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Currently in the US, there is a discrepancy between the adult populations' literacy levels necessary to understand and adhere to healthcare instructions. A major goal of the Department of Health and Human Services Healthy People 2010 initiatives is to improve the communication (health literacy) of those with inadequate or marginal levels. Health literacy is defined as the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions. African Americans (AAs) ages 50 years and older with inadequate health literacy skills are subject to have higher rates of non-adherence to their medical regimens. Large numbers of AAs living in the United States are disproportionately affected by hypertension (HTN) and the burdens of associated complications. The purpose of this study was to describe the association of health literacy levels and adherence to antihypertensive regimens in AA adults aged 50 years and older. Green and Kreuter's (2005) Precede-Proceed Model (PPM) was used as a framework for this study. PPM accentuates the connection among health and social issues, pre-planning, culturally sensitive psychosocial barriers, population significance, and evaluation. A descriptive correlational design was used for 121 AAs ages 50 years and older who had been diagnosed with HTN and prescribed antihypertensive regimens (such as medication and dietary restrictions). Health literacy was measured utilizing the REALM and adherence was measured using the HBCS. Results of the study showed that the majority of the participants were not able to adequately understand healthcare information and were

functioning with inadequate health literacy levels. Regression analysis showed that age and health status significantly predicted adherence to antihypertensive regimen, indicating that those who were younger and reported 'poor' or 'fair' health status were more likely to not adhere to their antihypertensive regimen.

HEALTH LITERACY AND ADHERENCE TO ANTIHYPERTENSIVE REGIMENS
IN AFRICAN AMERICANS AGES 50 AND OLDER

by

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To My Lord and Savior who gave me the strength to endure this educational experience, I say “Thank You.” To my husband Chinno Ingram Sr. I love you so much and thank God for you and all of the love, prayers, encouragement and support you had for me during this entire process. To my beautiful children: Mike, Celessia, Regina, CJ, and Ben, thank you for your patience, love and support. To my friend Dr. Dionne Roberts, thank you for your listening ear and the hours of discussion, prayers and tear shedding that encouraged me to keep going. To my dissertation chair Dr. Ivanov who’s persistence and dedication to my success represents the belief that ‘all can do if given the resources and opportunity. To my church family and my WSSU colleagues, thank you for your many prayers, and support. I dedicate this dissertation and the fruits of my future scholarly endeavors to all of you.

APPROVAL PAGE

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CHAPTER I

BACKGROUND

Introduction

Large numbers of African Americans (AAs) living in the US are disproportionately affected by hypertension (HTN) and the burdens of associated complications are more severe in this population (Douglas, Ferdinand, Bakris, & Sowers, 2002; Hajjar, Kotchen & Kotchen, 2006; Hekler et al., 2008; Peters, 2004; US Department of Health and Human Services (USDHHS, 2000). Simultaneously, the prevalence of hypertension is far greater in AAs than Whites residing in the United States (American Heart Association (AHA), 2010; Douglas et al., 2002; Hajjar et al., 2006; Schneider et al., 2001; Szromba, 2000; USDHHS, 2000). High levels of non-adherence to antihypertensive regimens in African American (AA) populations create major obstacles for both health care professionals and AA populations as it relates to health care treatment (Krousel-Wood, Thomas, Munter, & Morisky, 2004; Schneider et al., 2001). Adherence as a concept focuses on a person's ability as well as their willingness to abide by a prescribed regimen (Krousel-Wood et al., 2004). Factors associated with adherence to antihypertensive regimens include demographic characteristics, side effects associated with medication(s), complex medication regimens, quality of life, knowledge, awareness, beliefs, and attitudes, depression, and health care system issues (Krousel-Wood et al., 2004). Equally important to the issue of poor adherence to antihypertensive regimens is

low levels of education among AAs (AHA, 2010; Douglas et al., 2002; USDHHS, 2000). Generally speaking, low levels of education tend to generate low health literacy levels. According to Cutilli (2005), AAs had lower levels of health literacy when compared to Caucasians. Moreover, low health literacy levels in AAs have been more prevalent in those ages 50 and older (Cutilli, 2005). Clients with inadequate health literacy skills are subject to have higher rates of non-adherence to their medical regimens (Safeer & Keenan, 2005). Additionally, poor adherence to antihypertensive regimens related to low levels of education is another obstacle for AAs (Douglas et al., 2002). New information continues to evolve concerning adherence and effective treatment for AAs with HTN, yet high rates related to non-adherence and health disparities still exist (Safeer & Keenan, 2005; Wolf, Gazmararian & Baker, 2007). According to Krousel-Wood et al. (2004), non-adherence to prescribed antihypertensive medications and regimens contributes highly to poorly controlled hypertension. In addition to issues associated with non-adherence to antihypertensive regimens, older adults experience health care deficits associated with low levels of health literacy (Greenberg, 2001; Sudore et al., 2006; USDHHS, 2000). Consequently, health literacy is associated with adherence to medical regimens (Wolf et al., 2007), which includes antihypertensive regimens.

Background of the Problem

The *National Association of Adult Literacy (NAAL) of 1992* found that adults with low levels of literacy were older, had lower levels of education, lower paying jobs, a low socioeconomic status (SES), and were ethnic or racial minorities (National Center for Education Statistics (NCES, 2003b). AAs may not be able to access necessary

information related to HTN which potentially influences their adherence to antihypertensive medication regimens (Bosworth, 2008; Byrd, Fletcher, & Menifield, 2007; Schoenberg, 1997). Compliance to prescribed medical regimens may be affected by decreased comprehension of their condition related to a low educational status (Byrd et al., 2007). Access and comprehension deficits further result in AA elders with low literacy levels not participating in their health care and treatment plans and as a result not adhering to their antihypertensive regimens (Byrd et al., 2007).

The Agency for Healthcare Research and Quality (AHRQ, 2007) found that persons with low health literacy levels are 12 to 18 times more likely to lack the ability to comply with their health care regimens. These statistics are far greater in poor elderly minorities (AHRQ, 2007) and may be partially responsible for health care disparities within these groups. More specifically, findings from a foundational research study by Dressler (1996) pertaining to AAs and factors contributing to HTN, found that AAs with low levels of education had high prevalence rates of HTN. Finally, a systematic literature review conducted by Paasche-Orlow, Parker, Gazmarian, Nielsen-Bohlman, and Rudd (2005) concluded that low levels of health literacy are more prevalent in minorities, those with lower levels of education, and persons who are of older age. Paasche-Orlow et al. (2005) also concluded that AAs had higher rates of low literacy when compared to other minorities, suggesting an association between race and health literacy, and thus advising health care professionals to incorporate health literacy efforts into health care practice to address related health care disparities.

The Civil Rights Act of 1964, Public Law 88-352, (pages 241-268) which protected the constitutional rights of people of color, is one of the major political factors affecting healthcare and education for AAs (Department of Justice, 2000). Prior to this Act, AAs had limited rights in the US. During this time, ‘people of color’ were referred to as AA or Black. The Civil Rights Act made it possible for AAs to receive an education equivalent to their White counterparts and to receive adequate healthcare services as it prevents discrimination based on color, race, or national origin. Prior to this act, AAs were not able to seek healthcare in public hospitals and especially not private hospitals (Thomson, 1997). Instead, AAs could only go to hospitals that served ‘Colored’ people which often did not have the facilities and resources that the ‘White’ hospitals had, leading to ineffective or low quality healthcare services (Thomson, 1997). Furthermore, education was an issue affecting AAs, and thus an additional component of the Civil Rights Act. More specifically, AAs were denied the right of an education which interfered with their ability to receive employment opportunities that required their having a certain level of education. This was detrimental due to the separation of hospitals and other healthcare services based on race, color, or religion. Consequently, limited levels of education interfered with the healthcare education of AA healthcare professionals which was necessary for the provision of quality care to the AA population (Department of Justice, 2000).

The history of AAs and lower educational levels stems from slavery and AAs undergoing severe punishment if they could read or write. This historical occurrence significantly adds to the increasing percentage of AAs with low levels of education and

having limited English proficiency. The limitations are not necessarily associated with lack of intelligence, but are historically associated with the decreased ability of AAs to obtain an education and thus articulate and comprehend the English language. This educational limitation continues to affect AAs over generations. Simply stated, if a parent(s) or guardian(s) lacks the ability to articulate and comprehend the English language, then it is typically difficult for them to assist their children or those to whom they provide educational assistance. This issue generally surfaces during healthcare encounters when healthcare professionals use complex language or medical terms while explaining and providing healthcare services. Consequently, language barriers often exist between AAs and healthcare providers, potentially contributing to health disparities within this population.

Accordingly, populations with different cultural backgrounds tend to encounter healthcare issues such as decreased access to care and low quality of care, which leads to poorer health conditions and its associated outcomes (AHRQ, 2007). Furthermore, a report from the Institute of Medicine (IOM, 2003) regarding race and ethnicity in healthcare concluded that there is a significant difference in treatment between whites and ethnic and racial minorities. According to the US Census Bureau Report (2008), 34.2% of AAs relied on public health insurance in 2007 compared with 26.7% of Whites. Approximately 19.5% of AAs did not have healthcare insurance as compared to 10.4% of Whites (US Census Bureau, 2008). Furthermore, the median income for AAs in 2007 was \$33, 916 compared to \$54, 920 for Whites. Twenty five percent of AAs were living at or below the poverty level and the unemployment rate for AAs was twice as high compared

to Whites (US Census Bureau, 2008). Finally, 80% of AAs ages 25 and older had a high school diploma as compared to 89% of Whites (US Census Bureau, 2008). The low income and educational levels are likely to influence AA's ability to access and maintain quality healthcare. For example, AAs median income is much lower than their White counterparts which may account for their general lack of healthcare insurance. They are not able to afford healthcare insurance and care for their families on such an income and not having healthcare insurance interferes with accessing or receiving healthcare services.

