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Association of Social Support and Patient-Provider Communication and Medication Adherence

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This is to certify that the doctoral study by

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Walden University
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Abstract

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MPH, University of South Florida, 2008

BA, University of California Riverside, 2001

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

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Abstract

The prevalence of hypertension in African Americans is the highest of any population in the United States, and this population also demonstrates lower rates of adherence to mediation. Social support and patient–provider communication have been considered as reinforcing factors to help hypertensive patients achieve optimal blood pressure control. The purpose of this study was to examine the association of social support and patient–provider communication and medication adherence for hypertensive African American men and women. The study was guided by the theory of reasoned action. This study was conducted to determine whether social support and patient–provider communication was associated with medication adherence by self-report, age, and gender. A quantitative cross-sectional design with secondary data analyses was used. The sample included 566 hypertensive African American men and women between the ages of 21and 65 years who participated in a survey administered in the Counseling African Americans to Control Hypertension clinical trial collected between 2004 and 2011. The independent variables were social support and patient–provider communication; the dependent variable was medication adherence. Descriptive, 2-way analysis of variance and hierarchal logistic regression model analyses indicated a significant association between patient–provider communication and medication adherence. There was no significant difference in the relationship between social support, patient–provider communication, and age and gender and medication adherence. The implications of this study for social change include improvement in policies and development programs to support the critical role of providers in ensuring medication adherence in hypertensive African American patients.

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Dedication

This doctoral capstone is first and foremost dedicated to God for giving me the strength, passion, and will to complete the highest level of an educational degree as well as being the first doctor in my family. I also dedicate this research to my mom, dad, grandma, and other family members who pushed me and kept me motivated. I dedicate this to my grandfather, Charles Gaddis, and to my aunt, Tammie Hayes. I further dedicate this doctoral capstone to Mr. Jason Faddies as well as to my friends and coworkers who were an awesome social support system and continuously gave me words of encouragement along the way.

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Table of Contents

List of Tables

Section 1: Foundation of the Study and Literature Review

Introduction

Hypertension, also known as high blood pressure, is a chronic disease that affects people of all ages, races, gender, and ethnic backgrounds. Uncontrolled hypertension remains an important health issue for patients throughout the United States (Bokhour et al., 2016). According to the American Heart Association (AHA; 2016), 80 million adults have been diagnosed with hypertension. Hypertension can also lead to the development of other health complications including cardiovascular disease, stroke, and kidney disease (Fongwa et al., 2015; Kretchy, Owusu-Daaku, & Danquah, 2013). In 2010, the mortality rate indicated that 360,000 American deaths had high blood pressure as a contributing factor (Brown, 2015). Age, family history, being overweight, a sedentary lifestyle, diet, and race are factors that increase the risk of an individual developing hypertension (Centers for Disease Control & Prevention [CDC], 2016).

African American men and women are disproportionality affected by hypertension. Researchers have shown that the prevalence of hypertension in African Americans is 42%, which is the highest of any population in the United States (CDC, 2016; Lewis, Ogedegbe, & Ogedegbe, 2012). In addition, African Americans have a lower rate of adherence to antihypertension mediation (Rimando, 2015). Medication adherence is defined as "the extent to which patient's behavior coincides with medical or health advice, and has been associated with improved health outcomes" (Schmitt, Linder, & de Santa Helena, 2013, p 615). Nonadherence to medication has also been identified as a major public health concern, particularly for patients with hypertension. Evidence has

shown that nonadherence is associated with adverse health outcomes as well as higher healthcare costs (Nair et al., 2011).

Improving adherence to medication in hypertensive African Americans requires an understanding of what influences their decision and why nonadherence occurs. Such barriers that affect adherence rates include cost of medication, socioeconomic status, or a lack of both social support and patient-provider communication (Rimando, 2015). Medication adherence is a multidimensional process that can also be influenced by patients' health beliefs, knowledge, and attitude (Schoenthaler et al., 2016). For some African Americans, their intentions on adhering to treatment depend upon what people think or believe as well as what attitudes they hold and how other people influence them (Ashaye & Giles, 2003; Rimando, 2015).

Interventions targeted at improving uncontrolled blood pressure in African American men and women are essential to decreasing morbidity and mortality rates. Social support and patient-provider communication have been considered as reinforcing factors to help hypertensive patients achieve optimal blood pressure control (Abel & Efird, 2013). However, there is a gap of knowledge in understanding how social support and patient-provider communication are associated with medication adherence among hypertensive African Americans (Lewis et al., 2012). Through this study, I aimed to show that improvement in patient-provider communication and social support can help create social change in African Americans' attitudes towards self-management of their health behaviors and reduce patient isolation in dealing with chronic illnesses including hypertension.

In the first section of this research study, I will discuss how hypertension among African Americans is a concern and explain why this study was necessary. I will also focus on addressing the research questions and the theoretical framework used to support the study. In Section 1, I will describe the literature search strategy and review the studies related to medication adherence, social support, and patient-provider communication based on an in-depth literature review. Lastly, I will define key terms and provide a brief description of the assumptions and delimitations that could affect the research.

Problem Statement

It is estimated that 30%–50% of hypertensive patients withdraw from their prescribed medication within 1 year, and 33% of hypertensive patients do not adhere to the prescribed pharmacologic dosage (Bosworth et al., 2011; Branham, Moose, & Ferreri, 2010). A lack of effective health provider response to uncontrolled blood pressure and insufficient patient adherence to treatment recommendations create a problem for hypertensive individuals to maintain their blood pressure. Within the United States, the prevalence of hypertension is 46% among African American women and 43% among African American men (Cuffee et al., 2013; Pettey et al., 2016). African American women with high blood pressure tend to be more aware of their condition and likely to seek treatment (Flack et al., 2010). They also have relatively higher control rates than their male counterparts (Ashaye & Giles, 2003).

Nevertheless, enhancing medication adherence in hypertensive African Americans can be challenging because poor adherence is a multifactorial problem. For some African Americans, low socioeconomic conditions, including poverty, high stress

levels, sedentary lifestyles, poor food choices, and lack of physical activity, play a role in blood pressure control and medication adherence (Forsyth, Schoenthaler, Ogedegbe, & Ravenell, 2014; Pettey et al., 2016). Both African American men and women are less likely compared to European Americans to adhere to high blood pressure treatment due to a lack of health insurance, cost of medication, no access to healthcare, or missed diagnosis (Lewis, 2012). Additional factors for nonadherence include low education as well as low health literacy; therefore, many patients lack the knowledge about the potential health risks and consequences of not taking their medication (Pettey et al., 2016). Forgetting has also been found to be the most common reason for diagnosed patients not taking medication (Hill, Miller, & DeGeest, 2011).

Adherence to medical treatment refers to how well and consistently a patient follows the management plan developed by their healthcare provider (Fongwa et al., 2008). The consequences of nonadherence to medication can result in poor health outcomes and increased medical care cost (Fongwa et al., 2008). Education in managing high blood pressure and medication adherence are needed to improve control rates (Brunton, 2011; Zullig, Peterson, & Bosworth, 2013).

There is a lack of agreement in literature as to the role social support and patient-provider communication has on African Americans with hypertension (Cornwell & Waite, 2012; Lewis et al., 2012). Social support is defined as a perceived or actual instrumental and expressive provision supplied by the community, social networks, and confiding partners (Holt et al., 2014; Zimet, Dahlem, Zimet, & Farley, 1988). Social support has been shown to be associated with various health behaviors but has not yet

been clearly proven to be associated with medication adherence in African Americans who are diagnosed with hypertension (Lewis et al., 2012; Vaccaro, Exebio, Zarini, & Huffman, 2014). Likewise, empirical researchers have demonstrated that effective patient-provider communication can also improve health behaviors through collaboration between the patient and health provider (Brewer et al., 2013; Schoenthaler, Allegrante, Chaplin, & Ogedegbe, 2012). There is a lack of understanding, however, regarding the relationship between patient-provider communication and the attitudes of adherence towards high blood pressure treatment among African Americans (Lewis et al., 2012). Therefore, further research was necessary to better understand how social support and patient-provider communication influence the attitudes of both hypertensive African American men and women towards medication adherence based on age and gender.

Purpose of Study

The purpose of this quantitative study was to examine the association of social support and patient-provider communication towards medication adherence for both hypertensive African American men and women between the ages of 21 and 65 years old in the United States. Older individuals have been found to be more likely to adhere to medication in comparison to younger people. Grant et al. (2015) conducted a study on the effects of expectation of care, perceived social support, and hypertension knowledge, finding age to be a significant factor in medication adherence among older African Americans.

The first independent variable in this study was social support, which I defined as support perceived or received from family, friends, health providers, faith and community

organizations, and social networking groups or programs that specifically help hypertensive individuals. The construct of social support can be measured in two different ways—perceived or received support—utilizing dimensions such as emotional, instrumental, and informational support (Gallant, 2003). Emotional support is associated with sharing life experiences, while informational support focuses on the provision of advice, suggestions, and information that a person can use to address problems (Strom & Egede, 2012). Instrumental support involves tangible help or services that directly assist a person in need and is provided by close friends, neighbors, or colleagues (University of Twente, 2010). The second independent variable was patient-provider communication, which was defined as patients' perception of their provider and the clarity of advice given to them. Patient-provider communication can be measured by assessing patients' experience of care or the degree to which their doctor provides information (Levinson, Lesser, & Epstein, 2010).

The dependent variable was adherence to high blood pressure medication, which I defined as how well and consistently a patient follows recommended treatment and the plan developed by his or her healthcare provider. The control variables were gender, age, income, education, employment, insurance status, and place of residence. The length of time in treatment, number of medications, and the severity of hypertension were also used as control variables. These demographic variables were used as baseline characteristics to assess the population under study (see Forsyth et al., 2014; Pettey et al., 2016).

Research Questions and Hypotheses

In this research study, I aimed to answer the following research questions by evaluating their associated hypotheses:

Research Question 1: Are social support and patient-provider communication associated with hypertensive African Americans self-reported medication adherence?

$H_0$1: There is no significant difference in adherence to medication between individuals with and without social support and patient-provider communication.

$H_1$1: There is a significant difference in adherence to medication between individuals with and without social support and patient-provider communication.

I expected that there would be greater adherence to treatment by African Americans with higher social support and patient-provider communication.

Research Question 2: What is the association between social support and patient-provider communication by age among hypertensive African Americans?

$H_0$2: There is no significant difference in the relationship between social support and patient-provider communication and adherence by age among hypertensive African Americans.

$H_1$2: There is a significant difference in the relationship between social support and patient-provider communication and adherence by age among hypertensive African Americans.

I expected that there would be greater adherence to treatment for older African Americans with higher patient-provider communication and social support.

Research Question 3: What is the association between social support and patient-provider communication among hypertensive African American men and women?

$H_0$3: There is no significant difference in adherence to medication between hypertensive African American men and women with or without patient-provider communication and social support.

$H_1$3: There is a significant difference in adherence to medication between hypertensive African American men and women with or without patient-provider communication and social support.

I expected that there would be greater adherence to treatment for African American women compared to men with higher patient-provider communication and social support.

Theoretical Framework

I used the theory of reasoned action (TRA) of Ajzen and Fishbein (1969; 1980) as the theoretical framework for this study. This theory is focused on the constructs of attitude, subjective norms and perceived control, which can be used to help explain the variance in behavioral intention (Glanz, Rimer, & Viswanath, 2015). Attitudes can be based on multiple factors, including past experiences, social support, health education and literacy, and the environment (Cleverism, 2018; Hackman & Knowlden, 2014). Subjective norms are considered the beliefs an individual has regarding whether others approve or disapprove of the behavior and the motivation to comply (RECAPP, 2016).

The TRA is further concerned with the individual motivational factors as determinants of the likelihood of performing a specific behavior (Hackman & Knowlden, 2014).

I used this theoretical construct in order to better understand how social support and patient-provider communication influence or motivate hypertensive African Americans to adhere to medication. The TRA has eight key constructs, which include behavior, behavioral intention, attitude, behavioral belief, evaluation, subjective norm, normative beliefs, and motivation to comply (Glanz et al., 2015). The more positive the attitude and subjective norms, the greater the perceived control and the more likely an individual is to comply with the intended behavior (RECAPP, 2016). The individual must decide to adhere to treatment in order to reduce other associated health risks. A strength of the TRA is that the framework provides a way to identify and measure the underlying reasons why a person intends to behave a particular way (RECAPP, 2016). If patients' attitudes change over time through social support or patient-provider communication, then their behavioral intent would most likely change as well.

Nature of Study

In this study, I used the quantitative approach with a cross-sectional design. Quantitative research is a method that tests the objective theories by examining the relationship between the independent and dependent variables, and the data analysis is constrained by the type of data available (Creswell, 2009). In a quantitative approach, numerical data are gathered and used to generalize across a particular group of people to explain a particular phenomenon (University of Southern California, 2016). Moreover, the cross-sectional design was most appropriate for this study because I aimed to

determine the association between the independent and dependent variables at a single point in time (see Creswell, 2009). The cross-sectional design is observational and allows for multiple variables to be compared at the same time (Cherry, 2015). The key variables in this study were social support and patient-provider communication as the independent variables and medication adherence as the dependent variable. The covariates were gender, age, income, education, employment, insurance status, place of residence, the length of time in treatment, number of medications, and the severity of hypertension.

Secondary Data Set

I used a secondary data set to collect cross-sectional data for this study. Secondary data describes the analysis of larger data sets collected by a primary source, which allows studies to be conducted on high-impact research questions to further help improve the understanding of a public health issue (Smith et al., 2011). Likewise, secondary data are useful when time and resources are limited to design questionnaires and manage a large-scale data collection project (Cheng & Phillips, 2014). One of the main goals of quantitative research is the concept of external validity, which involves generalizing the research results to a larger population (Laerd Statistics, 2012). External validity can be increased if the study is properly designed and there is a good representation of the population under study (Rothwell, 2006; Steckler & McLeroy, 2008).

Literature Search Strategy

I conducted a literature search for peer-reviewed journal articles to review empirical studies with data-based conclusions relevant to the research questions of this study. I searched Walden University's data library, published dissertations, ProQuest,

PubMed, and Medline. The CDC data library and Google Scholar were also used to obtain relevant information on hypertension and medication adherence. Only peer-reviewed journal articles published within the last 5 to 6 years were used for this research study. Due to limited data based on current research, I also considered peer-reviewed journals published within the last 9 years as relevant sources for this study if they had been referenced in other research studies.

I used the following key search terms: *hypertension, medication adherence, African Americans, high blood pressure, social support,* and *patient-provider communication*. My search yielded over 100 sources in the area of hypertension, medication adherence, and African Americans. I reviewed over 80 articles that addressed the influences of patient-provider communication and social support on medication adherence in individuals diagnosed with hypertension and what has been shown to hinder or facilitate improvement blood pressure control among the target population.

