu

JHAC12_English_ 2005a.doc
43K

APPENDIX K

INDEX OF RACE-RELATED STRESS-BRIEF VERSION (IRRS-B)

This survey questionnaire is intended to sample some of the experiences that Black people have in this country because of their "blackness." There are many experiences that a Black person can have in this country because of his/her race. Some events happen just once, some more often, while others may happen frequently. Below you will find listed some of these experiences; for which you are to indicate those that have happened to you or someone very close to you (i.e. a family member or loved one). It is important to note that a person can be affected by those events that happen to people close to them; this is why you are asked to consider such events as applying to your experiences when you complete this questionnaire. **Please circle the number on the scale (0 to 4) that indicates the reaction you had to the event at the time it happened. Do not leave any items blank**. If an event has happened more than once refer to the first time it happened. **If an event did not happen circle 0 and go on to the next item.**

	This never happened to me	This event happened, but did not bother me	This event happened & I was slightly upset	This event happened & I was upset	This event happened & I was <u>extremely</u> upset
1. You notice that crimes committed by White people tend to be romanticized, whereas the same crime committed by a Black person is portrayed as savagery, and the Black person who committed it, as an animal.	0	1	2	3	4
2. Sales people/clerks did not say thank you or show other forms of courtesy and respect (i.e. put your things in a bag) when you shopped at some White/non-Black owned businesses.	0	1	2	3	4
3. You notice that when Black people are killed by the police the media informs the public of the Victim's criminal record or negative information in their background, suggesting they got what they deserved.	0	1	2	3	4

	This never happened to me	This event happened, but did not bother me	This event happened & I was slightly upset	This event happened & I was upset	This event happened & I was extremely upset
4. You have been threatened with physical violence by an individual or group of White/non-Blacks.	0	1	2	3	4
5. You have observed that White kids who commit violent crimes are portrayed as "boys being boys", while Black kids who commit similar crimes are wild animals.	0	1	2	3	4
6. You seldom hear or read anything positive about Black people on radio, T.V., newspapers or in history books.	0	1	2	3	4
7. While shopping at a store the sales clerk assumed that you couldn't afford certain items (i.e. you were directed toward the items on sale).	0	1	2	3	4
8. You were the victim of a crime and the police treated you as if you should just accept it as part of being Black.	0	1	2	3	4
9. You were treated with less respect and courtesy than Whites and other non-Blacks while in a store, restaurant, or other business establishment.	0	1	2	3	4
10. You were passed over for an important project although you were more qualified and competent than the White/non-Black person given the task.	0	1	2	3	4

	This never happened to me	This event happened, but did not bother me	This event happened & I was slightly upset	This event happened & I was upset	This event happened & I was extremely upset
11. Whites/non-Blacks have stared at you as if you didn't belong in the same place with them; whether it was a restaurant, theater, or other place of business.	0	1	2	3	4
12. You have observed the police treat White/non-Blacks with more respect and dignity than they do Blacks.	0	1	2	3	4
13. You have been subjected to racist jokes by Whites/non-Blacks in positions of authority and you did not protest for fear they might have held it against you.	0	1	2	3	4
14. While shopping at a store, or when attempting to make a purchase you were ignored as if you were not a serious customer or didn't have any money.	0	1	2	3	4
15. You have observed situations where other Blacks were treated harshly or unfairly by Whites/non-Blacks due to their race.	0	1	2	3	4
16. You have heard reports of White people/non-Blacks who have committed crimes, and in an effort to cover up their deeds falsely reported that a Black man was responsible for the crime.	0	1	2	3	4

	This never happened to me	This event happened, but did not bother me	This event happened & I was slightly upset	This event happened & I was upset	This event happened & I was extremely upset
17. You notice that the media plays up those stories that cast Blacks in negative ways (child abusers, rapists, muggers, etc. [or as savages] Wild Man of 96th St., Wolf Pack, etc.), usually accompanied by a large picture of a Black person looking angry or disturbed.	0	1	2	3	4
18. You have heard racist remarks or comments about Black people spoken with impunity by White public officials or other influential White people.	0	1	2	3	4
19. You have been given more work, or the most undesirable jobs at your place of employment while the White/non-Black of equal or less seniority and credentials is given less work, and more desirable tasks.	0	1	2	3	4
20. You have heard or seen other Black people express the desire to be White or to have White physical characteristics because they disliked being Black or thought it was ugly.	0	1	2	3	4
21. White people or other non-Blacks have treated you as if you were unintelligent and needed things explained to you slowly or numerous times.	0	1	2	3	4
22. You were refused an apartment or other housing; you suspect it was because you are Black.	0	1	2	3	4

The Index of Race-Related Stress (IRRS)-Brief Version

Willie Abel <wmabel@uncg.edu>   **Mon, Nov 8, 2010 at 1:12 AM**
To: soutsey@vcu.edu

Dr. Utsey,

My name is Willie Mae Abel. I am PhD student in Nursing at The University of
North Carolina at Greensboro. I will be conducting a non-funded research study on
issues influencing medication adherence among African American women with
hypertension on a sample size of 75 study participants during spring semester 2010.