Purpose of Study

The purpose of this research is to explain the association of predisposing, reinforcing, and enabling factors that are related to adherence to antihypertensive regimens in AA adult's ages 50 years and older. A second purpose is to explain predisposing, reinforcing, and enabling factors that are related to health literacy in AA adult's ages 50 years and older.

Specific Aims and Research Questions

The first specific aim for this research is to explore adherence to antihypertensive regimens and health literacy levels in AAs ages 50 years and older who have been diagnosed with HTN and subsequently prescribed an antihypertensive regimen.

Questions that will be addressed for this specific aim are:

- What are the adherence scores to antihypertensive regimens of older adult African Americans?
- What are the health literacy levels of older adult African Americans?

The second specific aim is to explain predisposing, reinforcing, and enabling variables that may influence adherence to antihypertensive regimens and health literacy levels in AA adults ages 50 years and older. The questions that will be addressed related to this specific aim are as follows:

- To what extent do predisposing factors (age, education, read prescription information and understand prescription information), a reinforcing factor (health status), and enabling factors (income, receipt of healthcare comorbidities and health literacy) explain adherence to antihypertensive regimens in older Adult African American's ages 50 years and older?
- To what extent do predisposing factors (age, education, read prescription information and understand prescription information), a reinforcing factor (health status), and enabling factors (income, receipt of healthcare comorbidities) explain health literacy in older Adult African American's ages 50 years and older?

Significance of Problem

Despite the numerous studies and interventions conducted related to managing HTN in AAs, effective treatment and related interventions remains a complex phenomenon, often resulting in increased rates of cardiovascular, and kidney diseases (AHA, 2010; Douglas et al., 2002; Hajjar et al., 2006; Hekler, 2008; Krousel-Wood, 2004; Peters, 2004; Szromba, 2000; USDHHS, 2000). New information continues to evolve concerning adherence and effective treatment for AAs with HTN; yet high rates related to non-adherence and health disparities still exist. According to Kim, Hill, Bone, and Levine (2000), persons tend to not adhere to their blood pressure regimens for

various reasons including when they are feeling well, when they are feeling sick, or prior to their doctor visits. According to Krousel-Wood et al. (2004), non-adherence to prescribed antihypertensive regimens contribute greatly to poorly controlled hypertension. In addition, older adults experience more health care deficits associated with low levels of health literacy (Greenberg, 2001). Accordingly, non-adherence to antihypertensive regimens in AAs as well as their low health literacy is well documented in the literature. However, no studies were found that described the association of health literacy and adherence to antihypertensive regimens in AAs ages 50 and older. Furthermore, no studies were found using Green and Kreuter's (2005) Precede-Proceed Model as a framework to explore the association of health literacy and adherence to antihypertensive regimens in older adult AAs. More research is needed studying the association of health literacy and adherence to antihypertensive regimens in order to develop interventions that will assist in decreasing health disparities that result in non-adherence to antihypertensive regimens in AAs. In addition, the relationship between low levels of health literacy and health risk behaviors such as adherence to medical regimens has not been thoroughly investigated (Wolf et al., 2007). Furthermore, in-depth research endeavors exploring barriers that are associated with lower health literacy in AA populations are needed. More research is also needed to assist in decreasing mortalities and morbidities associated with non-adherence to antihypertensive regimens in older adult AAs. In conclusion, exploring and describing potential associations of health literacy levels and adherence to antihypertensive regimens will assist health care

professionals in creating solutions that will decrease associated health disparities in AA populations.

Conceptual Framework

The Precede-Proceed Model (PPM) was initially developed in the 1970's and aids in the procedural development and evaluation of health-based programs, while simultaneously incorporating plans, policy, and other resources necessary for effectiveness (see Appendix A), (Glanz, Rimer, & Viswanath, 2008; Green & Kreuter, 2005). PRECEDE is an acronym representing the constructs Predisposing, Reinforcing, and Enabling in Educational/Environmental Diagnosis and Evaluation (Ahmed, Fort, Elzey, & Bailey, 2004; Glanz et al., 2008; Green & Kreuter, 2005). The constructs of this acronym are based on the premise that health education should focus on interventions that are specific to previously identified needs. Conversely, the PRECEDE component of this framework initiates the final outcome (Green & Kreuter, 2005). More specifically, the determinant of the health outcome is addressed prior to the outcome intervention. Addressing the health outcome determinants assists in decreasing poorly designed interventions or interventions that do not directly address the issue at hand.

The PRECEDE component of this model include the first four phases. Phase 1 focuses on social assessment, participatory planning, and situation analysis. Phase 1 determines a community's perception of personal needs and quality of life (Glanz et al., 2008; Green & Kreuter, 2005). The main variable in this phase is quality of life. An assessment of a target population's quality of life is done to explore the population's needs and aspirations (Green & Kreuter, 2005). This step allows researchers to explore

pertinent information within the community of interest in an effort to better understand the community's needs or desires and their priorities. Additionally, this social assessment explores the community of interest strengths, necessary and available resources, and their readiness and ability to change. Community in this phase refers to a specific area with defined boundaries or a particular group of people with shared characteristics, interests, values, and norms (Glanz et al., 2008; Green & Kreuter, 2005). Partnerships within the community are developed during participatory planning to solicit information specific to the community. Finally, situation analysis allows for an agreement on what the actual issues are, reflecting on the perceptions of participants' issues or desires.

Phase 2 focuses on the epidemiological, behavioral, and environmental assessment. The main variables in this phase are genetics, health, behavior and environment. This phase involves determinacy of the most appropriate health issues along with behavioral and environmental influences within a community (Glanz et al., 2008; Green & Kreuter, 2005). Genetics assists in identifying groups who are in need of health promotion interventions. Health is identified by exploring and analyzing existing data. This data should provide information related to the targeted community's mortality, morbidity associated with a health issue of concern and further assist in pointing out a community's subgroup or the population that may be at high risk. Often, characteristics such as age, gender, ethnicity, geographical location, education, and income further assist in defining the subgroup that may be at a major disadvantage, indicating an even higher risk. Factors that may be linked to the particular health issue that need attention are also assessed (Glanz et al., 2008; Green & Kreuter, 2005). Behavioral factors, which include

lifestyles, are those that contribute to the prevalence and the significance of the health issues that are to be addressed. Environmental factors are the external physical and social factors that are beyond the community or the population's control. However, these uncontrollable external factors are usually modifiable and thus capable of influencing positive health behaviors for associated outcomes.

Phase 3 focuses on educational and ecological assessment. This phase identifies three variables that affect health behavior and are referred to as predisposing, reinforcing, and enabling (Glanz et al., 2008; Green & Kreuter, 2005). Collectively, these three conditions are the antecedents as well as the underlining factors necessary to initiate and sustain behavioral and environmental change. *Predisposing* conditions or factors are those that refer to reasons or attitudes that contribute to behavior (Ahmed et al., 2004). Even further, predisposing conditions serve as behavioral precursors that provide insight into the underlying justification for the behavior (Glanz et al., 2008). These justifications typically include current knowledge, attitudes, beliefs, preferences, capabilities, life stressors and priorities, values, and perceptions of self-efficacy (Glanz et al., 2008; Green & Kreuter, 2005). Ethnicity and other cultural influences, demographics, socioeconomics, and other socioeconomic indicators are all components of predisposing conditions (Arnsberger et al., 2006). Moreover, genetic predisposition and childhood experiences are also components of predisposing factors as they strongly influence values, attitudes, and perceptions (Green & Kreuter, 2005). *Reinforcing* factors are those that attribute to continuous health seeking behavior (Glanz et al., 2008; Green & Kreuter, 2005). More specifically, reinforcing factors are the negative and positive feedback that a person

receives following a behavioral or lifestyle change. Lifestyle is an “enduring pattern of behavior” influenced by political advocacy or consumer demand (Green & Kreuter, 1999, p. 13). Additionally, reinforcing factors are post sequential behaviors that provide incentives for the behavioral actions to continue (Dennison, Peer, Steyn, Levitt, & Hill, 2007; Glanz et al., 2008). *Enabling* factors are those that trigger or support behavioral changes (Glanz et al., 2008; Green & Kreuter, 2005). More specifically, enabling factors include the skills, resources, or barriers that assist or interfere with a population’s or community’s ability to accomplish a desired change (Green & Kreuter, 2005). Enabling factors allow potential behaviors to be modified into actual behaviors (Dennison et al., 2007), and have both indirect and direct effects on behavior through an environmental effect (Glanz et al., 2008). Enabling factors include programs, services such as income, health insurance, laws and statutes, and other necessary resources that aid in or create barriers for environmental and behavioral change. More importantly, these enabling factors are transformed into prioritized interventions, based on the previously identified perspectives of the community, relevant empirical literature, or through previously related data collection and are then developed into measurable objectives (Glanz et al., 2008). Finally, classifying behavioral influences into the predisposing, reinforcing, and enabling categories facilitates specific strategies that may best meet the needs of the community. These strategies then become constructs that can be used in theoretical frameworks to help further organize relevant planning phases.