Literature Review

Overview of Hypertension

Hypertension, or high blood pressure, is a chronic condition that has a significant impact on health outcomes and health disparities (Guo, He, Zhang, & Walton, 2012). Hypertension exists when blood pressure is 140/90 millimeters of mercury (mmHg) or above most of the time (AHA, 2016). When the force of the blood flow is high, the walls of the arteries become stretched beyond a healthy limit, causing damage (AHA, 2016). According to the World Health Organization (WHO; 2016), hypertension contributes to 9.4 million deaths worldwide every year. Economically, the burden of hypertension is

around $47.5 billion annually in direct medical expenses and $3.5 billion in lost productivity (Rajpura & Nayak, 2014).

According to data from the National Health and Nutrition Examination Survey, 1 in every 3 adults in the United States aged 20 years or older suffer from hypertension (Rajpura & Nayak, 2014). While hypertension is a modifiable condition, if left untreated, it can lead to numerous health problems including heart disease, stroke, kidney failure, and vision loss (AHA, 2016). This condition must be detected early and treated appropriately in order to avoid poor health outcomes. Adherence to treatment is the foundation to helping control blood pressure.

Prevalence of Hypertension Among African Americans

The health status for African Americans in the United States lags behind that of other racial and ethnic groups (Martin et al., 2011). Many African Americans report a lack of confidence in the healthcare system, and some hold the belief that they are less likely to receive the same medical resources and quality of care as European Americans (Martin et al., 2011). Additionally, because African Americans are disproportionately affected by high blood pressure, the prevalence of hypertension is much higher for this population in comparison to European Americans or Hispanics (Lewis et al., 2012). Heart disease is a contributing factor for hypertension and further contributes to the morbidity and mortality in African Americans (Brown, 2015). The onset of hypertension tends to develop at an earlier age for African Americans, and its symptoms are usually more severe (CDC, 2016). Various barriers have caused an increase in the incidence of uncontrolled high blood pressure for African Americans including poverty,

socioeconomic status, access to medical care, a lack of health insurance, and nonadherence to treatment (Grant et al., 2015).

Researchers have reported that 45% of African American men and 46% of African American women have hypertension, in comparison to 34% of European American men and 31% of European American women (CDC, 2016; Pettey et al., 2016). The National Health and Nutrition Examination Survey reported that only about 28% of African Americans with high blood pressure have it under controlled in comparison to 33% of European Americans (Fauntleroy, 2013). Moreover, there is a greater risk of being diagnosed with hypertension for African Americans living in the South (Pettey et al., 2016). Similarly, Martin et al. (2011) found that rural African American residents had the worse blood pressure control in comparison to their rural and urban White counterparts. Even with access to free medication and a regular source of healthcare, rural or low-income hypertensive African American residents continue to encounter medication adherence barriers (Martin et al., 2011).

Medication Adherence and Nonadherence

Medications continue to be beneficial in saving lives for many individuals diagnosed with a chronic illness. Adherence to medication is an essential component of successful patient care and self-management of hypertension (Bosworth et al., 2011). Hypertensive patients are often encouraged to establish a consistent medication routine in their daily lives to increase adherence behaviors and to achieve optimal high blood pressure control rates (Solomon et al., 2015). Nonadherence to medication or treatment for high blood pressure is complex and challenging due to medication costs, health

literacy, older age, a complex routine regimen, as well as poor social support and patient-provider communication (Marshal, Wolfe, & McKevitt, 2012).

Nonadherence is often an unrecognized risk factor that further contributes to a lack of control of blood pressure for individuals diagnosed with hypertension (Oliveira-Filho, Barreto-Filho, Neves, & Lyra Junior, 2012). Researchers have estimated that 20% to 50% of patients do not take their medication as prescribed (Oliveira-Filho et al., 2012). It has also been estimated that 125,000 deaths occur in the United States annually due to nonadherence to medication (Bosworth et al., 2011). Although medication adherence is a behavior in which people should be able to report, there has been a lack of adequate reliability and strong validity in self-report measures of medication adherence (Morisky & DiMatteo, 2011).

Moreover, nonadherence can be categorized as intentional or unintentional if the given treatment advice is ignored, misunderstood, or used incorrectly (Miller & DiMatteo, 2013). Nair et al. (2011) conducted a qualitative study to understand the barriers that influenced adherence rates for hypertensive patients and found that unintentional nonadherence, which included forgetfulness or a lack of access to medications, was the primary form of nonadherence for patients with high blood pressure. When patients perceive that the prescribed medication is not working or has unwanted side effects, they may stop taking the treatment, which would be considered intentional nonadherence (Pettey et al., 2016; Schmitt et al., 2013). Schoenthaler, Butler, Chaplin, Tobin, and Ogedegbe (2016) conducted a cross-sectional study to examine the predictive role of key psychosocial and interpersonal factors on changes in medication

adherence in hypertensive African American patients. These researchers concluded that both patient-provider communication and social support indirectly affected medication adherence among patients; yet, efforts were still needed to improve adherence behaviors based on the patient's medical care and the community they resided in.

Assessment of medication adherence among African Americans. High blood pressure continues to increase among African Americans, and medication adherence rates are much lower for those who have been diagnosed with hypertension (Lewis, 2012). Studies have shown that antihypertensive medications have an impact on achieving optimal blood pressure control; yet, nonadherence to treatment has also been identified as a reason for poorly controlled blood pressure among African Americans (Hu, Taira, Yeboah, & Castillo, 2014). Conversely, documenting the adherence rates among hypertensive patients has been found to be difficult, and it is still not clear as to the factors that are associated with adherence for African Americans (Lewis, 2012). Barriers that affect African Americans from seeking proper treatment include poverty, low-income, stress, religious practices, and cultural beliefs and attitudes (Brown, 2015).

Misperceptions and a lack of understanding of the causes and treatment greatly influence medication adherence as well (Buis, Artinian, Schwiebert, Yarandi, & Levy, 2014). Thus, it is imperative for African Americans diagnosed with hypertension to adhere to treatment to help lower the burden of heart disease morbidity and mortality and improve their blood pressure control. It is also important for healthcare providers to understand the culture of African Americans, and tailor treatment based on the particular needs of the patient (Brown, 2015).

Adherence among African American men and women. Poor adherence to antihypertensive medications is more pronounced in African American men than in women (Lewis, Schoenthaler, & Ogedegbe, 2012). African American women tend to have a greater awareness of their condition and are quicker to seek treatment, and therefore, exhibit better blood pressure control rates (Ashaye & Giles, 2003). Through a literature review, Lewis et al. (2012) showed that higher rates of medication nonadherence existed for African American men even in environments with equal access to care regardless of race or socioeconomic status. In another literature review examining factors associated with medication adherence among hypertensive African Americans, Lewis (2012) found that men were more likely to be nonadherent to their antihypertensive medications in comparison to women. On the other hand, Petty et al. (2012) found that females were less adherent to treatment than men due to a higher amount of medication and neglecting to take care. Rose, Kim, Dennison, and Hill (2000) conducted a qualitative study on the contexts of adherence for African Americans between the ages of 18 and 49 years old with high blood pressure and concluded that it was important for African American men to have a collaborative relationship with their healthcare provider, which also had a significant positive influence on their adherence to recommended medications. Additional researchers have shown that there is no association between gender and medication adherence (Lewis, 2012). These studies, however, were limited due to the use of self-reported data as well as a delimitation of only male participants.

Older Age and Hypertension

Older adults may seemingly be faced with a greater challenge of adhering to recommended treatment when diagnosed with a chronic disease. The risk for hypertension increases as an individual becomes older (Holt et al., 2014). Schmitt et al. (2013) stated that older adults represented about 50% of multidrug users due to the prevalence of chronic illnesses. According to the CDC (2016), men under the age of 45 years old are more highly affected by hypertension than women, while women over the age of 65 years old are more affected by high blood pressure than men. Researchers have shown that an estimated 40% of adults between the ages of 45 and 64 years old and adults over the age of 65 years old have hypertension (Warren-Findlow, Seymour, & Huber, 2012). Although older adults who are diagnosed with hypertension tend to have better control rates than younger adults, less than 50% of them have it under control (Cornwell & Waite, 2012; Guo et al., 2012).

In particular, rates of uncontrolled hypertension are higher for African American older adults (Cornwell & Waite, 2012). In a study on adherence behaviors among hypertensive African Americans followed in primary care clinics, Hekler et al. (2008) reported that older age was associated with better medication adherence; however, scholars have shown that age does not predict or influence medication adherence for hypertension patients. For example, Nair et al. (2011) found that differences in age did not appear to influence nonadherence or predict adherence reliably. Nonetheless, the results of this study were limited because the authors did not compare hypertensive patients with high adherence rates to those patients with low or moderate adherence.

Similarly, in a meta-analysis examining the association between age and medication adherence among hypertensive African Americans, the results did not show an association while the findings of four cross-sectional studies included in the meta-analysis demonstrated an association between age and adherence (Lewis, 2012). Zullig et al. (2015) also conducted a cross-sectional analysis on self-reported medication adherence, race, and patient-provider communication and found that older African Americans reported following their health providers recommended instructions on medications less frequently than older European American patients.

Attitudes Towards Medication Adherence

Patients' beliefs and attitudes towards medication have been shown to be important drivers for adherence and disease outcomes in adults (Martin et al., 2011). As previously mentioned, barriers to treatment adherence include the effectiveness of the medication, cultural perceptions and attitude, amount of social support, and the level of patient-provider communication (AlGhurair, Hughes, Simpson, & Guirguis, 2012). Pettey et al. (2016) stated that understanding the perceptions of medication adherence and lifestyle changes needed to treat high blood pressure could further help to provide a foundation for improving adherence rates among African Americans. Few empirical studies have focused on the perceptions of adherence to treatment among hypertensive African Americans. In a literature review on medication adherence in hypertensive African Americans, Lewis (2012) found that attitudes and illness beliefs did not have a significant association with medication adherence. Nonetheless, this result may have been

due to the limited number of extant studies found by the author and the majority being cross-sectional.

Pettey et al. (2016) conducted a qualitative study to examine the perceptions of hypertensive treatment among African Americans between the ages of 21 and 64 years old. These investigators found that many of the participants had a willingness to adhere to their treatment but found it difficult even with free access to healthcare. Their study was limited by potential sample bias and longitudinal data that were not yet available at the time of analysis of their health because they focused on taking care of others (Pettey et al., 2016). Hardeman et al. (2015) conducted a quantitative study to examine the attitudes toward patient-centered care among African American and European American first year medical students. They conducted an assessment of the association between race, gender, and socioeconomic status with attitudes towards patient-centered care. The researchers concluded that status as a female medical student and a student with a low- to middle-income socioeconomic background significantly impacted their attitudes towards patient-centered care. Additionally, older medical students over the age of 25 also had more positive attitudes towards patient-centered care; however, race had no significant impact on their attitudes towards the topic (Hardeman et al., 2015).

Effects of Social Support

Social support plays a vital role in promoting better health outcomes and alleviating chronic diseases such as hypertension (Nurullah, 2012). According to Hatah et al. (2015), greater levels of social support are associated with better treatment adherence. Social support can come in the form of friends, family, coworkers, healthcare providers,

or community and faith-based organizations as perceived or received support. The concept of social support evaluates the interpersonal communication and relationships and support a patient receives from peers and medical providers (Criswell, Weber, Xu, & Carter, 2010). A person's perception of social support is usually reflected by the specific behaviors of family and peers, which can have positive or negative effects on adherence to treatment (Rosland, Heisler, & Piette, 2012). Additionally, social support is useful for increasing patients' perception regarding quality of life, facilitating better access to medical resources and utilization of healthcare services, as well as improving self-management of hypertension. Social support from family members provides patients with practical help and can buffer the stresses of living with an illness (Miller & DiMatteo, 2013).

Empirical investigators have used three broad categories to measure social support: social connectedness, perceived social support, and actual social support (Kim et al., 2015). The most common ways to measure social support include emotional, instrumental, and information support. Emotional support is defined as an individual having another person in his or her life to provide empathy, and someone that can be trusted (Johnson, Jacobson, Gazmararian, & Blake, 2010). Informational support describes having someone to help with reading written materials obtained from a physician or hospital. Moreover, instrumental support, also known as tangible support, includes the provision of material aid such as giving information to understand a situation or someone helping an individual complete their chores is they are sick (Johnson et al., 2010).

In a systematic review conducted on the impact of family behaviors and communication patterns on chronic illness outcomes, the results found that family encouragement and cohesion were associated with improved outcomes for individuals diagnosed with hypertension (Rosland et al., 2012). These researchers also found that general social support had a stronger effect for women than men. Moreover, Schoenthaler et al. (2016) found that functional social support rather than structural social support was an important aspect to adherence of antihypertensive medications. In a qualitative study conducted by Petty et al. (2016), 53% of the respondents reported that family support such as a mother or sister, was the most important, as well as hearing stories about family and friends with certain health complications facilitated their decision to seek care or adhere to treatment.

Studies have also been conducted to show the effects of culture and religion on social support and medication adherence. African Americans tend to have higher levels of religious involvement, and church is usually the foundation of the community (Holt et al., 2014). Religious involvement is a way to facilitate social support and provide a sense of belonging, as well as, cohesiveness. In the cross-sectional study conducted by Hatah et al. (2015), the researchers evaluated the influence of cultural orientation and religiosity of patients with chronic diseases including hypertension on social support and adherence to medication. The researchers found that while age, duration of treatment, and faith-based activity had significant influence on adherence to treatment, there was no significant association between social support and medication adherence. Holt et al. (2014) performed a qualitative study to assess the role of social support and the relationship of

religious involvement and physical and emotional functioning among African Americans and health outcomes. Holt et al. concluded that tangible social support was associated with religious behaviors and improving medication adherence.

The impact of social support can influence the ability of an individual to make lifestyle adjustments that would help them to live with hypertension and make positive behavioral changes. A randomized clinical trial was conducted by Bokhour et al. (2016) to assess the impact of viewing African American patients' stories of successfully controlling hypertension on intention to change self-management behaviors, as well as, engagement with educational materials. The study sample included 618 African American veterans with uncontrolled blood pressure who viewed information-only DVDs about hypertension or a DVD with African American veterans telling stories about successfully managing their blood pressure. The results demonstrated that videotaped patient's stories was not only an effective way of communication but also influenced other hypertensive patient's intentions to change their health behaviors affecting blood pressure control (Bokhour et al., 2016). The use of story sharing was a way to increase social support and peer interventions that could further help patients adhere to their medications. These authors also found that patients were more likely to communicate with their doctors after viewing the stories (Bokhour et al., 2016). Nevertheless, the study was limited to focusing on patients' intention to change their health behaviors but may not have resulted in actual change.

Social support through family and community members has been shown to be influential in African Americans decisions to adherence to hypertensive treatment; yet,

the extent of this influence is still not completely understood (Pettey et al. 2016). Social support can have a negative impact and become a barrier to self-management of hypertension. For example, in a literature review conducted by Miller and DiMatteo (2013), the investigators found that social support had been linked to adverse health outcomes and suggested that some patients felt criticized, nagged, or guilty when receiving support from family. The sabotaging behavior created conflict due to an increase in family involvement and undermined the success of an individual adhering to medication. Lewis et al. (2012) also found that social support did not appear to be consistently associated with medication adherence in hypertensive African Americans. Braverman and Dedier (2009) used an electronic cap to measure medication adherence and found that social support was not associated with adherence.