I am requesting permission to use the Index of Race-Related Stress (IRRS)-Brief
Version Questionnaire. I believe this tool will provide valuable information to
measure the association between perceived racism and hypertension among African
American women.

I look forward to hearing from you and I appreciate your prompt response.

Willie Mae Abel, MSN, RN, ACNS-BC
PhD Student, School of Nursing
The University of North Carolina at Greensboro
Phone: 704-638-0693
Fax: 704-636-1612
Email: wmabel@uncg.edu

Shawn O Utsey/FS/VCU <soutsey@vcu.edu>   **Mon, Nov 8, 2010 at 5:49 PM**
To: Willie Abel <wmabel@uncg.edu>

Greetings,

Yes, you have permission to use the IRRS-B. I have attached a copy of the
instrument and scoring protocol. Please let me know if you have questions.

Shawn

Shawn O. Utsey, Ph.D.,

Chair, Department of African American Studies,
Director, Institute for African American
Mental Health Research and Training,
Professor, Department of Psychology
Virginia Commonwealth University
(804) 828-1384
Fax: (804) 828-1665
2 attachments

irrsshort2.doc
28K

SCORING FOR IRRS BRIEF.doc
20K

PATIENT HEALTH QUESTIONNAIRE-9 (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems? *(Use "√" to indicate your answer)*	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

FOR OFFICE CODING   0   + _____ + _____ + _____

_____ = Total Score: _____

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
□	□	□	□

The Patient Health Questionnaire-9 (PHQ-9) was developed by Drs. Robert L. Spitzer, Janet B. W. Williams, Kurt Kroenke and colleagues, with an educational grant from Pfizer Inc. No permission is required to reproduce, translate, display, or distribute.

APPENDIX M

MARLOWE-CROWNE SOCIAL DESIRABILITY SCALE (M-C 1[10] SDS)

	True	False
1. I like to gossip at times.	True	False
2. There have been occasions when I took advantage of someone.	True	False
3. I'm always willing to admit it when I make a mistake.	True	False
4. I always try to practice what I preach.	True	False
5. I sometimes try to get even rather than forgive and forget.	True	False
6. At times I have really insisted on having things my own way.	True	False
7. There have been occasions when I felt like smashing things.	True	False
8. I never resent being asked to return a favor.	True	False
9. I have never been irked when people expressed ideas very different from my own.	True	False
10. I have never deliberately said something that hurt someone's feelings.	True	False

MARLOWE-CROWNE SOCIAL DESIRABILITY SCALE (M-C 1[10] SDS)

Answers
1. F
2. F
3. T
4. T
5. F
6. F
7. F
8. T
9. T
10. T

Marlowe-Crowne Social Desirability Scale (M-C 1[10] SDS)

Willie Abel <wmabel@uncg.edu>   **Tue, Jan 11, 2011 at 3:20 PM**
To: kgerbasi@niagaracc.suny.edu

Dr. Gerbasi,

My name is Willie Mae Abel. I am PhD student in Nursing at The University of North Carolina at Greensboro. I will be conducting a non-funded research study on issues influencing adherence among African American women with hypertension on a sample size of 80 study participants during spring semester 2011.

I am requesting permission to use the M-C 1(10) Social Desirability Scale published with Robert Strahan in the 1972 article entitled "Short, homogeneous version of the Marlow-Crowne Social Desirability Scale" (*Journal of Clinical Psychology, 28*(2), 191-193. I believe this tool will provide valuable information to control for social and culturally approved response tendencies in conjunction with other self-report measures.

I look forward to hearing from you and I appreciate your prompt response.

Willie Mae Abel, MSN, RN, ACNS-BC
PhD Student, School of Nursing
The University of North Carolina at Greensboro

Kathy Gerbasi <kgerbasi@niagaracc.suny.edu>   **Tue, Jan 11, 2011 at 3:25 PM**
To: Willie Abel <wmabel@uncg.edu>

Dear Willie Mae,

Of course you may use the MCSDS short form(s). Just be sure to appropriately cite the article. Good luck with your research.

Kathy Gerbasi PhD

Professor Psychology Social Science Division
Niagara County Community College
Sanborn NY 14132
kgerbasi@niagaracc.suny.edu
716-614-6762

APPENDIX N

PERMISSION TO USE COX INTERACTION MODEL OF CLIENT HEALTH

BEHAVIOR FIGURE