Phase 4 involves administration and policy, and assessment and intervention alignment. This phase focuses on identifying resources, organizing barriers and

facilitators, and policies for implementing and sustaining programs. It is referred to as the phase necessary to identify policies, resources, organizational influences and other associated conditions that either promote or hinder the implementation of a developed program (Glanz et al., 2008; Green & Kreuter, 2005). The variables in this phase are educational strategies and policy regulation organization (Ahmed et al., 2004; Glanz et al., 2008; Green & Kreuter, 2005). Educational strategies can be either macro level or micro level. The macro level focuses on the organizational and environmental systems. These can be interventions that enable environmental change to support the desired health outcome. At the micro level the focus is on health behaviors. Interventions at this level are focused on changing the predisposing, enabling, and reinforcing factors. Policies that support educational strategies are developed based on the outcome of the interventions.

The PROCEED component of the model also includes four phases. Phase 5 involves implementation of the program. At this phase, the developed program should be ready for implementation. Phase 6 focuses on process evaluation which typically addresses the development of the program and determines if the PRECEDE-PROCEED model's protocol was followed in the development of the program. Phase 7 focuses on impact evaluation which includes changes in the predisposing, reinforcing, and enabling factors and behavioral and environmental factors. Phase 8 is the outcome evaluation phase which determines the programs effect on health and quality of life, based on previously written program objectives (Glanz et al., 2008). It should be noted that evaluation is a continuous process; therefore these last evaluative steps never cease (Green & Kreuter, 2005).

The PPM asserts that environmental factors are strongly influenced by behavioral actions (Arnsberger et al., 2006; Glanz et al., 2008; Green & Kreuter, 2005). The model's design is based on several interrelated theories and constructs and expresses the necessity of identifying factors during the designing of an intervention program (Chang, Brown, Nitzke, & Bauman, 2004). The model begins with the fundamental principles of practice and participation (Glanz et al., 2008; Green & Kreuter, 2005). These fundamentals support the notion that behavioral change is enhanced in a specific group if this group is able to self-define and prioritize their goals, and assist in developing and implementing related interventions. Furthermore, the planning process of the PPM begins with the inclination that health behaviors are multi-causal, multidimensional, and have variable influences. In addition, the PPM offers a systematic approach with specifics to assist in the development of prioritized, applicable interventions for health related behaviors (Glanz et al., 2008; Green & Kreuter, 2005). Moreover, the PPM is a planning model that works backward in exploring and defining the most applicable intervention strategies necessary to achieve objectives based on input from a community. Simply stated, the model begins with final consequences and ends with identified causes (Ahmed et al., 2004; Green & Kreuter, 2005). The most recent revision of the PPM offers a more streamlined approach which allows for more efficient planning and the option to alleviate one of the components within the planning phases of the model when supportive evidence exists.

In summary, the PPM integrates health education, behavioral modification, and principles to maintain behavioral modification, culturally appropriate strategies, social

engagement, and social learning theory (Dennison et al., 2007). In addition, the model accentuates the connection among health and social issues, pre-planning, culturally sensitive psychosocial barriers, population significance, and evaluation (Dennison et al., 2007). Furthermore, the PPM is a theoretically robust model that has been effectively used as a guide to develop various programs and interventions at local and national levels including blood pressure control, self-breast exam and breast cancer screenings, smoking cessation, car-seat safety, and work-site health promotion (Glanz et al, 2008; Green & Kreuter, 2005). The model has also served as a framework for curriculum development and training programs for nursing and other healthcare disciplines (Green & Kreuter, 2005) and created a foundation for the model's use in this research study.

Summary of PPM's Use in Research. The PPM will serve as the framework in describing the association of health literacy levels and HTN adherence in AA ages 50 and older. A modified version of Green and Kreuter's (2005) PPM will be used to guide this research (see Appendix B and Appendix C). The PPM is a framework that provides structure in the development of the most appropriate interventions or strategies necessary to address an issue (Glanz et al., 2008; Green & Kreuter, 2005). Furthermore the PPM allows for the identification of behaviors that may contribute to adherence to antihypertensive regimens. The behavioral factors associated with this framework and in the proposed study are considered as factors contributing to the occurrence of low health literacy levels and increased non-adherence to antihypertensive regimens. Components of the PPM that will be used in the forthcoming research include predisposing, reinforcing, enabling and behavior factors (see Appendix B and Appendix C).

Predisposing factors in this study are those that influence behavioral and environmental change (Glanz et al., 2008). Predisposing factors specific to this study are the participant factors that have affected their adherence to antihypertensive regimens and health literacy. They include age, education, interest in reading about antihypertensive medications, and understanding the antihypertensive medication information.

Reinforcing factors in this study are those that render some type of support to the overall health status of a targeted person or community. Reinforcing factors assist in identifying participant influences that contribute to or interfere with their adherence to antihypertensive regimens and health literacy. In this study health status is the reinforcing factor.

Enabling factors in this study are those that trigger or support behavioral changes and will identify factors that influence the participants' adherence to their antihypertensive regimens and health literacy (Glanz et al., 2008; Green & Kreuter, 2005). They include income level, receipt of health care, comorbidities, and health literacy levels.

In this study, behavior is the outcome variable and refers to the participant's adherence to their antihypertensive regimens measured using the Hill-Bone Compliance Scale (HBCS). According to Krousel-Wood et al., (2004) factors associated with adherence to antihypertensive regimens may include demographic characteristics, side effects associated with medication(s), complex medication regimens, quality of life, knowledge, awareness, beliefs and attitudes, depression, and health care system issues.

Conceptual Definitions. The constructs predisposing, reinforcing, and enabling used in this research are defined by Green and Kreuter (2005), and Glanz et al. (2008) as follows: Predisposing factors are those factors that influence behavioral and environmental change. Reinforcing factors are those factors that support the overall health status of the participant. Enabling factors are those factors that trigger or support behavioral changes.

Health literacy is an enabling factor (see Appendix B) and a behavior construct (see Appendix C). As an enabling factor it refers to a person's ability to obtain health care information and effectively process this health care related information. As a behavior construct it refers to the health literacy level of participants. Adherence to antihypertensive regimens is also a behavior construct (see Appendix B) in this research and refers to following the advice of a primary health care provider by taking prescribed antihypertensive medications as scheduled, eating a diet conducive to a normalized blood pressure, and keeping regularly scheduled appointments regarding blood pressure management.

Operational Definitions. An overview of the operational definitions used in this research is as follows:

Predisposing factors in the proposed study are the participants' age, highest level of education obtained, their interest in reading information about antihypertensive medications and understanding the information. These predisposing factors will be operationalized using a researcher developed demographic questionnaire (see Appendix H).

The Reinforcing factor for the proposed research study is the participant's self-identified health status that may affect adherence to their antihypertensive regimen. This reinforcing factor will be identified using the researcher developed demographic questionnaire (see Appendix H).

Enabling factors in the proposed study are their income level, receipt of healthcare, comorbidities and health literacy and will identify the socioeconomics that have influenced the participants' adherence to antihypertensive regimens. These enabling factors (income, receipt of healthcare, and comorbidities) will be operationalized using the researcher developed demographic questionnaire (see Appendix H). Health literacy levels will be operationalized as participants' score on the shortened 66-word version of the Rapid Estimate of Adult Literacy in Medicine (REALM) (see Appendix D).

Behavior in this research study (see Appendix B for Model #1) was assessed based on the participants' adherence scores using the HBCS (see Appendix E). Adherence as a concept focuses on a patient's ability as well as their willingness to abide by a prescribed regimen (Krousel-Wood et al., 2004). The HBCS is a measure used to assess adherence to antihypertensive regimens. This measure assesses behaviors based on three domains associated with HTN. These domains are the decreased sodium intake, taking medication, and keeping related appointments (Kim et al., 2000). Scores for the HBCS are determined based on 14 questions that focus on hypertension management.

Behavior was also assessed as Health Literacy (see Appendix C for Model #2) and measured as described above under Enabling factors.

Assumptions

An assumption of this research study is that health literacy levels can be adequately measured using the REALM in AAs ages 50 and older. In addition, it is assumed that self-reported scores on the HBCS will produce adequate adherence scores. A third assumption is that modified versions of the PPM can be used to guide this study for the target population of AAs ages 50 and above. A fourth assumption is that adherence to antihypertensive regimens can be explained by demographic factors. A final assumption is that health literacy levels based on REALM scores will provide information related to its association with the adherence scores from the HBCS of the target population and will aid in future interventions or program development.

Summary

The two-fold purpose of this study was to explain the association of predisposing, reinforcing, and enabling factors that are related to adherence to antihypertensive regimens in AA adults ages 50 years and older; and to explain predisposing, reinforcing, and enabling factors that are related to health literacy in AA adults ages 50 years and older. Two modified versions of Green and Kreuter's (2005) PPM was used to guide the study. Results of this study will be used to explore and describe factors that are associated with adherence and health literacy levels to antihypertensive regimens. The findings will assist health care professionals in developing solutions that may decrease associated health disparities in AA populations related to antihypertensive regimens and health literacy.

CHAPTER II

REVIEW OF THE LITERATURE

Historical Overview of Literacy and Health Literacy

In the mid 1990's there was a major discrepancy between the US adult's populations' literacy levels necessary to understand and adhere to healthcare instructions (Doak, Doak, & Root, 1996). During the 19th century, being literate was based on the ability to write one's name. To date, having the ability to write one's name no longer equips a person with the ability to function in society. Though higher literacy skills were needed to understand healthcare information during the 1990's, one of five adult Americans were reading at or below the fifth grade level (Doak et al., 1996). Currently, adequate function in today's society and within the healthcare environment requires reading above the fifth grade level, and at or above the 8th to 9th grade level (National Center for Education Studies (NCES, 2003a; Speros, 2005).