Patient-Provider Communication and Care

Communication skills are fundamental in healthcare, in particular between the provider and the patient. Patient-provider communication is multidimensional and can have an impact on patients' decision to adhere to their medication (Levinson et al., 2010; Schoenthaler et al., 2009). Patients tend to rely on their healthcare provider as the primary source of information when discussing medical care and treatment options (Lewis et al., 2012). The provider usually asks the patient various questions to assess the best medical treatment that would meet patients' needs for their particular health condition such as hypertension. Patients who communicate with their healthcare provider have the ability to express how they feel about their health, medical treatment, and making healthier lifestyle choices; however, healthcare providers have been found to lack

skills in identifying poor medication adherence among their African American patients. For example, in a study about young, urban hypertensive African Americans, the authors estimated that 60% of the time, the health provider was unable to identify poor mediation adherence (Braverman & Dedier, 2009).

Moreover, trust in a provider is synonymous with adherence to treatment. Patient-provider communication is one way to establish trust and encourage individuals to become more involved in decisions regarding their health (Martin et al., 2011). Equally, the trust built through patient-provider communication can be associated with better satisfaction with healthcare, an increase in treatment adherence, as well as, improved health outcomes. Abel and Efird (2013) stated that patients' trust in their health provider implies confidence that the provider's words are honest, and actions are appropriate in the provision of care and treatment. Lower levels of trust in health providers are also associated with lower patient satisfaction and treatment adherence among racial minority populations, including African Americans (Martin et al., 2011).

African Americans are less likely to seek or receive needed health services, procedures, or routine treatments for hypertension in comparison to White Americans (Martin et al., 2011). Researchers have further suggested that African American patients report poor quality of interactions with healthcare providers (Greer, Brondolo, & Brown, 2014). Abel and Efird (2013) found that hypertensive African American women who trusted their health providers were more likely to be adherent to treatment versus those who did not trust their providers. The lack of trust and communication can also increase health disparities among races. The distrustful relationships between African Americans

and healthcare providers have also been influenced by past historical events such as the Tuskegee experiment. Throughout history, African Americans were frequently used in experiments by White doctors to help improve medical and surgical techniques before attempting the same procedures on Whites, thus causing distrust (Abel & Efird, 2013).

Likewise, patients who engage in decision-making with their healthcare provider are not only more likely to be satisfied with the quality of care but are also likely to adhere to recommended treatment (Aseltine, Sabina, Barclay, & Graham, 2016; Schoenthaler et al., 2009). Several barriers, however, interfere with adherence to hypertensive treatment including a lack of knowledge and understanding of a provider's recommendations. Patient-provider communication can also be a complex process due to unrealistic patient expectations, nondisclosure of information, or a lack of sensitivity for the patient (Schoenthaler et al., 2012). Furthermore, healthcare providers are unable to accurately assess their patients' perceptions of their care, what is important to them, nor how well the care is being delivered (Rickert, 2012).

Similarly, African American patients may receive marked differences in the quality of patient-provider communication due to their race (Aseltine et al., 2016). Thus, racial differences also create a barrier to patient-provider communication. For instance, reports have shown that hypertensive African American patients receive suboptimal communication with providers and higher levels of unmet information needs (Lewis et al., 2012). In comparison to White Americans, communication for some African American patients was less informative and supportive, as well as, less participatory. Some healthcare providers perceived hypertensive African American patients as less

effective communicators, treated them contentiously, and did not use patient-centered communication. On the other hand, African American patients perceived their provider as disrespectful and provided unfair treatment, thus leading to a decrease in using health services and adherence to treatment.

Three main goals of patient-provider communication include developing an interpersonal relationship, facilitating the exchange of information, and involving patients in decisions making (Ha, Anat, & Longnecker, 2010). Miscommunication, however, can cause complications between the patient and healthcare provider that could hinder patients' understanding, expectations of treatment, or involvement in the medical decisions. Miscommunication also decreases patients' satisfaction with the quality of medical care (Ha et al., 2010). Doctors who avoid discussing patients' problems or discourage patients from voicing their concerns are additional barriers to medication adherence and patient-provider communication.

According to the Agency for Healthcare Research and Quality (2014), 40%–80% of the medical information patients are given during an office visit is forgotten immediately or nearly half of the information retained is incorrect. Patients who lack a clear understanding of their health condition will more than likely not make a follow-up appointment or risk being readmitted to the hospital. Collaborative patient-provider communication increases the likelihood of a patient adhering to their antihypertensive medication, especially for African Americans (Schoenthaler et al., 2016). The process of communication can significantly depend on preexisting, shared cultural patterns, and social structures (Lewis et al., 2012). Like social support, the role and influence of

patient-provider communication is not clearly understood among African American hypertensive patients (Schoenthaler et al., 2016).

Definition of Terms

Hypertension: This is a term used to describe high blood pressure (Rajpura & Nayak, 2014).

Medication adherence: The extent to which a patient follows a given medication regimen as agreed on in partnership with a healthcare professional (AlGhurair, Hughes, Simpson, & Guirguis, 2012)

Medication nonadherence: The extent to which patients do not follow treatment recommendations given by their health providers, either willfully or inadvertently (Miller & DiMatteo, 2013; Rajpura & Nayak, 2014).

Patient-provider communication: An increase in health providers' understanding of patients' individual values, needs, and perspectives that allows patients to actively participate in decisions regarding their health and healthcare (Levinson et al., 2010; Zulling et al., 2015).

Social support: The exchange of resources between two individuals perceived by the provider or the recipient to be intended to enhance the well-being of the recipient; assets that an individual is provided through their social ties (Hatah et al., 2015; Holt et al., 2014).

Uncontrolled blood pressure: A persistent elevation of systolic blood pressure of 140 mmHg or higher and diastolic blood pressure of 90 mmHg or higher (Grant et al., 2015).

Assumptions

I assumed that participants self-identified as African American. I also assumed that participants truthfully answered questionnaires to the best of their ability and on their own. Finally, I assumed that the material presented in the surveys was understood and relevant to the participants' life condition.

Scope and Delimitations

It was within the scope of this doctoral study to address the significance of patient-provider communication and social support on the influence of attitudes towards medication adherence in hypertensive African American patients. Poorly controlled hypertension due to nonadherence to antihypertensive medication continues to remain a significant public health issue in the United States, and specifically among African Americans (Schoenthaler et al., 2012). The study was delimited to African American men and women between the ages of 21–65 years, born in the United States, who speak fluent English, and have at minimum a high school education. Participants were required to be diagnosed with hypertension and were required to be taking at least one antihypertensive medication. Participants had to self-identify as African American. A secondary data set was used to collect information on selected participants related to the measuring variables for this study. By using secondary data, the quality of data, data collection, and available measuring instruments was limited to what was obtained in the primary research study.

Significance of Social Change Implications

Adherence to hypertension treatment is essential to controlling blood pressure as well as decreasing other health complications. Medication adherence is significantly

important for African Americans because they have a disproportionately greater burden of cardiovascular disease morbidity and mortality rates than any other ethnic group in the United States (Solomon et al., 2015). Thus, there is a need for enhanced patient-provider communication so that African Americans can learn to properly manage their blood pressure (Solomon et al., 2015). Treatment can then be tailored to meet the particular needs of patients based on their level of health knowledge.

Likewise, through social support, the creation of effective support groups can develop positive change by helping to promote adherence to medication and healthy living (Vaccaro et al., 2014). It is imperative for the healthcare community to identify barriers to medication adherence and develop efficient ways to engage African American men and women in programs to improve their hypertension control (Nair et al., 2011). Improvement of hypertension-related knowledge is an important strategy for increasing medication adherence (Zulling et al., 2013); however, no particular intervention for improving medication adherence in hypertensive individuals has emerged as the universal standard for improvement. (Lewis et al., 2012).

There is still a need to identify strategies to sustain adherence over time and create social change in health behaviors of African Americans with uncontrolled blood pressure (Lewis et al., 2012). The findings of this study could provide insight for healthcare providers to improve patient-provider communication among hypertensive African Americans by adapting better cultural sensitivity, which can help improve the attitudes towards self-management of health behaviors. This may also lead to an increase in better health outcomes and reduce chronic illnesses, hospitalizations, and associated diseases

(Aseltine et al., 2016). Furthermore, the results of this study could provide an understanding on how the impact of social support, through family, friends, and community sources can help prevent patient isolation in dealing with chronic health conditions. Thus, hypertensive African Americans could establish a more positive attitude about their health and develop better adherence to recommended treatment.

Conclusion

In Section 1, I illustrated how TRA was used as a foundation for this research investigation. In Section 1, I also provided an outline regarding the high prevalence of hypertension among African American men and women and why it has become a public health concern. Previous scholars have shown the importance of adhering to medication to improve health outcomes for patients diagnosed with hypertension. African Americans continue to be disproportionately affected by high rates of uncontrolled blood pressure and have lower rates of medication adherence. Patient-provider communication and social support are necessary factors to help improve blood pressure control and rates of adherence to medication among hypertensive African Americans; yet, studies are limited, have been inconclusive, or have varied according to gender and age in understanding the influence social support and patient-provider communication have on the attitudes of hypertensive patients towards medication adherence. Therefore, further research is warranted to obtain these findings. In Section 2, I will describe the research design and rationale of the doctoral study, including a brief description of the secondary data set that I used to collect data for analyzation. I will also discuss the methodology, including

sampling, setting, sampling frame, data collection, and the variable measuring instruments.

Section 2: Research Design and Data Collection

Introduction

The purpose of this doctoral study was to examine the association between social support and patient-provider communication towards medication adherence for both hypertensive African American men and women between the ages of 21 and 65 years old in the United States. This section will include an overview of the quantitative cross-sectional design of the study, the rationale for choosing such a design, and the sampling method used. In Section 2, I will also discuss the sampling frame, the methods used for data collection, and the variable measuring instruments. Furthermore, I will briefly describe the Counseling African Americans to Control Hypertension (CAATCH) clinical trial study from which the secondary data were obtained. Data from the CAATCH study were collected between 2004 and 2011. Finally, I will describe the data analysis procedures, threats to internal and external validities, and ethical considerations of the study.

Research Design and Rationale

I used a quantitative cross-sectional design with a secondary data analysis as the approach for this study. In a cross-sectional study, data are collected at a single point in time to examine the relationship between the disease, such as hypertension, and other variables of interest (Cherry, 2015). Additionally, a cross-sectional study can provide a snapshot of various health-related characteristics or frequency of a disease for a defined population. An advantage to conducting a cross-sectional study is that information can be gathered quickly and in a less expensive manner than other designs (Cherry, 2015). A

cross-sectional study allows multiple factors, including exposure, outcomes, and confounders, to be examined simultaneously (Cherry, 2015). Moreover, I used a secondary data set that contained the variables and measuring instruments related to this doctoral study. It was not my goal to interview or observe participants in their natural setting. Likewise, due to time constraints in designing the study and collecting primary data, use of a secondary data set was appropriate for this study.

Study Variables

The design that I chose for this study allowed for the assessment of the relationship between the independent and dependent variables. I focused on two independent or predictive variables, which were patient-provider communication and social support. The dependent or outcome variable was medication adherence among hypertensive African Americans. The covariate variables included gender, age, income, education, employment, insurance status, and place of residence. The length of time in treatment, number of medications, and the severity of hypertension were also used as moderating variables. Using these particular demographics allowed me to generalize the findings to a broader population (see Ogedegbe et al., 2014).

Methodology

Population

The target population for this doctoral study was hypertensive African American men and women between the ages of 21 and 65 years old. A total of 1,039 patients over the age of 18 years old were enrolled in the study who self-identified as African

American with uncontrolled hypertension (Ogedegbe et al., 2014). From this population, I selected the sample participants.

Setting and Sampling Method

I identified a cluster-randomized clinical trial known as the CAATCH trial as the appropriate secondary data set to use for this doctoral study. The CAATCH study is considered the largest, practice-based, implementation trial of a multilevel, evidence-based intervention targeted towards blood pressure control in hypertensive African Americans and represented the best source of data for this research study (see Ogedegbe et al., 2014). A total of 1,039 patients over the age of 18 years old were enrolled in the study who self-identified as African American with uncontrolled hypertension (Fernandez et al., 2011). The patients were chosen from 30 community health centers where they received care and randomly assigned to the intervention condition or usual care condition (Fernandez et al., 2011). Patients were recruited through letters from their primary care clinicians (Ogedegbe et al., 2014). Random sampling can help to ensure that every sampling unit of the population has an equal chance of being included in the sample (Frankfort-Nachmias & Nachmias, 2008). An advantage to using random sampling is the potential to reduce selection bias (Laerd Statistics, 2012). The CAATCH study protocol was approved by the institutional review boards of Columbia University, New York University, and the Clinical Directors Network (Ogedegbe et al., 2014). I obtained permission to access the data set through an e-mail sent to the original researchers. A copy of this letter is located in Appendix A.

Sampling Frame

I determined the sampling frame based on the inclusion and exclusion criteria from the primary study. Participants who met the original demographic and inclusion criteria were also eligible for this study. In the following subsections, I will detail these criteria.

Inclusion. The participants were required to self-identify as African American and be between the ages of 21 and 65 years old. The participants were required to speak fluent English and be receiving care at the community health center for more than 6 months. The participants were required to have received a diagnosis of hypertension and uncontrolled blood pressure since their last office visit. Lastly, the participants were required to be on at least one antihypertensive medication.

Exclusion. Participants were excluded if they did not speak English and were unable or unwilling to complete screening or baseline assessment. Participants were also excluded if they had already participated in a hypertensive clinical study. The participants could not have an arm circumference greater than 42cm.

Data Collection Method

I collected data for this doctoral study through surveys that were administered originally in the CAATCH study. A survey is an instrument used to collect verifiable information, and usually requires a respondent to choose from a scale (Center for Research Quality, 2015). Surveys are also useful for collecting self-reported information on hard-to-measure variables. Data and study measurements were previously gathered by trained research assistants at baseline and every 3 months for 12 months, with a follow-

up 24 months later (Schoenthaler et al., 2016). Participants for the original study were recruited via letters from their primary care doctors at community health centers (Ogedegbe et al., 2014). All enrolled patients provided written informed consent (see Ogedegbe et al., 2014). I selected participants for this doctoral study from the CAATCH trial data set based on their responses to sociodemographic data and survey questions related to the measuring variables of this study. Demographic data included gender, age, employment status, insurance status, education, and income level. I gained access to the secondary data set through a permissions e-mail that I sent to the original researchers.

Power Analysis

I used a power analysis in this quantitative research study to help determine the sample size. Performing a power analysis and sample size calculation is an important aspect of a research design to avoid the sample size from being too small or too large to detect any significant differences between groups (Statistic Solutions, 2017). Power refers to the probability of achieving a significant result if the null hypothesis is false (UCLA Statistical Consulting Group, 2017). The probability also increases as the sample size gets larger (McDonald, 2014). Moreover, the statistical power is dependent on the effect size, which can be small, medium, or large (UCLA Statistical Consulting Group, 2017). For example, larger effect sizes require smaller samples sizes to have the same power, while smaller effect sizes require larger samples to have enough power (Sullivan & Feinn, 2012). The most commonly used power level is 0.80, with an alpha of 0.05 to achieve the desired level of significance (UCLA Statistical Consulting Group, 2017). I used the G*Power software as the statistical tool to calculate the sample size for this

doctoral study. I anticipated that a minimum sample size of 248 participants would be needed to test statistical significance for the study. The sample size was calculated using binomial logistic regression statistical model with a two-tailed test, an alpha of 0.05, and 0.80 power. The effect size was set to 0.3. Based on these projections, a sample size of 248 was deemed adequate for detecting a medium effect size for Hypotheses 1 and 2.

Instrumentation

Measuring instruments had already been developed and validated within the original CAATCH trial study, so I tailored these instruments for this research study. The instruments that I used in this doctoral study included the Morisky Medication Adherence Scale (MMAS), the Social Support Scale, and the Physician Communication Style Survey. Table 1 provides a brief summary of the operationalization of variables that I used in this doctoral study.

Table 1

Operationalization of Variables

Variable	Brief Description	Data Category	Measure
Adherence	Adherence to prescribed medication	Binary	0 = Nonadherent 1 = Adherent
Physician Communication Style	Patient-provider communication	Continuous	Questionnaire (Bultman & Svarstad, 2000)
Social Support	Social Support	Continuous	Medical Outcomes Study (MOS) Social Support Survey (Sherbourne & Stewart, 1991)
Covariates	Age	Interval	21-65
	Gender	Nominal	0 = Male 1 = Female
	Marital Status	Ordinal	0 = Never married 1 = Married 2 = Divorced 3 = Separated 4 = Widowed
	Education	Ordinal	0 = None 1 = Grades 8 2 = Grade 9 3 = High School 4 = Technical School 5 = Some College 6 = Associates 7 = Bachelors 8 = Graduate School (Masters or Above)
	Employment	Binomial	0 = No 1 = Yes
	Income	Ordinal	0 = less than $25,000 1 = ≥ $25,000
	Insurance	Binomial	0 = No 1 = Yes

Morisky Medication Adherence Scale (MMAS)

In this study, I assessed medication adherence using the MMAS, a psychosocial measure used in the CAATCH trial study. The MMAS is an indirect method of

measurement, and it includes a structured self-reported questionnaire used to assess the behavior of medication adherence for patients diagnosed with chronic illnesses, such as hypertension (Morisky & DiMatteo, 2011). In 2008, the scale was updated to an 8-item measure (MMAS-8), which has been shown to have high reliability and validity. For instance, in a study conducted by Oliveira-Filho et al. (2012), the MMAS-8 was used to measure medication adherence and demonstrated good potential as a screening tool in clinical practice to identify nonadherent patients and those at risk of uncontrolled blood pressure. The scale further demonstrated excellent internal consistency with the Cronbach's α of 0.90 using inner-city patients with hypertension (Shea, Misra, Ehrlich, Field, & Francis, 1992).

The MMAS is an 8-item instrument with dichotomous answers that are designed to avoid a bias of positive responses from patients when responding to health professionals (Schoenthaler et al., 2009; Schoenthaler et al., 2012). Questions 1 through 7 have "yes" or "no" responses, while Question 8 has a 5-point, Likert response scale (De las Cuevas & Peñate, 2015). The total scores on the MMAS-8 range from 0 to 8 to demonstrate the continuous levels of adherence (De las Cuevas & Peñate, 2015; Oliveira-Filho et al., 2012). A high score between 7 and 8 points represents high adherence, while a score below 6 points corresponds to less adherence to medication. The scale is also useful in better understanding behaviors related to medication use that may be intentional, such as not taking medication due to side effects, or unintentional, such as forgetfulness.

Physician Communication Style

I assessed patient-provider communication with a measuring instrument that originated from a study assessing the effect of physicians' initial and follow-up communication styles on beliefs and behaviors of patients with depression (see Schoenthaler et al., 2009). This communication instrument uses concepts from the health communication model and evaluates a patient's perception of the quality of their physicians' communication style as well as the extent to which the physician encourages patient participation in treatment process (Schoenthaler et al., 2012). The 13-item communication scale, also used as a measuring instrument in the CAATCH trial, was appropriate for this doctoral study because it focuses on how physicians monitor patients' medication use, which is an important component in having a collaborative patient-provider relationship.

The first 11 questions are based on a Likert-type scale. Questions include: "To what degree was your doctor: 1 = friendly during the visit?" and "To what extent did your doctor: 2 = ask if you had questions and concerns?" The total scores for the survey range from 1 to 4 with higher scores corresponding to better communication (Lewis et al., 2012; Schoenthaler et al., 2012). Additionally, the communication scale has been used in a study that evaluated the effects of patients' perceptions of health providers' communication on medication adherence in hypertensive African Americans (Schoenthaler et al., 2009). These researchers found the scale valid and reliable with a reported Cronbach's alpha of .92.

Medical Outcome Study – Social Support Survey (MOS-SS)

I measured social support using the Medical Outcome Study Social Support Survey (MOS-SS), another measuring instrument used in the CAATCH trial. The survey was developed for patients with chronic conditions, including hypertension, in the MOS (Grant et al., 2015; Moser et al., 2012; Sherbourne & Steward, 1991). The survey is a 19-item, self-administered questionnaire that measures multidimensional functional characteristics of the availability of perceived social support (Grant et al., 2015. The four domains of functional support covered within the questionnaire include emotional/informational support, tangible or instrumental support, positive social interaction, and affection (Grant et al., 2015; Schoenthaler et al., 2016). The survey uses a 5-point, Likert scale. Questions include: "How often is each of the following kind of support available to you if you need it?" and "Someone you can count on to listen to you when you need to talk." The overall social support score is measured by obtaining the average of the mean scores of the four domains or subscales (Schoenthaler et al., 2016). The MOS-SS is scored using the formula 100 x (observed score-minimum) / (maximum-minimum); this formula is used for getting total and subscale scores (Moser et al., 2012; Sherbourne & Steward, 1991). Moreover, the MOS-SS has response options ranging between 1 and 5; a higher score corresponds with greater social support (Grant et al., 2015).

The MOS-SS survey is a widely used, short, simple, and easy-to-understand measuring instrument that has been administered to cancer patients and chronically ill patients of all ages. Additionally, the instrument has been found to be valid and reliable.

For example, in the 2-year study of patients with chronic conditions conducted by Sherbourne and Stewart (1991) to better understand the various functions of social support, the MOS-SS was found to have a construct validity of 0.88. Internal-consistency reliability was also tested, and Cronbach's alpha showed tangible support of 0.92; emotional support scale of 0.96, affection of 0.91, positive interaction of 0.94; and overall support index of 0.97. In another study that examined and validated the psychometric properties of a modified MOS-SS in two populations of women with breast cancer, Moser et al. (2012) showed both internal reliability and construct validity to be good.

Research Questions and Hypotheses

Through this research study, I aimed to answer the following three questions by evaluating their associated hypotheses:

Research Question 1: Are social support and patient-provider communication associated with hypertensive African Americans self-reported medication adherence?

$H_0$1: The null hypothesis states that there is no significant difference in adherence to medication between individuals with and without social support and patient-provider communication.

$H_1$1: The alternative hypothesis states that there is a significant difference in adherence to medication between individuals with and without social support and patient-provider communication.

Research Question 2: What is the association of social support and patient-provider communication by age among hypertensive African Americans?

$H_0$2: The null hypothesis states that there is no significant difference in the relationship between social support and patient-provider communication and adherence by age among hypertensive African Americans.

$H_1$2: The alternative hypothesis states that there is a significant difference in the relationship between social support and patient-provider communication and adherence by age among hypertensive African Americans.

Research Question 3: What is the association of social support and patient-provider communication among hypertensive African American men and women?

$H_0$3: The null hypothesis states that there is no significant difference in adherence to medication between hypertensive African American men and women with or without patient-provider communication and social support.

$H_1$3: The alternative hypothesis states that there is a significant difference in adherence to medication between hypertensive African American men and women with or without patient-provider communication and social support.

Data Analysis

Data were analyzed and interpreted using the Statistical Package for the Social Sciences (SPSS) software, Version 25 (IBM Corp, 2012). Univariate analysis, which includes the frequency and percentage distributions, was used to describe sociodemographic characteristics of the study participants, physician communication

style, and adherence variables. Through this analysis, I determined whether all data met the appropriate assumptions. The mean and standard deviation were reported for ratio and interval variables. Missing data were automatically excluded by SPSS when the logistic regression model was created.

Furthermore, because the dependent variable was binary, a binomial logistic regression analysis was conducted to address the three research questions since the dependent variable in each of the different research questions which was adherence to medication is a binary variable. A binomial logistic regression predicts the probability that an observation falls into one of two categories of a dichotomous dependent variable based on one or more independent variables that can be either continuous or categorical (Statistics Solutions, 2017). In addition, a hierarchical form of the logistic regression was used to control for confounders in all logistic regression models created. Hierarchical logistic regression analysis is conducted when the dependent variable is dichotomous or has two categories and is useful as a model-building technique in any regression model by adding more predictors (Statistics Solutions, 2017). Furthermore, hierarchical regression is a way to show if variables of interest explain a statistically significant amount of variance in the dependent variable after accounting for all other variables.

Unadjusted and adjusted hierarchical logistic regression models were estimated and compared to evaluate and control for the potential effect of confounders including age, gender, income, education, marital status, employment, and health insurance that have been shown to influence medication adherence. Two blocks in the regression model were used for the unadjusted results. The first block included the control variables or

covariates. The second block controlled the effects of these covariates while determining the impact of the independent variables which are social support and patient-provided communication on medication adherence. The Likelihood Ratio test was used to test whether all predictor variables in a model are simultaneously zero, and the Wald test was used to test whether particular predictor variables in a model are zero. Predictors that are significantly associated ($p < 0.05$) with the dependent variable were included in the model, and dropped from the model otherwise. Comparing the unadjusted and adjusted hierarchical logistic regression helped to provide the best possible estimate of the impact of the primary predictors while controlling for or reducing bias. The resulting model helped me to estimate the adjusted odds ratio to explain the strength of the association between the independent variables of patient-provider communication and social support, and the dependent variable of medication adherence, while adjusting for potential confounders.

I interpreted the results using a two-tailed test with a confidence interval of 95%. To determine the statistical significance, the null hypotheses was rejected if $p < 0.05$. Measures of central tendency and dispersion were used to identify skewness of the data, outliers or leverage points. The fit of the models was evaluated using a modified version of the Hosmer-Lemeshow test. The modified Hosmer-Lemeshow test treats the multinomial model as if it were a set of independent ordinary logistic regressions models of each outcome against a reference group and tests the fit for each independent model separately (Statistics Solutions, 2017).

Threats to Validity

Validity is necessary to ensure that what is intended on being measured within the study is actually being measured. Internal and external validity can influence the study results and findings. Internal validity refers to ability to make casual inferences about the target population (Creswell, 2009). Conversely, external validity is the extent to which the results can be generalized to a larger population (Frankfort-Nachmias & Nachmias, 2008). This doctoral study was limited by threats to internal and external validities. A potential threat to internal validity for this study was the measuring instrumentations. Effective changes in instrumentation can have an impact on the outcome scores (Creswell, 2009; Datt, 2016). Therefore, the same measuring instruments used to collect data in the original CAATCH trial were used for this study that relate to this study's research variables. The measuring instruments being used in this doctoral study not only aligned with the theoretical framework, but have been previously established as reliable and valid.

Another potential threat to internal validity was the attrition rate. The attrition rate refers to the mortality or drop-out rate among participants, which can lead to incomplete outcome data (Datt, 2016). According to Ogedegbe et al. (2014), the CAATCH trial had an attrition rate of 30%; hence, the data for this study were weighted in order to be representative of the population being examined. Moreover, the external validity of the current study may be limited by the representativeness of the sample. The focus of the study was on African Americans between the ages of 35–65 years. Obtaining a good representativeness of the sample can be addressed through the specific inclusion and

exclusion criteria, as well as using participants who have complete data on the measures being examined. Participants for the study reflected the characteristics of the target population based on such criteria and can potentially be representative of other hypertensive African American patients.

Ethical Considerations

This doctoral study presented no risk to study participants. No physical experimentation was performed. Participants were subject to questionnaires and surveys only. Additionally, participants' names and personal information were excluded from the surveys. As previously stated, permission to use data for the study was obtained by a written e-mailed letter to the original researchers. All data remained anonymous and participants were identified by a generic code. Data were treated with extreme confidentiality and stored on a secure and encrypted flash drive. Only myself and a statistician had access to the secondary data. Official approval to collect data for this doctoral study was granted from the Walden University Institutional Review Board office (Approval # 07-18-18-0542557).

Summary

In this doctoral study, I used a quantitative cross-sectional design and collected data from a secondary data set. The target population for the study focused on hypertensive African American men and women between the ages of 21–65 years. Participants were randomly selected using characteristic as specified in the sampling frame. Moreover, survey instruments were used for data collection. The G*Power software was also used to calculate the sample size, and SPSS software was used for data

analysis. In Section 3, I will discuss the data collection of the secondary data set. In Section 4, I will present the results and findings from the data analysis.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of this quantitative cross-sectional study was to examine the association between social support and patient-provider communication related to medication adherence for hypertensive African American men and women between the ages of 21–65 years old in the United States. The independent variables in this study were patient-provider communication and social support, while the dependent variable in this study was adherence to prescribed medication among hypertensive African Americans. The covariates in this study were age, gender, marital status, education, employment, income, and insurance. I conducted descriptive statistical analysis and hierarchical logistic regression analysis to address the objectives of the study and used SPSS to run the different statistical analyses. Specifically, the following research questions and hypotheses were tested in the quantitative analysis:

Research Question 1: Are social support and patient-provider communication associated with hypertensive African Americans self-reported medication adherence?

$H_0$1: There is no significant difference in adherence to medication between individuals with and without social support and patient-provider communication.

$H_1$1: There is a significant difference in adherence to medication between individuals with and without social support and patient-provider communication.

Research Question 2: What is the association between social support and patient-provider communication by age among hypertensive African Americans?

$H_0$2: There is no significant difference in the relationship between social support and patient-provider communication and adherence by age among hypertensive African Americans.

$H_1$2: There is a significant difference in the relationship between social support and patient-provider communication and adherence by age among hypertensive African Americans.

Research Question 3: What is the association between social support and patient-provider communication among hypertensive African American men and women?

$H_0$3: There is no significant difference in the relationship between social support and patient-provider communication and adherence between hypertensive African American men and women.