The history of literacy dates back to the Egyptian and Greek cultures (Speros, 2005). During this time, literacy moved from verbal efforts to written descriptions. According to Venezkey (1990) literacy is defined as the "minimal ability to read and write in a designated language, as well as a mind set or way of thinking about the use of reading and writing in everyday life," (p. 142). During the 1980's, literacy related research focused on addressing educational measures and traditional strategies (Speros, 2005). Additionally, during the 1980's and the 1990's, a person's ability to read and

comprehend health care information was the focus of health education research (Willis, 1997). The 1992 and 2003 National Adult Literacy Survey defined literacy as “using printed and written information to function in society, to achieve one’s goals, and to develop one’s knowledge and potential,” (NCES 2003a, p. 1). They found that 75% of adults in America with some sort of health condition had low literacy levels. They also found that adults with low levels of literacy were older, had lower levels of education, lower paying jobs, low SES, and were ethnic or racial minorities. According to Benson and Forman (2002), 44% to 53% of the geriatric populations (adults ages 65 and older) perform at low literacy levels and 26% to 32% of this older population are said to have marginal literacy levels.

American ethnic minorities have sizably lower literacy levels than their non-minority American counterparts (Doak et al., 1996; National Center for Education Statistics (NCES), 2003b; Paasche-Orlow, Schillinger, Green & Wagner, 2006). These ethnic minorities are usually one literacy level below the general population. Some of these ethnic minorities have marginal or functional literacy levels, while others have low literacy levels. Simply stated, those who have marginal, functional, or low literacy levels have great difficulty reading and understanding healthcare related information (Benson & Forman, 2002; Doak et al., 1996; Van Servellen, Brown, Lombardi, & Herrera, 2003). Functional literacy levels allow a person to be able to function in society, but they are not able to adequately understand and manage their healthcare. Functional health literacy refers to a person’s ability to read and adhere to their prescription instructions, appointment information, and other information needed to assist in maneuvering through

the healthcare system (Koo, Krass, and Aslani, 2006; Van Servellen et al., 2003). Persons who are considered marginally literate maneuver through life only slightly above the low literate level. Consequently, those with low to marginal literacy levels are at a major disadvantage in understanding health care information provided them and managing their health care.

Health Literacy

Patients with low literacy levels face numerous challenges in maneuvering within the healthcare system. They are often faced with difficulties related to completing healthcare forms, understanding their healthcare instruction, keeping appointments and follow-up care, and self-administering their medications. The National Assessment of Adult Literacy (NAAL 2006) report indicates that approximately 50% of the US population has low literacy levels. Having low literacy levels equates to low health literacy levels. Patients with low health literacy levels are disadvantaged as they are prone to make potentially fatal mistakes or be non-adherent to their health care plan because of their decreased ability to obtain, process, and analyze basic health information (Chang, Brown, Nitzke, & Baumann, 2004).

A major goal of the US Department of Health and Human Services *Healthy People 2010* objectives is to improve the communication (health literacy) of those with inadequate or marginal levels (2000). Health literacy is defined by the American Medical Association (AMA, 2006) and the US Department of Health and Human Services (USDHHS, 2000) as the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health

care decisions. The World Health Organization (WHO, 1998), defines adequate health literacy as having cognitive and social skills which equips individuals to access, understand, and use health information for health promotion and disease prevention. Similarly the NAAL (2006) defines health literacy as having the ability to use literacy skills to read and understand health care information. McCabe (2006) further describes a person with adequate health literacy as having a combination of skills that enable them to access health care information and equips them to make informed health care decisions. In essence, the definition of health literacy has progressed from having the ability to read health related information, to having the skills necessary to problem solve, compute, articulate, and make appropriate health care decisions (Cutilli, 2005).

Although many studies have been conducted on literacy, fewer studies have been conducted investigating health literacy. Morrow et al. (2006) conducted a study to determine the effects of health literacy on middle aged and older adults. They found that 28% of the entire sample had low or marginal health literacy levels and that health literacy levels were particularly lower for AAs and less educated participants. Interestingly, health literacy scores were overall lower for the male participants (Morrow et al., 2006). This study concluded that half of the adult population of the United States has inadequate health literacy and that low health literacy levels lead to decreased healthcare knowledge, poor health status, decreased abilities to adhere to medication regimens, decreased self-abilities to successfully maneuver through the healthcare system, and increased hospitalization and associated cost (Morrow et al., 2006).

Levinthal, Morrow, Tu, Wu and Murray (2008) conducted a study to determine if sensory and cognitive abilities were associated with health literacy levels of older hypertensive adults. Similar to Morrow et al. (2006) they found that the health literacy scores were lower for the less educated, male, and older AA participants. In addition, those who had lower cognition scores and reported more comorbidities had lower health literacy scores. This study concluded that cognitive abilities were highly reflective in the health literacy levels of older adults. Furthermore, these results suggest that cognition adds more insight into the health literacy levels of older adults as compared to sensory abilities. In addition, they found that cognition had a stronger association with health literacy levels as compared to participant education levels, indicating cognition as an essential predictor of health literacy levels.

Arozullah et al. (2006) conducted a study investigating the association of health literacy, social support, and preventable hospital admission. They found that low literacy levels were not directly associated with preventable hospital admission. A little over half (52%) of the participants that had inadequate literacy levels (less than 7th grade reading levels) were more likely to have social support (the company of someone to a medical appointment). However, those with low health literacy levels who did not have a social support system were more reliant on advice from their personal acquaintances instead of accessing formal health care services.

AAs have historically experienced barriers associated with reading and writing (Willis, 1997). In AA history, there was severe punishment during slavery times when it was realized that a slave was able to read and write. Consequently, not being able to read

and write has hindered some AAs from persevering as a culture in regards to literacy and in their ability to live above poverty levels. Social and cultural influences have also contributed to health literacy deficits in minority clients (Willis, 1997). Over time, these influences have led to historical literacy crises and associated racial and cultural biases. Though social and cultural advancements such as Civil Rights and Affirmative Action, have assisted in the advancement of minority groups affected by literacy related deficits, there is still a vast amount of work needed to assist with literacy and health literacy deficits in AA populations (Willis, 1997).

Adherence

Large numbers of AAs living in the United States are disproportionately affected by hypertension (HTN) and the burdens of its associated complications (Douglas, Ferdinand, Bakris, & Sowers, 2002; Hajjar, Kotchen & Kotchen, 2006; Hekler, 2008; Peters, 2004;). The prevalence of HTN is far greater in AAs at a higher rate than Caucasians living in the United States (American Heart Association (AHA), 2010; Douglas et al., 2002; Hajjar et al., 2006; Hyman, Pavlik, Vallbona, Dunn, Louis et al., 1998; Schneider, Castillo-Richmond, Alexander, Meyers, Kaushik, et al., 2001; Szromba, 2000). High levels of non-adherence to antihypertensive regimens in AA populations creates major obstacles for both health care professionals and AA clients as it relates to health care treatment (Krousel-Wood, Thomas, Munter, & Morisky, 2004; Schneider et al., 2001). Adherence as a concept focuses on a patient's ability as well as their willingness to abide by a prescribed regimen (Krousel-Wood et al., 2004). Factors associated with adherence to antihypertensive regimens include demographic

characteristics, such as age, education, and marital status, side effects associated with medication(s), complex medication regimens, quality of life, knowledge, awareness, beliefs, attitudes, depression, and health care system issues (Krousel-Wood et al., 2004). Chronic health conditions and its associated effects on the overall well-being of the individual are major contributors to medical regimen adherence (Elliot, Ross-Degna, Adams, Safran, & Soumerai, 2007). One may decide how much to adhere, if at all, to their medical regimen on a daily basis based on how well or poorly they feel (Elliot et al., 2007). In addition, factors such as comorbidities, associated cost, asymptomatic illnesses such as HTN, and income influence adherence to medical regimens. Banta et al. (2009) defined non-adherence to an antihypertensive regimen as failing to carry out the recommended medical regimens that include medication, diet, and exercise. They found that adherence to an antihypertensive regimen in an asymptomatic hypertensive person is especially a challenge (Banta et al., 2009). Bosworth et al. (2008) found that poorly controlled hypertension is associated with non-adherence to prescribed medication and older age.

McLaughlin et al. (2005) suggested a dual approach to medication adherence in elderly populations. For example, outcomes related to medication adherence, such as normalized blood pressure readings, can be enhanced with the use of a medication refill unit, pill counts, or self reports. These can then serve to monitor adherence and adjust medical regimens accordingly. Finally, Hope, Wu, Tu, Young, and Murray (2004) conducted a study on older adult's medication adherence, knowledge, skills and their

association with congestive heart failure. Findings from the study suggested that decreased knowledge regarding medical regimens increases poor patient outcomes.

An additional major goal of the USDHHS (2000) *Healthy People 2010* objectives is to increase the control of hypertension in adults by 50%. Between 1998 and 1994 only 19% of African Americans and 18% of White Americans had their blood pressure controlled. The USDHHS (2000) also recognized that there are a vast amount of scientific-based strategies available to successfully manage cardiovascular disorders and the accompanied risk factors which include hypertension. However there are multiple issues that often go unnoticed that interfere with the management of hypertension and adherence to the developed strategies (USDHHS, 2000). Initially, a person must be willing to adhere to their treatment regimen. A person who has a cardiovascular disorder and an asymptomatic risk factor such as hypertension makes management and adherence even more difficult. Common reasons that interfere with adherence include a person adhering to the initial efforts of the treatment regimen such as getting a related prescription filled and then discontinuing the medication after a few weeks when they are feeling better (USDHHS, 2000). In addition, a person may adhere only to a partial component of their treatment regimen, interfering with effective management. Therefore, research efforts geared towards determining strategies that aid in adherence to prescribed regimens are needed. These efforts should include the use of technology assisted devices and strategies that involve patient identified community support (USDHHS, 2000).