$H_1$3: There is a significant difference in the relationship between social support and patient-provider communication and adherence between hypertensive African American men and women.

Data Collection

The target population in this study consisted of hypertensive African American men and women between the ages of 21 and 65 years old. I used secondary data in this study from the survey administered originally in the CAATCH clinical trial study. Data from the CAATCH study were collected between 2004 and 2011. The CAATCH study is considered the largest, practice-based, implementation trial of a multilevel, evidence-

based intervention targeted towards blood pressure control in hypertensive African Americans (Ogedegbe et al., 2014). In the CAATCH, the African American patients with uncontrolled hypertension were chosen from 30 community health centers where they received care and randomly assigned to the intervention condition or usual care condition (Ogedegbe et al., 2009). Patients were recruited through letters from their primary care clinician (Ogedegbe et al., 2014).

For this study, the minimum required number of sample participants was 248, based on the results of a power analysis. Initially, I obtained a total of 1,059 samples but removed 493 (48.5%) samples that did not meet the inclusion criteria of this study. Those excluded from the final data set were not African American or did not fit within the inclusion criteria for age (i.e., between the ages of 21 and 65 years old). Specifically, among these 493 samples that were removed, 19 (1.88% of the total sample) were aged less than 21 years old, 249 (23.5% of the total sample) were aged greater than 65 years old, and 225 (21.2% of the total sample) were not African American. The final number of samples of the study consisted of 566 (51.5% of the total sample) hypertensive African American men and women between the ages of 21 and 65 years old. The final number of 566 participants was acceptable because it was more than the requirement of 248 participants deemed necessary by the power analysis.

Demographic Information

I considered the demographic data as covariates in this study. The demographic information included age, gender, marital status, education, employment, income, and insurance. Table 2 displays the demographic information of the sample population. The

mean age of the 566 hypertensive African American men and women was 51.91 years old (*SD* = 8.66). Concerning gender, more than half of the 566 samples of hypertensive African Americans were females (*n* = 381, 67.3%). The majority of the sample were not of Hispanic origin (*n* = 545, 96.3%). For marital status, the majority of the participants were never married (*n* = 208, 36.7%), while 135 (23.9%) were married. For education level, the top three highest degrees or levels of school completed were high school (*n* = 182, 32.2%), Grade 9 (*n* = 154, 27.2%), and some college (*n* = 120, 21.2%). For employment status, only 193 (34.1%) out of the 566 participants were employed. For insurance, more than half of the sample reported having Medicaid (*n* = 341, 60.2%). For income, a majority of the 566 participants were in the low-income group (*n* = 491, 86.8%).

Table 2

Frequency and Percentage Summaries of Gender, Marital Status, Education, Employment, Insurance, and Income

	Frequency	Percent
Gender/sex		
0 Male	184	32.5
1 Female	381	67.3
Missing	1	0.2
Are you of Hispanic origin?		
0 Not Hispanic	545	96.3
1 Hispanic	10	1.8
Missing	11	1.9
Race		
0 African American	566	100.0
Marital status		
0 Never Married	208	36.7

Table continues

	Frequency	Percent
1 Married	135	23.9
2 Divorced	88	15.5
3 Separated	77	13.6
4 Widowed	50	8.8
Missing	8	1.4
Education: Highest degree or level of school completed		
0 None	4	0.7
1 Grades 8	21	3.7
2 Grades 9	154	27.2
3 High School	182	32.2
4 Technical School	13	2.3
5 Some College	120	21.2
6 Associates	15	2.7
7 Bachelors	34	6.0
8 Graduate School, Masters or Above	16	2.9
Missing	7	1.2
Employment		
0 No	355	62.7
1 Yes	193	34.1
Missing	18	3.3
Insurance: Do you have Private insurance such as Blue Cross, Aetna, 1199 Fund, etc.?		
0 No	258	45.6
1 Yes	78	13.8
Missing	230	40.6
Insurance: Medicare		
0 No	258	45.6
1 Yes	77	13.6
Missing	231	40.8
Insurance: Medicaid		
0 No	116	20.5
1 Yes	341	60.2
Missing	109	19.3
Insurance: HMO		
0 No	245	44.3

Table continues

	Frequency	Percent
1 Yes	100	17.7
Missing	215	38.0
Insurance: Military or Veteran's Administration sponsored		
0 No	300	53.0
1 Yes	3	0.5
Missing	263	46.5
Insurance: No insurance?		
0 No	276	48.8
1 Yes	41	7.2
Missing	249	44.0
Income Level		
0 Low income	491	86.8
1 High income	58	10.3
Missing	17	3.0

Adherence to Prescribed Medication

As previously stated, the dependent variable was adherence to prescribed medication among hypertensive African American. I measured adherence to prescribed medication using the MMAS instrument. Adherence to prescribed medication was measured at three time periods: at baseline (i.e., starting period of data collection), at Time 3 (i.e., after 12 months), and at Time 5 (i.e., after 24 months follow-up). Tables 3 and 4 display the adherence to prescribed medication among hypertensive African Americans. At baseline, the mean total score in the MMAS was 3.62 (*SD* = 1.46), wherein less than half, or 219 (38.7%) of the 566 samples, of hypertensive African Americans adhered to prescribed medication at the baseline period. At Time 3, the mean total score in the MMAS was 3.19 (*SD* = 1.74), wherein less than half, or 147 (26%) out of the 566 samples, of hypertensive African Americans adhered to prescribed medication.

At Time 5, the mean total score in the MMAS was 3.85 (*SD* = 1.39), wherein less than half, or 188 (33.2%) out of the 566 samples, of hypertensive African Americans adhered to prescribed medication at the Time 5 period. As a comparison, the samples of hypertensive African American samples had the highest frequency of adherence to prescribed medication at baseline and had the least frequency of adherence to prescribed medication at Time 3 or at period after 12 months.

Table 3

Frequency and Percentage Summaries of Adherence to Prescribed Medication Among Hypertensive African Americans at Baseline, Time 3, and Time 5

	Frequency	Percent
Morisky medication adherence, at baseline		
0 Nonadherent	339	59.9
1 Adherent	219	38.7
Missing	8	1.4
Morisky medication adherence, at Time 3 (12 months)		
0 Nonadherent	286	50.5
1 Adherent	147	26.0
Missing	133	23.5
Morisky medication adherence, at Time 5 (24 months)		
0 Nonadherent	215	38.0
1 Adherent	188	33.2
Missing	163	28.8

Table 4

Descriptive Statistics Summaries of Total Scores of Morisky Medication Among Hypertensive African Americans at Baseline, Time 3, and Time 5

	N	Minimum	Maximum	*M*	*SD*
Morisky medication adherence, at baseline (total score)	558	0	5	3.62	1.46
Morisky medication adherence, at Time 3 (total score)	433	0	5	3.19	1.74
Morisky medication adherence, at Time 5 (total score)	403	0	5	3.85	1.39

Patient-Provider Communication

One of the independent variables was patient-provider communication. I measured patient-provider communication using the Physician Communication Style Survey. Table 5 presents the patient-provider communication scores among hypertensive African Americans. The mean score for patient-provider communication of the 566 samples of hypertensive African Americans was 2.198 (*SD* = 0.75). The mean score was at the average levels, which indicated that the hypertensive African American reported an average quality of communication with their physicians.

Table 5

Descriptive Statistics Summaries of Total Scores of Patient-Provider Communication

	N	Minimum	Maximum	Mean	Std. Dev.
Patient-Provider communication	502	0	3	2.18	0.75

Social Support

Another independent variable was the social support that the hypertensive African

Americans have received. I measured social support was measured using the MOS-SS. The MOS-SS has five different measures, including the overall support index and the four domain scores of emotional support, tangible support, affect, and positive interaction. Social support was also measured at three time periods: at baseline, at Time 3, and at Time 5. Table 6 indicates the social support among hypertensive African Americans.

For the overall support index, the hypertensive African American sample participants had the highest overall support index at Time 5 (M = 3.90, SD = 0.92) and had the lowest overall support index at baseline (M = 3.75, SD = 0.96). For the domain of emotional support, the participants had the highest emotional support at Time 5 (M = 3.88, SD = 0.97) and had the lowest emotional support at baseline (M = 3.70, SD = 1.03). For the domain of tangible support, the participants had the highest tangible support at Time 5 (M = 3.84, SD = 1.13) and had the lowest tangible support at baseline (M = 3.65, SD = 1.23). For the domain of affection, the participants had the highest affection at Time 5 (M = 4.07, SD = 1.09) and had the lowest affection at Time 3 (M = 4.00, SD = 1.12). For the domain of positive interaction, the participants had the highest affection at Time 5 (M = 3.89, SD = 1.09) and had the lowest affection at baseline (M = 3.76, SD = 1.10). This indicated that the participants had the highest social support at Time 5, which is the ending period, and had the lowest social support at the baseline period.

Table 6

Descriptive Statistics Summaries of Scores of Overall Support Index and Domain Scores of Emotional Support, Tangible Support, Affection, and Positive Interaction Among Hypertensive African Americans at Baseline, Time 3, and Time 5

Period	Measure	*N*	Min.	Max.	*M*	*SD*
Baseline	Overall support index	493	1	5	3.75	0.96
	Emotional support	493	1	5	3.70	1.03
	Tangible support	493	1	5	3.65	1.23
	Affection	493	1	5	4.02	1.12
	Positive interaction	493	1	5	3.76	1.10
Time 3	Overall support index	363	1	5	3.79	0.93
	Emotional support	363	1	5	3.77	0.98
	Tangible support	363	1	5	3.67	1.17
	Affection	362	1	5	4.00	1.12
	Positive interaction	362	1	5	3.80	1.12
Time 5	Overall support index	406	1.05	5	3.90	0.92
	Emotional support	406	1	5	3.88	0.97
	Tangible support	406	1	5	3.84	1.13
	Affection	406	1	5	4.07	1.09
	Positive interaction	405	1	5	3.89	1.09

Results

Hierarchical logistic regression analysis was conducted to address Research Question 1 and examine the association of social support and patient-provider communication towards medication adherence for both hypertensive African American men and women between the ages of 21–65 years in the United States, while controlling for the potential confounding effect of age, gender, marital status, education, employment, income, and insurance. Hierarchical logistic regression analysis was also conducted to determine whether there is a significant difference in the relationship between social support and patient-provider communication and adherence by age and

gender among hypertensive African Americans to address Research Questions 2 and 3, respectively. The data used for the dependent variable of medication adherence and the independent variable of social support were the data at Time 3, which is the period after 12 months follow-up from the baseline, were used in the hierarchical logistic regression analysis in order to determine if there was a significant difference in adherence. Although there were three time periods, analysis for period of Time 3 was selected to reduce the possibility of significant redundancy of results. A level of significance of 0.05 was used in the hierarchical logistic regression analysis. I concluded that there is a significant predictive relationship and difference in adherence to medication if the *p* value of the χ^2 test is less than or equal to the level of significance value. Binomial logistic regression analysis is conducted to address the three research questions since the dependent variable in each of the different research questions which was adherence to medication is a binary variable (Nonadherent versus Adherent). A binomial logistic regression predicts the probability that an observation falls into one of two categories of a dichotomous dependent variable based on one or more independent variables that can be either continuous or categorical. In addition, a hierarchical form of the logistic regression was used in order to controlling for the potential confounding effect of age, gender, marital status, education, employment, income, and insurance in all logistic regression models created.

Results of Hierarchical Logistic Regression Analysis for Research Question 1

Hierarchical logistic regression analysis was conducted to examine the association of social support and patient-provider communication towards medication adherence. I

performed this analysis while controlling for the potential confounding effect of age, gender, marital status, education, employment, income, and insurance. The results of the hierarchical logistic regression are shown in Table 8.

The results of the Hosmer-Lemeshow test showed that the model fit of hierarchical logistic regression was insignificant ($\chi^2(8) = 2.71$, $p = 0.95$), which indicated that the regression model for Model 2—which is the regression model in determining the predictive relationship of social support and patient-provider communication with medication adherence controlling for the potential confounding effect of age, gender, marital status, education, employment, income, and insurance—had an acceptable model fit. With the Hosmer-Lemeshow test, if $p > 0.05$, then the model has an acceptable fit. This means that the predictive relationship of social support and patient-provider communication with medication adherence after controlling for the potential confounding effect of age, gender, marital status, education, employment, income, and insurance was insignificant. The Cox and Snell R^2, or measure of effect size, of Model 2 of the hierarchical logistic regression model was 0.15, which indicated a low effect size, meaning that both the independent variables of social support and patient-provider communication explained a variance of only 15% to predict medication adherence after controlling for age, gender, marital status, education, employment, income, and insurance.

On the other hand, the Nagelkerke R^2 of Model 2 of the hierarchical logistic regression model was 0.20, which also indicated a low effect size, meaning that both the independent variables of social support and patient-provider communication explained a

variance of only 20% to predict medication adherence after controlling for age, gender, marital status, education, employment, income, and insurance. Table 7 illustrates the results of the classification table, which indicated that there was 82.4% of hypertensive African American samples that were nonadherent to the prescribed medication that were correctly predicted and there were 45.1% of hypertensive African American samples that were adherent to the prescribed medication. The overall accuracy of the prediction of the medication adherence was 67.1%.

My investigation of the individual predictive relationship in the hierarchical logistic regression model in Table 8 showed that only the patient-provider communication (*Wald* (1) = 4.43, $p = 0.04$) was significantly associated or have a significant predictive relationship with medication adherence after controlling for the potential confounding effect of age, gender, marital status, education, employment, income, and insurance. There was a significant predictive relationship because the p value was less than the level of significance value of 0.05. The examination of the coefficient of the odd ratio statistic of Exp(β) showed that the odds ratio of patient-provider communication was 1.72, which implied that a one-unit increase in patient-provider communication score increased the odds of the hypertensive African Americans to adhere to prescribed medication—versus not adhering to prescribed medication—by 0.72 or 72%.

In contrast, the overall support index (*Wald* (1) = 1.05, $p = 0.31$) was not significantly associated or have significant predictive relationships with medication adherence after controlling for the potential confounding effect of age, gender, marital

status, education, employment, income, and insurance. With these results of the hierarchical logistic regression analysis, the first null hypothesis—which states that there is no significant difference in adherence to medication between individuals with and without social support and patient-provider communication—was rejected. The alternative hypothesis—which states that there is a significant difference in adherence to medication between individuals with and without social support and patient-provider communication—was supported. A significant association was observed only between patient-provider communication and medication adherence.