Health care professionals have a critical role in making certain that appropriate interventions related to hypertensive management and adherence are established

(USDHHS, 2000). These interventions include adequate patient education related to prescribed treatment regimens and continuous patient monitoring for therapeutic responses to long-term management. Finally, culturally appropriate efforts by healthcare professionals are vital to the management of hypertension and to patient adherence to their treatment regimens (USDHHS, 2000). Research that involves the socioeconomic status, access to healthcare services, health status, income, and education levels of underserved populations is needed for effective management of hypertension and related patient adherence.

Predisposing Factors and Adherence

Researchers have found a relationship between adherence and age among AAs. For example, Schoenberg (1997) found that older AAs may not be able to access necessary information related to HTN which potentially lowers their adherence to antihypertensive medication regimens. Elliot et al. (2007) conducted a small exploratory, qualitative study to see how older adults who were taking a variety of medicines adhered to their medical regimens. Findings from the study concluded that medication adherence was related to the number of medications prescribed. Additional findings suggested that adherence to medical regimens in older adults with more than one chronic illness is influenced by personal, and non-personal decisions. Banta et al. (2009) found that age was a significant predictor of non-adherence but different from Schoenberg (1997), they found that adherence to their medication regimen improved as the age of participants increased. Hekler et al. (2008) also found a significant relationship between age and

medication adherence, with older participants more adherent. However, Bosworth et al. (2008) found that younger populations had higher medication adherence scores.

Banta et al. (2009) also studied adherence to written health care information. They found an association between adherence and understanding health care information where participants who understood the health care information provided were more likely to adhere to the health care regimen. They concluded that adherence requires knowledge of the healthcare regimen, motivation to follow through, social support, and financial resources. In relation to education, Dressler (1996) and Douglas (2002) found that AAs with low levels of education had poor adherence to antihypertensive regimens.

Predisposing Factors and Health Literacy

Low health literacy levels in AAs are more prevalent in those aged 50 years and older (Cutilli, 2005). Characteristics associated with low health literacy include being an ethnic or cultural minority, having a low average income, residing in southern and western areas of the US, not having a high school diploma or its equivalent, being older than 65 years of age, having mental or physical disabilities, being in prison, and being homeless (Mika, Kelly, Price, Franquiz, & Villarreal, 2005; Schloman, 2004). Lower socioeconomic ethnic or minority groups are most often faced with increased literacy deficits, (Mika et al., 2005; Speros, 2005). According to Pawlak (2005), “race, ethnicity, and culture may influence health literacy through social networks and cultural traditions, access to health information from providers and payers, as well as the understanding and utilization of that information,” (p. 174). Similarly, limited levels of health literacy have a strong association with socioeconomic factors such as levels of

education, race or ethnicity, and age (Paasche-Orlow & Wolf, 2007). Consequently, individuals belonging to minority groups or ethnic backgrounds who may have limitations associated with their formal education, including limited literacy levels, and cultural and linguistic barriers often have difficulty comprehending and adhering to written health care information (Corbie-Smith, Thomas, Williams, & Moody-Ayers, 1999).

The Institute of Medicine (IOM, 2006) produced a report on the relationship between health literacy, medication adherence, and health outcomes. They found that the readability levels of healthcare information documents often exceed the reading capabilities of most American adults. They also found that older adults and those with limited education had lower health literacy levels, and written healthcare information such as medication inserts are often written at literacy levels above the reading levels of the intended audience. They concluded that health literacy may be the link between health care education and positive health outcomes.

Koo, Krass, and Aslani (2006) investigated how disease state, functional health literacy also known as written medical information (WMI), health locus of control, coping style, and demographics influence WMI. The operational definitions of health locus of control included their ability to attribute their health outcomes to their personal actions, another's action, or to fate, and coping style as becoming actively involved in their illness or deferring the opportunity to actively participate in their care. Findings from the study indicated that persons experiencing chronic pain read more health care information than those who were asymptomatic. Reading health care information was

lower in participants with blue collar occupations and those 61 years of age and older. Furthermore, those considered as having inadequate or marginal health literacy levels were less likely to read WMI. Paasche-Orlow et al. (2005) and Davis et al. (2006) found similar results as the IOM Report. In addition, they found that low levels of health literacy are more prevalent in AAs, those with lower levels of education, and persons who are of older age. Davis et al. (2006) also found that complex medical regimens were related to the number of co-morbidities and were predictors of misunderstanding medical regimens. More specifically, a complex medical regimen was found to be a proxy for a large number of co-morbidities and the more complex the prescription medications and the medical instructions, the more difficulty clients with low literacy levels had reading and understanding the information and adhering to their regimens.

Davis et al. (2006) conducted a study to determine if literacy levels were associated with misunderstanding prescription medication information. Findings from this study indicated that almost half (46%) of the participants were not able to read and interpret instructions regarding their medication. Though these issues were higher in participants with low literacy levels, approximately 38% of participants with adequate literacy levels had some difficulty reading and understanding their medication information. Furthermore, participants in this study who had adequate literacy levels were able to read the prescription information but were unable to demonstrate understanding of the related instructions and adhering to the instructions given.

von Wagner, Steptoe, Wolf, and Wardle (2009) state that “low health literacy has been associated with a wide range of health-related outcomes, “ (pg 861). Their meta-

analytic study found that those with low literacy rates (6th grade level) were more likely to report poor health and illnesses such as diabetes and depression, and poor access to health care. Their study also identified relationships between low health literacy and increased hospitalization and increased mortality among Medicare recipients.

Reinforcing Factors and Adherence

Few studies were found that explored the relationship between health status and adherence. Banta et al. (2009) studied the relationship between health status and adherence to antihypertensive regimen. They found that participants who were adherent to their antihypertensive regimen reported their health status as 'fair or poor.' Wong, Mouanoutoua, Chen, Gray, and Tseng (2005) conducted a study investigating adherence to hypertensive regimens in Hmong participants. They found that 44% of the participants reported poor health status and 54% reported non-adherence to their antihypertensive regimen. In addition, those who were non-adherent were ages 50 and older. Finally, a study involving pharmaceutical follow-up for hypertension and adherence to a hypertensive regimen by De Souza et al. (2007) found that frequent follow-up by the pharmacist resulted in an improved adherence rate and significant improvement in the participants self-reported health status.

Reinforcing Factors and Health Literacy

A number of researchers have found a relationship between health literacy and health status. Kalichman and Rompa (2000) studied the association of health literacy with demographics (age, education level, income, gender, ethnicity, and sexual orientation), disease related knowledge, barriers to care, and health status. Findings indicated that

persons with low health literacy levels were more likely to self-report their health status as poor. Baker, Parker, Williams, and Clark (1998) also found a relationship between health literacy and health status when they explored the relationship between literacy levels, a patient's hospital admissions, and health status. Those who had adequate literacy scores reported a 'good to excellent' health status (59%), compared to those with marginal literacy levels (48%) and those with inadequate literacy levels (42%). Other studies researching health literacy and health status assessed the effects of limited literacy in older adults and how this affects health outcomes reported as health status. For example, Sudore et al. (2006) found that 33% of participants that reported 'poor health' had low literacy levels within the inability to read to 6th grade category. The IOM's (2006) report also found that adults with low health literacy levels were more likely to report a 'poor' health status.

Sudore et al. (2006) researched the relationship between health literacy, patient demographics (age, gender, ethnicity, education levels, and income), health status and healthcare access among AAs and White Medicare-eligible participants who were considered to have good physical functioning. They found that older AAs with low health literacy levels were twice as likely to have limited access to healthcare, and reported their health status as poor.

Enabling Factors and Adherence

A few studies were found that researched adherence to medical regimens and comorbidities. Elliot et al. (2007) studied adherence to complex medical regimens. They found that participants who had at least three comorbidities took from 4 to 12

medications (average of 7 medications per participant) and were significantly less likely to adhere to their medical regimens. In addition, Elliot et al. (2007) noted that participant medication concerns were not discussed between the participants and their healthcare providers. King and Crisp (2006) also studied the association of specific comorbidities, demographics (age, race, gender, and rural status), and treatment factors with uncontrolled hypertension. Findings suggested that males were twice as likely to have uncontrolled hypertension as were those seeking healthcare at a rural practice. Different from findings in other studies, they found that age, race, and the number of comorbidities were not associated with uncontrolled hypertension.

In relation to income and adherence, DiMatteo (2004) found a significant association between income and adherence to medical regimens. Gellad, Haas, and Safran (2007) studied factors associated with an older patient's adherence to prescription medicine found that there was a significant association among non-adherence, income level, and cost of medications. More specifically, they found that AAs were skipping doses to make the medication last longer and were also spending less money on basic needs such as food to balance the affordability of their medication. Finally, Soumerai et al. (2006) conducted a study to investigate income level, cost of medication and its affect on adherence and medication. Findings indicated that both elderly and disabled patients are most affected by the cost of medications which affects their ability to adhere to their medical treatment regimens.

A study addressing adherence and receipt of health care (Banta et al., 2009) found that the participants who were more non-adherent were more likely to be uninsured and

also lacked a consistent source of primary health care. Those who were more adherent to their antihypertensive regimen had better access to health care.

As for adherence and health literacy as an enabling factor several studies found similar results. For example, Byrd, Fletcher, and Menifield (2007) found that in addition to access and comprehension deficits, a low educational status and inadequate health literacy levels were the main reasons for non-adherence to antihypertensive regimens among older AAs. They added that inadequate health literacy levels decreased the patients' ability to effectively participate in their health care plan, and to adhere to their treatment plan. Paasche-Orlow et al. (2006) used the REALM to see if low health literacy levels had a role in adherence to antiretroviral therapy (ART) and viral load suppression in persons diagnosed with HIV and alcoholism. Study results concluded that the participant adherence scores were directly related to the health literacy levels of the participants.

The Agency for Healthcare Research and Quality (AHRQ, 2007) found that persons with low health literacy levels are 12 to 18 times more likely to lack the ability to comply with their health care regimens. Safer and Keenan (2005) also found that participants with inadequate health literacy skills are subject to have higher rates of non-adherence to their medical regimens. Byrd, Fletcher, and Menifield (2007) found that access and comprehension deficits, a low educational status, and inadequate health literacy levels among older AAs were the main reasons for their non-adherence to their antihypertensive regimens. They added that inadequate health literacy levels decreased

their ability to effectively participate in their health care plan, and to adhere to their treatment plan (Byrd et al., 2007).

Contrary to the AHRQ findings, Gatti, Jacobson, Gazmararian, Schmotzer and Kripalani's (2009) study involving mostly female AA participants tested the association of medication adherence and health literacy levels. They found that health literacy levels were not directly related with adherence to medical regimens. Rather, they found that negative beliefs about medication and younger age were significantly associated with non-adherence to medical regimens. Kane's (2008) study on improving adherence in chronic diseases where patients may not experience daily clinical manifestations found that it is necessary to educate the patient on the specifics of their disease that then increases their health literacy levels.

Enabling Factors and Health Literacy

Few studies were found that addressed health literacy and comorbidities. Morrow et al. (2006) used the Shortened Test of Functional Health Literacy Assessment (STOFHLA) to correlate health literacy in patients with chronic heart failure and found literacy scores lower for older, less educated, male AAs and those with more comorbidities. Participants had on average three comorbid conditions and took a mean of nine medications. Based on the findings of this study, the researchers suggested that given the high average number of medications taken by older adults and the number of co-morbidities, medication instructions need to be designed so that they can easily be comprehended without excess demands on general cognitive abilities and literacy skills. Sudore et al. (2006) also found a relationship between health literacy and comorbidities

among AAs. They found that the majority of AA participants had health literacy levels within the Kindergarten to 6th grade level, and participants with chronic medical conditions and more than one comorbidity also had low health literacy levels.

Kalichman et al. (2000) found a relationship between health literacy levels and income. Ninety four percent of the participants in their study had low literacy levels and made less than \$20,000 annually. Wolf, Gazmararian, and Baker (2007) examined the association between health literacy and income in older adults and also found that older adults with lower health literacy levels had low income levels of less than \$10,000 annually. Similarly, Sudore et al. (2006) found that AAs with low health literacy levels were more likely to have annual income levels of below \$10,000 and less likely to have medical insurance and as a result, less likely to have a primary source of care. Finally, Banta et al's (2009) in studying AAs with low health literacy levels found that they were more likely to have annual income levels below \$10,000, were less likely to have medical insurance, and were less likely to have a primary source of care.

Research with AA and Cultural Issues

Recruiting minorities to participate in research studies is known to be a challenging task. This challenge is more critical in the recruitment of AAs (Corbie-Smith et al., 1999; Ammerman et al., 2003; Mason, 2005; Gonzalez, Gardner, & Murasko, 2007). In addition, it is more difficult to recruit and retain older minority adults (Gonzalez et al., 2007). Subsequently, the reluctance of AAs to participate in research studies can be traced to historical events (Mason, 2005) and has created challenges for researchers in their efforts to address healthcare disparities (Ammerman et al., 2003).

One critical example of a historical event that has made it difficult to recruit AAs is the Tuskegee Syphilis Study (Mason, 2005). It is a historical case that contributes to the decreased trust of AAs in the research process and their participation in research. This study is said to be one of the key cases that involved deceit, ethical misconduct, negligence, and racism among the medical community toward AAs (Corbie-Smith et al., 1999; Mason, 2005). The study exemplifies abuse of the research process and exploitation of AAs and is largely responsible for the suspicion that AAs have toward research studies (Carmack, Bates, & Harter, 2008; Mason, 2005; McAvoy, Winter, Outley, McDonald, & Chavez, 2000). The Tuskegee Syphilis study involved 600 AA men in Macon County, Alabama (Achter et al., 2005; Carmack et al., 2008; Corbie-Smith et al., 1999; Mullins et al., 2005). The study was conducted by the US Public Health Service in cooperation with the Tuskegee Institute from 1932 to 1972. The researchers did not obtain informed consent from the participants and told them that they were being treated for 'bad blood'. During those times, the 'bad blood' concept was one that was used to refer to various illnesses in the AA community (Carmack et al., 2008). The men were offered the incentives of hot meals, physicals, free transportation to the clinic, and burial stipends for their families for their participation (Carmack et al., 2008). Deception occurred in the Tuskegee Syphilis study when the researchers withheld the penicillin treatment from the AA participants when it became available.

Other reasons it is difficult to recruit AAs is related to slavery, its associated abuse, and AA's fear of hospitals related to claims of abuse. These fears contribute to the increased hesitancy that AAs have related to healthcare and their involvement in research

projects (Achter et al., 2005). There are several common fears that generally surface when AAs are solicited to participate in research. Some AAs believe that the HIV infection was created and planted in the AA communities as a mechanism to eliminate the AA population (Corbie-Smith et al., 1999; Carmack et al., 2008). Another incident that has fostered the belief that there are forces who want to eliminate the AA population is the Agent Orange exposure (Corbie-Smith et al., 1999), and the surfacing of crack cocaine in AA communities (Corbie-Smith et al., 1999; Carmack et al., 2008). More specifically, it is believed by some AAs that the Central Intelligence Agency deliberately placed crack-cocaine in AA communities in an effort to eliminate the AA race (Corbie-Smith et al., 1999). Sickle Cell screening among AAs is yet another fear related factor as information from mandates associated with related screenings led to discriminatory issues, such as the denial of employment and insurance (Achter et al., 2005).

Lack of trust has been documented as the primary barrier in recruiting AAs to participate in research (Corbie-Smith et al., 1999; Mason, 2005). According to a research study conducted by Mason (2005), distrust of the researcher, insufficient outreach, and lack of resources to support participation were the most frequent reasons for decreased AA participation. Smith et al. (2007) conducted a study examining the thoughts of AA females and their participation in research. Lack of trust was identified as one of the major barriers to their participation. Furthermore, there was a perception that research only benefits Whites, further contributing to the lack of trust. Jacobs, Rolle, Ferrans, Whitaker, and Warnecke's (2006) study found that AAs did not trust research due to personal experiences, experiences of their acquaintances, and historical events.

The US Congress instituted the National Institutes of Health (NIH) Revitalization Act of 1993 which mandates that women and minorities be included in research (Corbie-Smith et al., 1999; Mullins, Blatt, Gbarayor, Yang, & Baquet, 2005; Mason, 2005). This mandate compels researchers to understand and comply with the cultural specifics of minority populations in the attempt to recruit minorities in research studies. In addition, this NIH mandate helps in increasing AA participation in research and assists in establishing key strategies in the recruitment of AAs in research studies.

Strategies to Increase AA participation in Research

Suggestions for recruitment and retention of AAs include community involvement of AAs in the research design, culturally appropriate advertisement, explaining the importance of research, incorporating methods that would increase trust, including incentives, and minority representation on the research team. Persons who are trusted in the AA community should be accessed initially (Moore & Miller, 1999). These persons are often referred to as gatekeepers and may be formal or informal. The formal gatekeepers are generally relatives or guardians of vulnerable populations while informal gatekeepers are usually non-relatives, such as church leaders, who are trusted by the community or have protected the community in the past. The informal gatekeepers have a strong capacity to influence their community (Moore & Miller, 1999). Gaining access into a community through a receptive gatekeeper usually enhances a researcher's accessibility into a community and typically initiates the snowball effect. Incorporating these strategies also allow participants to feel welcomed and respected (Mason, 2005).

Participatory approaches aid in forming trust relationships in AA communities, foster open communication related to the research study, and engages potential participants in the planning and implementation process (Ammerman et al., 2003). The AA church has a major role in participatory research and gaining access and trust of the AA community (Ammerman et al., 2003). The pastor's endorsement of a research study to their congregation fosters trust and acceptance. This endorsement from the pastor is then passed down to the designated leaders of the church which then fosters trust and acceptance in the church community.

Location and time are additional resources that should be considered in the recruitment of AAs in research studies (Mason, 2005). Having a site that is convenient to the participants potentially enhances recruitment and study maintenance rates. In addition, more time may be required to alleviate or decrease factors associated with distrust. Specifically, time for questions or concerns regarding negative research related historical events should be taken into account when recruiting AA participants. Because AAs are very attentive to how they are treated in particular environments, lengthy waits are associated with racism and may therefore interfere with their retention in a research study or for their recruitment into future studies. This is especially a problem if the person that feels mistreated is a gatekeeper or if the person passes the maltreatment information on to other potential AA participants.