Table 7

Classification Table of Hierarchical Logistic Regression Model for Adherence to Prescribed Medication Among Hypertensive African Americans

Observed		Predicted		
		Morisky medication adherence, at Time 3 (dichotomized)		Percentage Correct
		Nonadherent	Adherent	
Morisky medication adherence, at Time 3 (dichotomized)	Nonadherent	84	18	82.4
	Adherent	39	32	45.1
Overall Percentage				67.1

Table 8

Hierarchical Logistic Regression Results of Association of Social Support and Patient-Provider Communication with Adherence to Prescribed Medication Among Hypertensive African Americans Controlling for Age, Gender, Marital Status, Education, Employment, Income, and Insurance

Block	Variables	*B*	S.E.	Wald	*df*	*p*	Exp (B)
1	Sex (Female)	-0.72	0.40	3.26	1	0.07	0.49
	Age	0.06	0.02	6.12	1	0.01	1.06
	Marital status (Never Married): Reference Category			1.85	4	0.76	
	Marital status (Married)	-0.07	0.67	0.01	1	0.91	0.93
	Marital status (Divorced)	-0.06	0.72	0.01	1	0.94	0.94
	Marital status (Separated)	-0.63	0.76	0.69	1	0.41	0.53
	Marital status (Widowed)	-0.56	0.78	0.52	1	0.47	0.57
	Education (None): Reference Category			3.92	8	0.86	
	Education (Grades 8)	-20.27	28167.94	0.00	1	1.00	0.00
	Education (Grades 9)	-0.29	1.09	0.07	1	0.79	0.75
	Education (High School)	-0.65	0.96	0.45	1	0.50	0.52
	Education (Technical School)	-0.18	0.95	0.03	1	0.85	0.84
	Education (Some College)	-0.18	1.35	0.02	1	0.90	0.84
	Education (Associates)	0.26	0.96	0.07	1	0.79	1.30
	Education (Bachelors)	-1.00	1.66	0.36	1	0.55	0.37
	Education (Graduate School, Masters or above)	0.48	1.08	0.19	1	0.66	1.61
	Employment (Yes)	0.18	0.48	0.14	1	0.71	1.20
	Insurance: Private Insurance (Yes)	0.59	0.65	0.83	1	0.36	1.80
	Insurance: Medicare (Yes)	0.19	0.56	0.12	1	0.73	1.21
	Insurance: Medicaid (Yes)	0.53	0.52	1.05	1	0.31	1.71
	Insurance: HMO (Yes)	0.34	0.46	0.57	1	0.45	1.41
	Insurance: No insurance? (Yes)	-0.63	0.81	0.60	1	0.44	0.54
	Income	-0.06	0.20	0.10	1	0.75	0.94
	Constant	-3.37	2.54	1.76	1	0.18	0.03
2	Sex (Female)	-0.64	0.41	2.49	1	0.12	0.53
	Age	0.06	0.02	5.26	1	0.02	1.06
	Marital status (Never Married): Reference Category			2.01	4	0.73	

Table continues

Block	Variables	*B*	S.E.	Wald	*df*	*p*	Exp (B)
	Marital status (Married)	-0.14	0.70	0.04	1	0.84	0.87
	Marital status (Divorced)	-0.20	0.75	0.07	1	0.79	0.82
	Marital status (Separated)	-0.80	0.80	1.01	1	0.32	0.45
	Marital status (Widowed)	-0.59	0.81	0.53	1	0.47	0.56
	Education (None): Reference Category			5.04	8	0.75	
	Education (Grades 8)	-21.12	28397.57	0.00	1	1.00	0.00
	Education (Grades 9)	-0.83	1.16	0.51	1	0.48	0.44
	Education (High School)	-1.10	1.03	1.15	1	0.29	0.33
	Education (Technical School)	-0.70	1.02	0.47	1	0.49	0.50
	Education (Some College)	-0.55	1.43	0.15	1	0.70	0.58
	Education (Associates)	-0.14	1.02	0.02	1	0.89	0.87
	Education (Bachelors)	-1.74	1.70	1.06	1	0.30	0.18
	Education (Graduate School, Masters or above)	0.19	1.13	0.03	1	0.87	1.21
	Employment (Yes)	0.21	0.49	0.19	1	0.66	1.24
	Insurance: Private Insurance (Yes)	0.75	0.66	1.29	1	0.26	2.11
	Insurance: Medicare (Yes)	0.25	0.58	0.18	1	0.67	1.28
	Insurance: Medicaid (Yes)	0.56	0.54	1.08	1	0.30	1.76
	Insurance: HMO (Yes)	0.18	0.49	0.13	1	0.72	1.19
	Insurance: No insurance? Yes)	-0.81	0.85	0.93	1	0.34	0.44
	Income	-0.05	0.21	0.05	1	0.82	0.96
	Patient-Provider communication	0.54	0.26	4.43	1	0.04	1.72
	Overall support index at Time 3	0.21	0.20	1.05	1	0.31	1.23
	Constant	-4.62	2.63	3.08	1	0.08	0.01

Note. Hosmer-Lemeshow $X^2(8) = 2.71$, $p = 0.95$, Cox & Snell $R^2 = 0.15$, Nagelkerke $R^2 = 0.20$, $N = 173$

Results of Hierarchical Logistic Regression Analysis for Research Question 2

Hierarchical logistic regression analysis was also conducted to examine the association of social support and patient-provider communication with medication adherence by age among hypertensive African Americans controlling for the potential confounding effect of gender, marital status, education, employment, income, and insurance. The hierarchical logistic regression analysis was conducted to determine

whether there is a significant difference in the relationship between social support and patient-provider communication and adherence by age among hypertensive African Americans. I investigated the significance of the interaction effects of social support and age, as well as of patient-provider communication and age, on medication adherence. The results of the hierarchical logistic regression with age are shown in Table 10.

The results of the Hosmer-Lemeshow test showed that the model fit of hierarchical logistic regression was insignificant ($\chi^2(8) = 6.43$, $p = 0.60$), which indicated that the regression model for Model 2—which is the regression model in determining the association of social support and patient-provider communication with medication adherence by age controlling for the potential confounding effect of gender, marital status, education, employment, income, and insurance—had an acceptable model fit. This means that the association of social support and patient-provider communication with medication adherence by age among hypertensive African Americans after controlling for the potential confounding effect of gender, marital status, education, employment, income, and insurance was insignificant. The Cox and Snell R^2, or measure of effect size, of Model 2 of the hierarchical logistic regression model was 0.16, which indicated a low effect size, meaning that individual effects of the independent variables of social support, patient-provider communication, and age; and the interaction effects of overall social support and age; and patient-provider communication and age explained a variance of only 16% to predict medication adherence after controlling for gender, marital status, education, employment, income, and insurance.

On the other hand, the Nagelkerke R^2 of Model 2 of the hierarchical logistic regression model was 0.22, which also indicated a low effect size, meaning that the individual effects of the independent variables of social support, patient-provider communication, and age; and the interaction effects of overall social support and age; and patient-provider communication and age explained a variance of only 22% to predict medication adherence after controlling for gender, marital status, education, employment, income, and insurance. Table 9 showed the results of the classification table, which indicated that there was 76.5% of hypertensive African American samples that were nonadherent to the prescribed medication that were correctly predicted and there were 45.1% of hypertensive African American samples that were adherent to the prescribed medication when considering the interaction effect of age. The overall accuracy of the prediction of the medication adherence was 63.6% when considering the interaction effect of age.

My investigation of the individual predictive relationship in the hierarchical logistic regression model in Table 11 showed the individual effects of overall support index (*Wald*(1) = 2.27, $p = 0.13$), patient-provider communication (*Wald*(1) = 0.00, $p = 0.95$), and age (*Wald*(1) = 1.88, $p = 0.17$) were not significantly associated or do not have a significant predictive relationship with medication adherence after controlling for the potential confounding effect of gender, marital status, education, employment, income, and insurance. The results of the hierarchical logistic regression showed that medication adherence was not significantly different by the individual differences of age among hypertensive African Americans. Also, the interaction effects of overall social support

and age (*Wald*(1) = 1.87, *p* = 0.17) and patient-provider communication and age (*Wald*(1) = 0.14, *p* = 0.71) on medication adherence after controlling for the potential confounding effect of gender, marital status, education, employment, income, and insurance were insignificant. This means that there is no significant difference in the relationship between social support and patient-provider communication and medication adherence by age among hypertensive African Americans. The results were insignificant because the *p* values were all greater than the level of significance value. With these results of the hierarchical logistic regression analysis, the second null hypothesis—which states that there is no significant difference in the relationship between social support and patient-provider communication and adherence by age among hypertensive African Americans—was not rejected.

Table 9

Classification Table of Hierarchical Logistic Regression Model for Adherence to Prescribed Medication Among Hypertensive African Americans Considering Interaction Effect of Age

Observed		Predicted		
		Morisky medication adherence, at Time 3 (dichotomized)		Percentage Correct
		Nonadherent	Adherent	
Morisky medication adherence, at Time 3 (dichotomized)	Nonadherent	78	24	76.5
	Adherent	39	32	45.1
Overall Percentage				63.6

Table 10

Hierarchical Logistic Regression Results of Individual Association and Interaction Effects of Social Support, Patient-Provider Communication, and Age with Adherence to Prescribed Medication Among Hypertensive African Americans Controlling for Gender, Marital Status, Education, Employment, Income, and Insurance

Block	Variables	*B*	S.E.	Wald	*Df*	*p*	Exp (B)
1	Sex (Female)	-0.61	0.39	2.55	1	0.11	0.54
	Marital status (Never Married): Reference Category			1.18	4	0.88	
	Marital status (Married)	-0.30	0.65	0.22	1	0.64	0.74
	Marital status (Divorced)	-0.26	0.70	0.13	1	0.72	0.78
	Marital status (Separated)	-0.59	0.75	0.63	1	0.43	0.55
	Marital status (Widowed)	-0.67	0.77	0.76	1	0.38	0.51
	Education (None): Reference Category			3.65	8	0.89	
	Education (Grades 8)	-21.35	28280.87	0.00	1	1.00	0.00
	Education (Grades 9)	-0.28	1.08	0.07	1	0.79	0.75
	Education (High School)	-0.98	0.94	1.09	1	0.30	0.38
	Education (Technical School)	-0.58	0.92	0.39	1	0.53	0.56
	Education (Some College)	-0.64	1.30	0.24	1	0.62	0.53
	Education (Associates)	-0.23	0.92	0.06	1	0.80	0.79
	Education (Bachelors)	-1.28	1.61	0.63	1	0.43	0.28
	Education (Graduate School, Masters or above)	0.03	1.05	0.00	1	0.98	1.03
	Employment (Yes)	0.19	0.46	0.17	1	0.68	1.21
	Insurance: Private Insurance (Yes)	0.58	0.63	0.84	1	0.36	1.78
	Insurance: Medicare (Yes)	-0.10	0.54	0.03	1	0.86	0.91
	Insurance: Medicaid (Yes)	0.55	0.51	1.18	1	0.28	1.74
	Insurance: HMO (Yes)	0.33	0.45	0.55	1	0.46	1.39
	Insurance: No insurance? (Yes)	-0.68	0.80	0.73	1	0.39	0.51
	Income	-0.07	0.19	0.13	1	0.72	0.93
	Constant	0.47	1.95	0.06	1	0.81	1.60
2	Sex (Female)	-0.65	0.41	2.47	1	0.12	0.52
	Marital status (Never Married): Reference Category			1.91	4	0.75	
	Marital status (Married)	-0.15	0.70	0.05	1	0.83	0.86
	Marital status (Divorced)	-0.20	0.75	0.07	1	0.79	0.82
	Marital status (Separated)	-0.82	0.79	1.07	1	0.30	0.44

Table continues

Block	Variables	*B*	S.E.	Wald	*Df*	*p*	Exp (B)
	Marital status (Widowed)	-0.51	0.81	0.39	1	0.53	0.60
	Education (None): Reference Category			5.12	8	0.75	
	Education (Grades 8)	-21.59	28196.26	0.00	1	1.00	0.00
	Education (Grades 9)	-1.04	1.20	0.75	1	0.39	0.36
	Education (High School)	-1.31	1.07	1.49	1	0.22	0.27
	Education (Technical School)	-0.89	1.06	0.70	1	0.40	0.41
	Education (Some College)	-0.80	1.46	0.30	1	0.58	0.45
	Education (Associates)	-0.37	1.06	0.12	1	0.73	0.69
	Education (Bachelors)	-1.96	1.70	1.33	1	0.25	0.14
	Education (Graduate School, Masters or above)	-0.03	1.16	0.00	1	0.98	0.97
	Employment (Yes)	0.24	0.49	0.23	1	0.63	1.27
	Insurance: Private Insurance (Yes)	0.86	0.67	1.68	1	0.20	2.37
	Insurance: Medicare (Yes)	0.39	0.59	0.44	1	0.51	1.48
	Insurance: Medicaid (Yes)	0.71	0.56	1.61	1	0.21	2.04
	Insurance: HMO (Yes)	0.21	0.50	0.18	1	0.68	1.23
	Insurance: No insurance? (Yes)	-0.73	0.87	0.70	1	0.40	0.48
	Income	-0.05	0.21	0.05	1	0.82	0.95
	Patient-Provider communication	-0.12	1.83	0.00	1	0.95	0.89
	Overall support index at Time 3	1.92	1.27	2.27	1	0.13	6.80
	Age	0.15	0.11	1.88	1	0.17	1.16
	Patient-Provider communication * Age Category	0.01	0.03	0.14	1	0.71	1.01
	Overall support index at Time 3 * Age Category	-0.03	0.02	1.87	1	0.17	0.97
	Constant	-9.98	6.47	2.38	1	0.12	0.00

Note. Hosmer-Lemeshow $X^2(8) = 6.43$, $p = 0.60$, Cox & Snell $R^2 = 0.16$, Nagelkerke $R^2 = 0.22$, $N = 173$

Results of Hierarchical Logistic Regression Analysis for Research Question 3

Hierarchical logistic regression analysis was also conducted to examine the association of social support and patient-provider communication with medication adherence by gender among hypertensive African Americans controlling for the potential confounding effect of age, marital status, education, employment, income, and insurance.

The hierarchical logistic regression analysis was conducted to determine whether there is a significant difference in the relationship between social support and patient-provider communication and adherence by gender among hypertensive African Americans. I investigated the significance of the interaction effects of social support and gender; and patient-provider communication and gender on medication adherence. The results of the hierarchical logistic regression with gender are shown in Table 12.

The results of the Hosmer-Lemeshow test showed that the model fit of hierarchical logistic regression was insignificant ($\chi^2(8) = 8.31$, $p = 0.40$), which indicated that the regression model for Model 2—which is the regression model in determining the association of social support and patient-provider communication with medication adherence by gender controlling for the potential confounding effect of age, marital status, education, employment, income, and insurance—had an acceptable model fit. This means that the association of social support and patient-provider communication with medication adherence by gender among hypertensive African Americans after controlling for the potential confounding effect of age, marital status, education, employment, income, and insurance was insignificant. The Cox and Snell R^2, or measure of effect size, of Model 2 of the hierarchical logistic regression model was 0.15, which indicated a low effect size, meaning that individual effects of the independent variables of social support, patient-provider communication, and gender; and the interaction effects of overall social support and gender; and patient-provider communication and gender explained a variance of only 15% to predict medication adherence after controlling for age, marital status, education, employment, income, and insurance.

On the other hand, the Nagelkerke R^2 of Model 2 of the hierarchical logistic regression model was 0.20, which also indicated a low effect size, meaning that the individual effects of the independent variables of social support, patient-provider communication, and gender; and the interaction effects of overall social support and gender; and patient-provider communication and gender explained a variance of only 20% to predict medication adherence after controlling for age, marital status, education, employment, income, and insurance. Table 11 showed the results of the classification table, which indicated that there was 81.4% of hypertensive African American samples that were nonadherent to the prescribed medication that were correctly predicted and there were 46.5% of hypertensive African American samples that were adherent to the prescribed medication when considering the interaction effect of gender. The overall accuracy of the prediction of the medication adherence was 67.1% when considering the interaction effect of gender.

My investigation of the individual predictive relationship in the hierarchical logistic regression model in Table 12 showed the individual effects of overall support index (*Wald*(1) = 0.89, $p = 0.35$), patient-provider communication (*Wald*(1) = 0.75, $p = 0.39$), and gender (*Wald*(1) = 0.30, $p = 0.58$) were not significantly associated or do not have a significant predictive relationship with medication adherence after controlling for the potential confounding effect of age, marital status, education, employment, income, and insurance. The results of the hierarchical logistic regression showed that medication adherence was not significantly different by the individual differences of gender among hypertensive African Americans. Also, the interaction effects of overall social support

and gender (*Wald* (1) = 0.23, $p = 0.63$) and patient-provider communication and gender (*Wald*(1) = 0.10, $p = 0.75$) on medication adherence after controlling for the potential confounding effect of age, marital status, education, employment, income, and insurance were insignificant. This means that there is no significant difference in the relationship between social support and patient-provider communication and medication adherence by gender among hypertensive African Americans. The results were insignificant because the *p* values were all greater than the level of significance value. With these results of the hierarchical logistic regression analysis, the third null hypothesis—which states that there is no significant difference in the relationship between social support and patient-provider communication and adherence between hypertensive African American men and women—was not rejected.

Table 11

Classification Table of Hierarchical Logistic Regression Model for Adherence to Prescribed Medication Among Hypertensive African Americans Considering Interaction Effect of Gender

Observed		Predicted		
		Morisky medication adherence, at Time 3 (dichotomized)		Percentage Correct
		Nonadherent	Adherent	
Morisky medication adherence, at Time 3 (dichotomized)	Nonadherent	83	19	81.4
	Adherent	38	33	46.5
Overall Percentage				67.1

Table 12

Hierarchical Logistic Regression Results of Individual Association and Interaction Effects of Social Support, Patient-Provider Communication, and Gender with Adherence to Prescribed Medication Among Hypertensive African Americans Controlling for Age, Marital Status, Education, Employment, Income, and Insurance

Block	Variables	*B*	S.E.	Wald	*df*	*p*	Exp (B)
1	Age	0.05	0.02	5.42	1	0.02	1.06
	Marital status (Never Married): Reference Category			1.73	4	0.79	
	Marital status (Married)	-0.20	0.65	0.09	1	0.76	0.82
	Marital status (Divorced)	-0.30	0.70	0.19	1	0.67	0.74
	Marital status (Separated)	-0.72	0.74	0.94	1	0.33	0.49
	Marital status (Widowed)	-0.66	0.76	0.75	1	0.39	0.52
	Education (None): Reference Category			3.22	8	0.92	
	Education (Grades 8)	-20.41	27605.61	0.00	1	1.00	0.00
	Education (Grades 9)	-0.25	1.10	0.05	1	0.82	0.78
	Education (High School)	-0.55	0.97	0.33	1	0.57	0.58
	Education (Technical School)	-0.02	0.95	0.00	1	0.98	0.98
	Education (Some College)	0.02	1.33	0.00	1	0.99	1.02
	Education (Associates)	0.25	0.96	0.07	1	0.79	1.29
	Education (Bachelors)	-0.74	1.64	0.21	1	0.65	0.48
	Education (Graduate School, Masters or above)	0.45	1.09	0.17	1	0.68	1.57
	Employment (Yes)	0.24	0.47	0.26	1	0.61	1.27
	Insurance: Private Insurance (Yes)	0.52	0.63	0.68	1	0.41	1.68
	Insurance: Medicare (Yes)	0.26	0.55	0.22	1	0.64	1.29
	Insurance: Medicaid (Yes)	0.59	0.51	1.34	1	0.25	1.81
	Insurance: HMO (Yes)	0.27	0.45	0.36	1	0.55	1.31
	Insurance: No insurance? (Yes)	-0.70	0.81	0.75	1	0.39	0.50
	Income	-0.04	0.20	0.04	1	0.85	0.96
	Constant	-3.27	2.51	1.70	1	0.19	0.04
2	Age	0.06	0.02	5.20	1	0.02	1.06
	Marital status (Never Married): Reference Category			1.94	4	0.75	
	Marital status (Married)	-0.16	0.70	0.05	1	0.82	0.85
	Marital status (Divorced)	-0.20	0.75	0.07	1	0.79	0.82

Table continues

Block	Variables	*B*	S.E.	Wald	*df*	*p*	Exp (B)
	Marital status (Separated)	-0.79	0.80	0.98	1	0.32	0.45
	Marital status (Widowed)	-0.62	0.81	0.59	1	0.44	0.54
	Education (None): Reference Category			5.13	8	0.74	
	Education (Grades 8)	-21.01	28389.48	0.00	1	1.00	0.00
	Education (Grades 9)	-0.80	1.17	0.47	1	0.50	0.45
	Education (High School)	-1.05	1.06	0.98	1	0.32	0.35
	Education (Technical School)	-0.63	1.04	0.37	1	0.54	0.53
	Education (Some College)	-0.47	1.44	0.11	1	0.74	0.62
	Education (Associates)	-0.02	1.05	0.00	1	0.98	0.98
	Education (Bachelors)	-1.61	1.71	0.88	1	0.35	0.20
	Education (Graduate School, Masters or above)	0.28	1.15	0.06	1	0.81	1.32
	Employment (Yes)	0.21	0.49	0.19	1	0.66	1.24
	Insurance: Private Insurance (Yes)	0.73	0.67	1.20	1	0.27	2.07
	Insurance: Medicare (Yes)	0.20	0.59	0.12	1	0.73	1.23
	Insurance: Medicaid (Yes)	0.55	0.55	1.03	1	0.31	1.74
	Insurance: HMO (Yes)	0.15	0.49	0.09	1	0.76	1.16
	Insurance: No insurance? (Yes)	-0.82	0.85	0.94	1	0.33	0.44
	Income	-0.05	0.21	0.05	1	0.82	0.96
	Patient-Provider communication	0.41	0.48	0.75	1	0.39	1.51
	Overall support index at Time 3	0.37	0.39	0.89	1	0.35	1.44
	Gender	-1.05	1.91	0.30	1	0.58	0.35
	Patient-Provider communication * Gender Category	0.18	0.56	0.10	1	0.75	1.20
	Overall support index at Time 3 * Gender Category	-0.22	0.45	0.23	1	0.63	0.80
	Constant	-4.49	2.73	2.71	1	0.10	0.01

Note. Hosmer-Lemeshow $X^2(8) = 8.31$, $p = 0.40$, Cox & Snell $R^2 = 0.15$, Nagelkerke $R^2 = 0.20$, $N = 173$

Summary

The purpose of this quantitative cross-sectional study was to examine the association of social support and patient-provider communication towards medication adherence for both hypertensive African American men and women between the ages of

21–65 years in the United States. Descriptive statistics analysis and hierarchical logistic regression analysis were conducted to test the research questions and hypotheses posed in this study. The results of the hierarchical logistic regression analysis for Research Question 1 showed that the patient-provider communication was significantly associated or have a significant predictive relationship with medication adherence of hypertensive African Americans after controlling for the potential confounding effect of age, gender, marital status, education, employment, income, and insurance. Specifically, a higher quality of patient-provider communication score would results to a higher odds or probability of the hypertensive African Americans to adhere to prescribed medication versus not adhering to prescribed medication. The results of the hierarchical logistic regression analysis for Research Question 2 showed that there is no significant difference in the relationship between social support and patient-provider communication and adherence by age among hypertensive African Americans after controlling for the potential confounding effect of gender, marital status, education, employment, income, and insurance. The results of the hierarchical logistic regression analysis for Research Question 3 showed that there is no significant difference in the relationship between social support and patient-provider communication and adherence between hypertensive African American men and women after controlling for the potential confounding effect of age, marital status, education, employment, income, and insurance. In Section 4, I will review the findings from the study, explain how they relate to the literature on this topic, suggest implications for action, and provide recommendations for future research.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

Previous researchers have demonstrated the importance of medication adherence of hypertensive patients for health improvement (Hill et al., 2011; Zullig et al., 2013). The literature on the relationship of social support and patient-provider communication and medication adherence among African Americans with hypertension, however, is still lacking (Cornwell & Waite, 2012; Lewis et al., 2012). Therefore, the purpose of this quantitative cross-sectional study was to investigate the association between social support and patient-provider communication towards medication adherence for both hypertensive African American men and women between the ages of 21 and 65 years in the United States. In this study, I used social support and patient-provider communication as the independent variables, while adherence to high blood pressure was the dependent variable.

I used descriptive and hierarchal logistic regression model analyses to analyze data from a total of 566 hypertensive African Americans. The first independent variable was social support, which I defined as support perceived or received from family, friends, health providers, faith and community organizations, and social networking groups or programs that specifically help hypertensive individuals. The second independent variable was patient-provider communication, which was defined as the patients' perception of the provider and clarity of advice given to them. The dependent variable was adherence to high blood pressure medication, which I defined as how well and consistently a patient follows recommended treatment and the plan developed by his or

her healthcare provider. The control variables were gender, age, income, education, employment, insurance status, and place of residence. The length of time in treatment, number of medications, and the severity of hypertension were also used as control variables. The following research questions and hypotheses were used to guide the study:

Research Question 1: Are social support and patient-provider communication associated with hypertensive African Americans self-reported medication adherence?

$H_0$1: There is no significant difference in adherence to medication between individuals with and without social support and patient-provider communication.

$H_1$1: There is a significant difference in adherence to medication between individuals with and without social support and patient-provider communication.

Research Question 2: What is the association between social support and patient-provider communication by age among hypertensive African Americans?

$H_0$2: There is no significant difference in the relationship between social support and patient-provider communication and adherence by age among hypertensive African Americans.

$H_1$2: There is a significant difference in the relationship between social support and patient-provider communication and adherence by age among hypertensive African Americans.

Research Question 3: What is the association between social support and patient-provider communication among hypertensive African American men and women?

$H_0$3: There is no significant difference in adherence to medication between hypertensive African American men and women with or without patient-provider communication and social support.

$H_1$3: There is a significant difference in adherence to medication between hypertensive African American men and women with or without patient-provider communication and social support.

The results of the analyses showed that among the three research questions, only Research Question 1 indicated significant results. In particular, I found that patient-provider communication is a positive and significant predictor of medication adherence of African Americans with hypertension. Social support, however, was not found to significantly predict medication adherence. There was also no significant difference in medication adherence based on age and gender. The results of this study revealed the explicit relationships between social support, patient-provider communication, and medication adherence in the context of African Americans with hypertension in the United States.

It is especially important for researchers to understand the dynamics of patients and providers and the former's commitment to improve their health. The results of this study provide additional context regarding factors that influence medication adherence and overall healthcare experiences of African Americans with hypertension. In this section, I will discuss the results of this study in light of the existing literature on African

American with hypertension and their health-seeking behaviors as well as the influence of social support, patient-provider communication, and other factors on medication adherence.

Interpretation of Findings

In this section, I will interpret the results based on the existing related studies on the role of support and patient-provider communication on medication adherence of African Americans with hypertension. Hypertension is a chronic disease that greatly affects the quality of life of individuals (Bokhour et al., 2016). Scholars have reported that 45% of African American men and 46% of African American women have hypertension, in comparison to 34% of European American men and 31% of European American women (CDC, 2016; Pettey et al., 2016).

To answer the first research question, I focused on the relationship of social support and patient-provider communication and their association with African American self-reports of medication adherence. To answer the second research question, I determined the association between social support and patient-provider communication among African Americans with hypertension based on their age. To answer the third and last research question, I tackled the relationship between medication adherence and social support and patient-provider communication among hypertensive African American men and women.

Social Support, Patient-Provider Communication, and Medication Adherence

Drawing from previous literature on the influence of both social support and patient-provider communication (Levinson et al., 2010; Schoenthaler et al., 2009), I

hypothesized that there would be a significant difference in adherence to medication between individuals with and without social support and patient-provider communication. The results of the hierarchal logistic regression analysis for Research Question 1 showed that only patient-provider communication had a significant predictive relationship with medication adherence. Social support was not found to be a significant predictor of medication adherence. The positive finding on patient-provider communication as a predictive variable of medication adherence lends further support to the conclusions of Levinson et al. (2010) and Schoenthaler et al. (2009), who demonstrated that the multidimensional role of patient-provider communication has a large impact on patients' willingness to adhere to medication. The open communication between the patient and provider allows the former to express their thoughts and feelings about their health, treatment, and lifestyle choices (Braverman & Dedier, 2009). This increases the trust between the patient and the provider and was found to be an effective means to encourage patients with chronic diseases to be more responsible with regards to their health (Martin et al., 2011).

This significant predictive role of patient-provider communication on medication adherence among African Americans with hypertension provides further evidence on the lived experiences of hypertensive African Americans. In another study, Martin et al. (2011) concluded that lower levels of trust in health providers are also associated with lower patient satisfaction and treatment adherence among racial minority populations, including African Americans. This may be the reason why African Americans are less likely to seek or receive needed health services, procedures, or routine treatments for

hypertension in comparison to European Americans (Martin et al., 2011). The poor quality of relationships between patients and provider is a barrier in improving healthcare among ethnic minority groups. Based on the results of this study, the same could be said concerning the situation of African Americans with hypertension. The distrust towards providers has become a barrier that prevents African Americans from demonstrating positive health-seeking behaviors (Abel & Efird, 2013).

On the other hand, the nonsignificant result of the relationship between social support and medication adherence is incongruent to the findings of Nurullah (2012), who showed that social support is vital in promoting better health outcomes and improving chronic diseases, such as hypertension. According to the TRA, attitudes can be based on multiple factors, including past experiences, social support, health education and literacy, or the environment (Glanz et al., 2015). TRA also states that individual motivational factors influence the likelihood of performing a specific behavior (Hackman & Knowlden, 2014). In this case, I hypothesized that social support could be a significant predictor variable of medication adherence. As such, the nonsignificant findings could be cleared by looking into the social support experiences of African Americans with hypertension or chronic diseases. Research on this topic is scarce; however, lack of social support is considered a large barrier on medication adherence among African Americans with chronic diseases (Rimando, 2013). It is possible that the types of social support used in the present study were not comprehensive enough in capturing the experiences of African Americans with hypertension. This could have also been a result of the methodology used in this study. In any case, the disparity between the nonsignificant

findings of this study on the predictor role of social support on medication adherence in the context of African Americans with hypertension must be investigated further.