Minority vs. Non-minority Researchers. There are advantages and disadvantages associated with research conducted by minority researchers within minority communities (McAvoy et al., 2000). Advantages include the minority researcher's ability to establish

the trust of the minority community. The minority researcher may also be better able to generate culturally appropriate discussions related to the research study that a non-minority researcher would not (McAvoy et al., 2000). Minority researchers may also have an advantage because of their prior understanding of the culture and as a result may be better able to communicate with the minority participants. Disadvantages associated with a minority researcher within minority communities include the minority researcher's potential to overlook or read into some of the verbal or nonverbal responses of the minority participants because of their personal familiarity or perceptions of the fears regarding the culture (McAvoy et al., 2000).

Whether it is a minority or non-minority researcher, the establishment of credibility, trust, and rapport within the AA community is a critical step. Honesty, respect and openness must be established between the research team and the community leaders whether they are church leaders, educators, business leaders, or a nontraditional gatekeeper. The acceptance of the research study by these leaders or gatekeepers is critical to the success of the study and enhances the researcher's ability to access the participants (McAvoy et al., 2000). Taking the time to be culturally astute and sensitive contributes immensely to recruiting and retaining AA participants.

Summary

In conclusion, adequate literacy levels are vital in societal functioning. Health literacy is necessary to function within the healthcare system, to receive quality care, and adhere to medical regimens such as antihypertensive regimens. Having low literacy skills affects a person's health literacy level, ability to comprehend healthcare instructions or

related material, and subsequently adhere to the instructions given. Minorities are disproportionately affected by both literacy and health literacy. AA minorities tend to experience healthcare disparities associated with low health literacy levels and adherence to their medical regimens including antihypertensive regimens. Findings from this review of literature indicate the need to develop more open and trust-worthy relationships between patients and health care professionals which in turn will assist in increasing patient satisfaction, understanding of health care regimens, and adherence.

CHAPTER III

METHODOLOGY

Methodological issues related to this research are discussed in this chapter. Specific sections in this chapter include the pilot study, research design, sample and sampling plan, instruments, protection of human subjects, data collection, data analysis, and limitations.

Pilot Methodology

A pilot study was conducted to explore the reliability of the Hill-Bone Compliance Scale (HBCS). The Demographic Questionnaire was also tested for clarity of the requested information among the targeted population. Recruitment of the participants initially occurred at a local predominately African American (AA) church located within Forsyth County. After obtaining written permission from the church's pastor, flyers were passed out to the church's congregants after morning worship services. Flyers were also placed on cars within the church's parking lot. Persons who were interested in participating in the study, those who knew someone who they thought would qualify for the study, and those who had questions about the study were encouraged to contact the researcher for further clarification (see Appendix F). Several people contacted the researcher via the telephone number indicated on the flyer while others stopped the researcher prior to and after the church's worship services to indicate their interest and to sign up to participate in the study. The recruitment process took approximately 3 weeks.

The researcher conducted a research information session where the purpose of the study was explained to potential participants. If interested in participating in the study, they were asked to sign up for one of two data collection sessions. Refreshments were served at the data collection sessions as an incentive for the participants.

Inclusion criteria included AAs 50 years and older, a diagnosis of HTN, and prescribed antihypertensive medications. At the data collection sessions, the researcher explained the study to the groups. Those who were still interested and met the inclusion criteria remained to participate in the study. The researcher then went over the consent form in its entirety. It was explained to the participants that their signature on the consent form was their agreement to participate in the research. The risk and the benefits of the research were also explained to the participants along with informing them that they were not obligated to participate in the study and could withdraw from the study at any time without facing any penalties. The instructions related to the Demographic Questionnaire (DQ), REALM and the HBCS were also explained. The researcher answered all participant questions related to the research and the consent form. As needed, the researcher helped the participants complete the DQ, the HBCS, and the REALM by reading the information on the DQ and HBCS aloud or explaining the context of the questions. The researcher was not able to offer assistance for the REALM to those who were not able to read. A REALM score of “0” was entered for those who were not able to read. The REALM was the only measure that had to be administered separately from the remaining forms. Participant numbers were used rather than names on all questionnaires and surveys to maintain confidentiality.

Pilot Study Findings

There were 21 participants that expressed an interest in the pilot study. Two of the participants were unable to participate at the designated time due to family obligations. One of the participants became ill and was not able to attend the session and another stated that a busy schedule did not permit participation. One of the participants did not qualify to participate in the study due to not meeting the age requirement. The final sample was 16 AA participants; 7 male and 9 female. SPSS 15.0 was used to run the analysis of this pilot data.

Piloted Demographic Questionnaire. Issues related to questions in the Demographic Questionnaire were found during its administration. For example, several of the participants were veterans of the military. This issue raised questions related to their highest level of education (see Appendix G, question # 2). They shared that they had completed high school and then went into the military. They wanted to know which educational category was more appropriate for them to select. The researcher suggested the trade or technical option. This led the researcher to include military service as an option in the question related to the highest level of education completed portion on the final Demographic Questionnaire (see Appendix H, question #2).

The next issue was the marital status of the participants (see Appendix G, question # 3). Some of the participants stated that they were still legally married but had been separated from their spouse for a number of years. These participants wanted an option of “separated” to be included on the demographic questionnaire. Not having this option caused some to choose the “married” option while others chose the “single”

option. Separated was added as an option to the question regarding marital status (see Appendix H, question # 3).

Another issue was with question 4 “who do you live with” (see Appendix G). Some of the married males did not want to check any option as they stated that they did not relate the word “mate” to their wives. The option of mate was deleted from the list and the option “I live with significant other” was added (see Appendix H, question # 4). In this question, several participants listed the actual names of those they live with instead of the relationships of those they live with. The researcher clarified that the requested information was referring to those who live with another family member such as children, grandchildren, friends, cousins, etc. to be listed and not their actual names. In addition, “I live with a friend” was added as an option in this question (see Appendix H, question # 4).

Another issue that was raised was related to the question about health insurance (see Appendix G, question #9). Some participants were retired and had insurance plans from their former places of employment and others had government supplemental healthcare insurance that was not listed among the options. Other participants were veterans and did not know how to classify the Veterans Administration (VA) insurance. This led the researcher to include the VA as a separate option and to add the option of governmental supplemental insurance (see Appendix H, question # 9).

Another issue was related to the question “Where do you go to receive health care?” (see Appendix G, question # 10). Some of the participants checked more than one option. They stated they received healthcare at a variety of settings as they sometimes go

to the emergency room and sometimes to their private physician's office. Some of the military veterans chose multiple answers and included the VA hospital as "other." They documented they went to the VA sometimes for primary healthcare and also to the emergency department for their primary healthcare needs. The researcher clarified participants were to choose only one option which best represented their primary source of health care. This led to the adding of "VA hospital" as an option (see Appendix H, question #10).

Finally, upon recommendation of the dissertation committee, questions asking the length of time that participants have had hypertension, been taking antihypertensive medications, the number of different medications, a list of health conditions and two questions related to participant understanding of written information about their medications were added (see Appendix H, questions # 11 - 16).

Piloted Demographic Questionnaire findings. The ages of the participants ranged from 52 to 75. Thirty seven percent of the participants were between the ages of 54-60. Eighty seven percent had a 12th grade level of education or higher. Only 12% had education levels below the 12th grade. The majority (69%) of the participants reported being married. Thirty seven percent of the participants lived alone and 31% lived with their spouse. Fifty six percent were retired, while 25% worked fulltime. Nineteen percent reported incomes of less than \$30,000, 37% had incomes from \$30,000-\$39,999 and 37% had incomes from \$40,000- \$60,000 or above. The majority of participants (81%) rated their health status as "good." Forty three percent indicated that they had more than one form of health insurance. This finding regarding having more than one source of health

insurance may be related to their lack of clarity with question #9 (see Appendix H) on the Demographic Questionnaire as previously mentioned. Finally, thirty seven percent indicated a private physician as their main source for health care while another 37% selected the option of “other.”

Piloted REALM findings. The researcher administered the REALM to the participants on an individual basis. In addition to the group explanation of the REALM administration, the researcher went over the instructions individually with the participants. Specifically, 12% of the participants had REALM raw scores in the 4th-6th grade range indicating low literacy levels and difficulty reading health information such as prescription information. Approximately 37% had raw scores in the 7th to 8th grade range indicating moderate literacy levels, and 50% had levels in the high school range. According to Davis et al. (1991), participants within the moderate range may struggle reading healthcare literature and will do better if the material is written at a lower literacy level. Those reading at the high school range are functionally literate and should be able to read healthcare literature and comply with healthcare instructions (Davis et al., 1991). In conclusion, these findings indicate that only half of the sample should be able to read patient education materials associated with healthcare.

Piloted HBCS findings. The Hill Bone Compliance Scale (HBCS) is a 14-item measure that assesses patient behavior for adherence to their respective blood pressure regimens (Kim et al., 2000). In addition, the 14-item scale is broken up into 3 subscales: sodium intake, adherence to related appointments, and medication adherence.

Chronbach's alpha was conducted on the full HBCS with 14 items with an alpha of .64 obtained.

Research Design

A descriptive correlational design was used to explain the association of predisposing, reinforcing, and enabling factors that are related to health literacy levels and adherence to antihypertensive regimens in older AA adults.

Sample and Sampling Plan

The target sample for the research included a convenience sample of English speaking AAs ages 50 years and older that had been diagnosed with hypertension and had been prescribed an antihypertensive regimen including medication.

A convenience sample of AA residents from housing communities in Forsyth County and who attend two predominately AA churches was solicited. There were four target subsidized housing communities in various locations in Forsyth County that predominately house AA residents that are 55 years of age and older. Two of these housing communities house approximately 100 residents each, while the other two house approximately 70 residents each.