Medication Adherence Based on Age and Gender

To answer the second research question, I explored the association between social support and patient-provider communication by age among hypertensive African Americans, while in the third research question, I examined the role of gender on the medication adherence behaviors of African Americans with or without patient-provider communication and social support. I hypothesized (a) that there would be a significant difference between old and young African Americans with hypertension in terms of social support and patient-provider communication and (b) that there would be greater adherence to treatment for African American women compared to men with higher patient-provider communication and social support. These two research questions focused on the presence of disparity, if any, by age and gender, respectively.

The results were nonsignificant for both research questions. Rates of uncontrolled hypertension were found to be higher for African American older adults (Cornwell & Waite, 2012). The results of Research Question 2—that medication adherence is not significantly different between old and young African American—proved that in terms of social support and patient-provider communication, the experiences of both old and young African Americans are similar. In fact, this result substantiated previous scholars' conclusions that age does not predict or influence medication adherence for hypertension patients. For instance, Nair et al. (2011) posited that difference in age did not appear to be

a reliable measure of influence of medication adherence among young and old African Americans with hypertension.

Lewis (2012) further demonstrated that several studies did not show a significant relationship between social support and medication adherence. This may be related to attitudes towards medication adherence. Patients' beliefs and attitudes towards medication have been shown to be important drivers for adherence and disease outcomes in adults (Martin et al., 2011). The nonsignificant result in this study was incongruent to the results of Lewis (2012) who concluded that it is important for African American men to have a collaborative relationship with their healthcare provider, which also had a significant positive influence on their adherence to recommended medications. This researcher also showed that there is no association between gender and medication adherence (Lewis, 2012).

In the case of African American men and women, I found that there was no significant difference between the social support and patient-provider communication between the two groups. This result was incongruent to those of Ashaye and Giles (2003), who demonstrated that African American women tend to have a greater awareness of their condition and are quicker to seek treatment, leading to better blood pressure control rates. In addition, Lewis et al. (2012) posited that higher rates of medication nonadherence existed for African American men even in environments with equal access to care regardless race or socioeconomic status. Despite these previous findings, the nonsignificant result in this study reflected the notion that there is no association between gender and medication adherence (see Lewis, 2012). The disparity in

literature on the role of gender on medication adherence must be comprehensively researched to provide a consensus for the benefit of researchers and practitioners.

To summarize the interpretation of the findings, in the present study, I provided support to the notion that patient-provider communication is a predictive variable of medication adherence of African Americans with hypertension. This offers additional support to the vital role of trust between patient and provider, especially among minorities such as African Americans. This entails not only providing more opportunities for firsthand experiential exercises or practicum experiences, but also ensuring that the skills development programs deliver quality results for the providers. The nonsignificant result concerning the role of social support must also be studied further. In addition, I noted that despite the nonsignificant result, age and gender are critical aspects of medication adherence that must also be studied.

Limitations of the Study

Despite the significant result, it is important to discuss the findings based on the limitations that arose throughout the research. One major theoretical limitation in understanding the results of the present study was the scarcity of recent research focusing on the relationships of social support, patient-provider communication, and medication adherence among African Americans with hypertension in the United States. Because of this, it has been challenging to draw out social psychological and cognitive processes that occur in this context. Instead, I was only able to identify the explicit relationships and differences between the independent variables. This can be attributed to the quantitative nature of the study. Quantitative investigators focus on numbers and analysis to draw

conclusions about relationships of measured variables. While one of the advantages of using quantitative methods in the study is that the method can manage data from a large number of samples, it does not provide insight on underlying theories and processes of a relationship. Thus, future researchers may select qualitative methods to address this limitation. This can also help researchers contextualize the disparities in results.

Another limitation can be attributed to the operationalization of variables, specifically the scales of measure for the independent variables of social support and patient-provider communication. Nominal scale was used for these independent variables, which could not account for other aspects such as length of experience, quality of experience, amount of time spent in the treatment. This could have limited insights and interpretation on the specific dimensions of each variable and how these can invariably affect the self-reported medication adherence of the participants. It is important for future researchers to differentiate different types of social support and various dimensions of patient-provider communication to further nuance the relationships among the variables.

The sampling method could also be a source of limitation of the study. A total of 493 samples were removed because they did not satisfy the criteria. The use of samples whose age range from 21 to 65 years old could have limited the analysis in terms of data saturation. In addition, the use of an age range of 21 to 65 years old as a criterion could restricted the insights from that could be derived from the data pool. Future researchers may take note of these sampling limitations and select sampling criteria that are not as prohibitive.

To summarize, three major limitations were seen in the present study. The first limitation was the lack of research on the specific dimensions of these variables and how they could influence the willingness of African Americans with hypertension to stay committed to a medication. This impeded the contextualization of the results in the broader literature on healthcare of racial minorities. The second limitation referred to the methodology in which nominal scales were used for the independent variables. This limited the possible in-depth distinction of the influence of social support and patient-provider communication on medication adherence. The third limitation focused more on the methodology, particularly the sampling method used, which could have hindered in-depth interpretation of the results due to the removal of samples. In the next subsection, I will provide a set of recommendations for future research.

Recommendations

Based on the findings of the study, I recommend that future researchers build upon the results of this study and conduct studies that analyze specific aspects of each variable that are related to increased medication adherence in general and in the context of African Americans with hypertension. For practitioners, it would be interesting to determine whether family support pushes hypertensive African Americans to seek medication and stay committed to it, or if peer support is more important. Another important angle to work on is the quality of relationship between patient and provider—that is, whether the level of trust between the two parties could have a significant result on the medication adherence of patients. This could provide a more nuanced

understanding of medication programs and their impact on the patients' perceptions and adherence to medication.

Another important area to investigate is the perception of patients on the level of social support and quality of relationship that they have with their provider. Misperceptions and a lack of understanding of the causes and treatment greatly influence medication adherence as well (Buis et al., 2014). Thus, it is imperative for African Americans diagnosed with hypertension to adhere to treatment to help lower the burden of heart disease morbidity and mortality and improve their blood pressure control. It is also important for healthcare providers to understand the culture of African Americans, and tailor treatment based on the particular needs of the patient (Brown, 2015). Their perceptions of these could essentially influence their willingness to adhere to their medication. Future researchers could investigate this topic by utilizing a qualitative study. Such type emphasizes how patients perceive their experiences, and these experiences could affect self-regulatory processes of the patients. Likewise, it would be beneficial for future researchers to explore the perception of providers on the different factors that affect their patients' medication adherence. This could provide comprehensive data on the relationship among social support, patient-provider communication, and medication adherence.

To summarize, two important recommendations were discussed: (a) it is important to further analyze the different aspects of each variable and their association with medication adherence, and (b) it is critical for future researchers to exhaust every method possible to understand the perceptions of both patients and providers in the

context of hypertension and chronic diseases among ethnic minorities. These investigations would not only provide additional data but could also improve future researchers' nuanced understanding of the different factors that affect the medication adherence of African Americans. In the next section, I will discuss the implications of the results for professional practice and social change.

Implications for Professional Practice and Social Change

The present study revealed the explicit relationships among social support, patient-provider communication, and medication adherence in the context of African Americans with hypertension in the United States. Specifically, the results showed that patient-provider communication is a significant predictor of medication adherence among hypertensive African Americans. This is important especially for researchers to understand the dynamics of patients and providers and the former's commitment to improve their health. The results provide additional context regarding factors that influence medication adherence and overall healthcare experiences of African Americans with hypertension. This also entails practical and social implications, which could possibly contribute to the development of medication programs considering the effectiveness of patient-provider communication in ensuring the patients' medication adherence.

Implications for Professional Practice

Providers are essentially tasked to ensure that the patients trust them enough so that the latter would adhere to medication. Trust in a provider is synonymous with adherence to treatment. Patient-provider communication is one way to establish trust and

encourage individuals to become more involved in decisions regarding their health (Martin et al., 2011). The results of the study have shown that providers are extremely influential on the patients' commitment to medication. As such, it is important for providers to hone their communication skills in order to build more effective, trust-based relationships with patients. Central to this relationship is the role of experience. Future researchers can use the knowledge from this study to develop models that explain underlying psychological and social processes in the context of medication adherence among African Americans with hypertension. The findings of the present study contributed to the theoretical knowledge on the relationships among social support, patient-provider communication, and medication adherence. The findings may help substantiate and develop a model that could encompass the different factors that affect medication adherence of hypertensive patients.

Educational and organizational leaders may apply the insights from this study to create and maintain programs that develop the communication skills of providers through providing opportunities for intensive on-the-job experiences and training. This is critical in ensuring that counselor-in-training will have the chance to apply their knowledge into practice, while at the same time, increasing their self-efficacy in performing job responsibilities. Educational and organizational leaders are responsible in developing policies that highlight the accessibility of medication especially for ethnic minorities such as African Americans.

Implications for Social Change

The findings in this study may contribute to positive social change, especially considering the importance of developing providers' skills in communication to provide additional support for hypertensive patients. Previous researchers have suggested that African Americans are less likely to seek or receive needed health services, procedures, or routine treatments for hypertension in comparison to White Americans (Martin et al., 2011). This conclusion was also reflected in the results of this study, in which social support was not considered a factor in medication adherence of African Americans with hypertension. Additionally, patients who engage in decision-making with their healthcare provider are not only more likely to be satisfied with the quality of care but are also likely to adhere to recommended treatment (Aseltine et al., 2016; Schoenthaler et al., 2009). I found that the relationship between patient and provider is foundational to ensure medication adherence among hypertensive African Americans.

This knowledge can be a foundation for policy changes that highlight the role of provider to provide opportunities for patients to fully understand and appreciate the importance of medication in improving one's quality of life. This entails not only providing more opportunities for firsthand experiential exercises or practicum experiences, but also ensuring that the skills development programs deliver quality results for the providers. Additionally, in terms of policies, these results support the need to reexamine current policies and government programs that focus on the accessibility of medication for ethnic minorities with chronic diseases. Given the significant role of the provider, policymakers must revisit current laws and policies on health and well-being to

ensure that these address the contemporary challenges of racial minority groups with chronic illnesses. Lastly, the findings of this study demonstrate that improvements in patient-provider communication and social support can help create social change in African Americans' attitudes towards self-management of their health behaviors and reduce patient isolation in dealing with chronic illnesses including hypertension.

Conclusion

A lack of effective health provider response to uncontrolled blood pressure and insufficient patient adherence to treatment recommendations create a problem for hypertensive individuals to maintain their blood pressure. Thus, the purpose of this quantitative study was to examine the association of social support and patient-provider communication towards medication adherence for both hypertensive African American men and women between the ages of 21–65 years in the United States. The results of the analyses showed that among the three research questions, only Research Question 1 indicated significant results. I found that patient-provider communication is a positive and significant predictor of medication adherence of African Americans with hypertension.

Social support, however, was not found to significantly predict medication adherence. There was also no significant difference on medication adherence by age and gender. It is critical for researchers to understand the dynamics of patients and providers and the former's commitment to improve their health. The results of this study provide additional context regarding factors that influence medication adherence and overall healthcare experiences of African Americans with hypertension. Thus, I recommend that

future scholars focus on a nuanced understanding on the different factors that affect the medication adherence of African Americans. Policies and skills development programs must be further enhanced in order to support the critical role of providers in ensuring medication adherence among African American patients with hypertension.

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Appendix: Permission to Use CAATCH Study Data set from NYU

(a) CHBC Manuscript Proposal Form

Date of Submission: 06/08/18 Date of Approval: 06/29/18

PART I. OUTLINE OF PAPER

1. Title Information

a. Proposal Title: *The Association of Social Support and Patient-Provider Communication on Medication Adherence in Hypertensive African Americans*

b. Suggested key words: Hypertension, African Americans, social support, medication adherence, patient-provider communication

2. Lead Author Name: LaQuasha Gaddis

Institutional Affiliation**: Walden University**

Address: XXXXXXXX

Telephone: XXXXXXXX

Email: XXXXXXXX

3. Co-authors, Contact Information, and Responsibilities: N/A (Proposed co-authors,
Email address and/or telephone numbers and proposed responsibilities. Examples of responsibilities include design and concept of study, statistical analysis, data acquisition, methodological expertise, funding acquisition, literature review. Also indicate specific writing assignments including: introduction methods, results, discussion, preparation of tables and figures. Items not assigned to a co-author are assumed to be the responsibility of the lead author. Corresponding author should also be identified if it is not to be the lead author).

Name	Contact Information	Responsibilities
Antoinette Schoenthaler	**XXXXXXXX**	**Senior Author.** Interpretation of data, critical revision of the manuscript

Ego R. Onyejekwe	**XXXXXXXX**	Design and concept of study, interpretation of data, drafting of the manuscript
Kelley C. Sams	**XXXXXXXX**	Design and concept of study, interpretation of data, drafting of the manuscript
Mark Butler	**XXXXXXXX**	Design and concept of study, data analysis, interpretation of data, drafting of the manuscript
Gbenga Ogedegbe	**XXXXXXXX**	Interpretation of data, critical revision of the manuscript

PART II. AUTHOR CONTRIBUTIONS

10. Have all co-authors reviewed and approved this document? _X_ Yes (Signatures required)

PART III. ADDITIONAL INFORMATION

11. Type of Study:

____ Full Cohort _ Case Control _**X**_Other (list): Quantitative analysis (secondary data)

12. Type of Data:

____ Longitudinal _**X**_Cross-Sectional _ Other (list):

13. Location of Statistical Analysis:

___ NYU
___ Local (list site):
__X__ Other (specify): Walden University

14. Conflict of Interest:

a. Are these analyses to involve a for-profit corporation? _____Yes __**X**__No

If Yes, explain:

Additional Information

1. **Do you need help with analyzing the data:** ☒Yes ☐No

   If Yes, preferred analyst: __No preference_____

2. **Is Presentation at a Professional Meeting Anticipated:** ☐Yes ☒No

   If Yes, meeting title: _____Date: _____

3. **Name of Target Journals for Submission (top 3): Proquest/UMI**

4. **Timetable for completion of first draft: I would like to complete my DrPH dissertation by the end of the Winter Quarter 2018_____**

Conditions

Data from the CHBC's projects are being provided to collaborators to promote clinical and scientific understanding. The data are to be used only for the analyses approved by the CHBC's ***Study Oversight Committee (****CHBC's Statisticians, Project's PIs). By submitting a concept sheet, you agree to* ***1) gain approval from the CHBC for all concepts, data analyses, professional presentations and publications resulting from CHBC's data, 2) abide by specified authorship guidelines 3) agree to submit a copy of the syntax and output of your analyses to be verified by CHBC's statisticians prior to publication, 4) and agree to have the manuscript removed from you if you fail to abide by the established deadline for manuscript completion.***

Author's Signature--------- *LaQuasha Gaddis* ***----------***

CHBC's Representative-----  ***----------***