A priori power analysis was done to determine the sample size. For multiple regression analysis, alpha was set at 0.05, and a medium effect size of 0.25 with a power of 80% obtaining a sample size of 108 participants (Soper, 2009). A final sample of 121 was obtained.

Inclusion criteria for the participants were as follows:

- 50 years of age or older
- African American ethnicity
- Diagnosis of hypertension
- Prescribed an antihypertensive regimen (medication or dietary restrictions)
- Able to follow verbal directions
- Able to understand English

Exclusion criteria for the participants were as follows:

- Visual deficits

Eligible participants were AAs who self reported they had been diagnosed with hypertension and are either currently taking antihypertensive medications or were under dietary restrictions related to their hypertension.

Data Collection

Data were collected using the DQ, the HBCS, and the REALM survey. Administration of the REALM took place first. Self-administration of the HBCS and the DQ occurred next. If participants had difficulty reading, the questions were read to them. The data from all three of these instruments were collected and analyzed by the researcher. This data collection process took place over a four to six week period. Having the data collected by the researcher assisted in maintaining consistency of the instruments' use.

Study participants were recruited by posting and passing out flyers in four subsidized housing communities that predominately house AA residents with permission

of the housing authority, and two local churches with predominately AA congregations with permission of church leaders. Prior to the posting and mailing of flyers, the researcher provided an overview of the research study to the church leaders and leaders of the subsidized housing developments. The researcher posted dates on the flyers for the participant recruitment session at the four housing developments and two churches. The sessions took place in meeting rooms or in conference rooms that were conveniently accessible and provided privacy.

The participant recruitment sessions involved the researcher giving an overview of the research study. This five to ten minute overview provided detailed insight of the research and allowed interested and qualified participants the opportunity to ask related questions. This overview also gave the researcher a chance to see if potential participants met inclusion criteria. The researcher read over the consent form in its entirety to the participants and provided the participants with a copy, allowing the participants to follow along with the researcher. After the overview was given, questions were answered and consent forms were signed. Interested and qualified participants were given the research instruments to complete. After the participants completed their sessions, they were given a Wal-Mart gift card worth \$10 for their time. Follow-up with the participants was not necessary for this research study. However, the researcher offered to provide results to the participants upon their request during the data collection process.

Data were collected over a four to six week period, allowing one week per site (four housing units and two churches). Each data collection session took approximately

fifteen to thirty minutes. Data collection sessions were scheduled as needed to obtain the desired sample size.

Protection of Human Subjects

Protection of human subjects was maintained throughout the research study. The proposed research study followed the procedures outlined by the Institutional Review Board (IRB) of the University of North Carolina at Greensboro. This process took place prior to the initiation of any portion of the proposed study. The consent form (see Appendix I) included information that addressed the right of the participants to withdraw from the study without penalty, the research study's purpose, procedures for data collection, confidentiality information, potential and actual participant risk associated with the study along with benefits, persons to contact if there were additional questions or concerns, and consenting signatures of both the participant and the researcher. During the explanation of the study and the informed consent process, the researcher informed participants that if they could not read or did not understand the information within the consent form, then the information would be read to them by the researcher. The researcher provided a copy to potential participants during the consent form process to allow them to follow along as the researcher read over the form. The researcher then asked participants if they understood the consent form. The researcher continued with this process until the consenting and eligible participant(s) verbalized understanding of the purpose of this study and what they were consenting to.

Participants were allowed to ask any questions for clarity and to express any concerns they had related to the research study and confidentiality. Those who were still

interested after the informed consent process were then asked to sign the consent form in the presence of the researcher. The consent form was written at the fifth grade reading level to assure participant comprehension and was assessed for readability. The researcher also read or clarified information within the questionnaires to participants upon their request.

All health risks including potential health risk, discomforts, and benefits were explained to the participants at this point. There was limited, potential health risks associated with the study. One particular psychological health risk noted in the literature was associated with the administration of the REALM. More specifically, participants could be subject to feelings of embarrassment or shame related to their inability to pronounce some of the terms on the REALM. To decrease the risk of embarrassment, participants were informed of their optional ability to go to a private area within the designated location to ask the researcher questions related to the study. Participants who requested to go to a private location due to embarrassment were also reminded of their right to not answer further questions and their ability to withdraw from the study without penalty. Additional issues that were considered prior and during the administration of the REALM included patient privacy and confidentiality (Brez & Taylor, 1997).

Subsequently, changes in body language, voice tone, and verbalization of diminished esteem were closely monitored. To address negative changes in participant body language and voice tone and diminished self-esteem, the researcher planned to redirect the participant using therapeutic communication strategies and to enforce the participants rights to privacy and to withdraw from the study without penalty.

All consent forms were kept in a locked file cabinet and were only accessible to the research team. The consent forms were kept separately from the questionnaires in a locked file. Participant numbers were not used on the consent forms and participant names were not used on the questionnaires. The questionnaires were also kept in a locked file cabinet that was only accessible by the research team. The researcher maintained a list of the participant's numerical codes to assure that all participants received compensation for participating in the research study. This list was kept in a password protected computer file that was accessible only to the research team. After data analysis was completed, the questionnaires were destroyed via shredding. Data were kept in a password protected computer file without identifying markers that could link information to a specific participant. No identifiable data were used in the disseminated findings from this study.

Instruments

Rapid Estimate of Adult Literacy in Medicine (REALM). The REALM is an instrument that measures health literacy levels in adults (Doak, Doak, & Root, 1996; Greenberg, 2001; Pawlak, 2005). The REALM is considered to be the most reliable and frequently used assessment tool in the determination of health literacy levels in healthcare settings (Bass, Wilson, & Griffith, 2003; Davis et al., 2006; Golbeck, Ahlers-Schmidt, & Paschal, 2005; Monachos, 2007; Osborn et al., 2007; Paasche-Orlow, Parker, Gazmarian, Nielsen-Bohlman, & Rudd, 2005). Paasche-Orlow et al. (2005) systematic review of 85 studies conducted in the United States that examined low health literacy prevalence revealed that 37 of the studies used the REALM to measure health literacy levels.

The REALM is also simple in its administration and does not pose a financial strain on the proposed research study. The REALM can be administered in approximately five to ten minutes (Greenberg, 2001) with three to five minutes being the standard administration time (Davis et al., 1993; Doak et al., 1996; Monachos, 2007; Paasche-Orlow et al., 2005). Administration of the REALM involves having a person read aloud words from a list of 22 medical terms per column that are arranged by syllabi in order of difficulty (Davis et al., 1991; Davis et al., 1993; Bass et al., 2003; Barragan et al., 2005; Osborn et al., 2007). The terms included in the REALM are based on a psychometric analysis of item difficulty and discrimination, and the frequency of the words usage in written patient material. The first three words of the REALM were chosen due to their simplicity, and their ability to boost confidence and decrease anxiety during administration (Davis et al., 1991). Furthermore, the terms included within the REALM are medically related and should be easily recognized by adults. More specifically, the words included in the REALM are associated with common body parts and illnesses that are more commonly used in written material and on health care forms (Davis et al., 1991; Davis et al., 1993).

Correct pronunciation of these words, according to the dictionary pronunciation, is the scoring standard for the REALM. The REALM produces a literacy score that is associated with health care knowledge, and a reading grade range (Davis et al., 1991; Davis et al., 1993). Furthermore, scores obtained from the REALM are affiliated with health care knowledge and reading grade ranges. Persons are given a copy of the REALM assessment and are asked to read the words out loud as listed in the three

separate columns, one column at a time. If there is a word that the person being tested cannot pronounce, the person should either verbally state “skip,” “blank or “next” to the REALM administrator or the person can just skip to the next term. The administrator uses a personal copy of the REALM and uses check marks or plus (+) symbols to mark the person’s pronunciations as either correct or incorrect. This should be done in a manner that does not discourage the client. At the completion of the REALM, the administrator adds up the points of the person’s correctly pronounced terms from all three columns. The column totals are added together to produce the person’s literacy score, with a maximum total score of 66. These scores are then transferred into grade equivalencies and used to indicate health literacy levels. REALM scores of 0-18 are equivalent to not being able to read at a third grade reading level, scores of 19-44 are equivalent to fourth to sixth grade reading levels, scores of 45-60 are equivalent to seventh to eighth grade reading levels, and scores above 60 are equivalent to a high school reading level (Davis et al., 1991; Davis et al., 1993).

REALM scores can be used to estimate a patient’s health literacy level in an effort to assist healthcare professionals in providing written and verbal health education at levels appropriate to the literacy level of the patient (Davis et al., 1991; Davis et al., 1993). In essence, health literacy scores from the REALM can be used to identify persons who cannot read, as well as those who may need simplified instruction (Davis et al., 1991; Davis et al., 1993). The 66-word version of the REALM was used to determine the participants’ health literacy levels. This version of the REALM has been tested in AA’s similar to the participant sample and has also been tested for reliability in the assessment

of health literacy levels and the prediction of health care outcomes with good results (Davis et al., 1991; Davis et al., 1993; Rosenthal et al., 2007).

During the initial validation of the REALM, reliability and validity was undetermined and required further investigation (Davis et al., 1991). It was thought that the REALM had value in healthcare settings to determine patient literacy but further research was needed to shorten the instrument. Shortening the instrument added practicability and simplified the administration of the instrument. Furthermore, physicians using the REALM were requesting a version that took less time to complete; more specifically two to three minutes (Davis et al., 1993). This request resulted in an additional study to validate a shorter version of the REALM. Thus, the REALM was reduced from 125 to 66 words (Davis et al., 1993). Retained words were based on a psychometric analysis of item difficulty and discrimination, and the frequency of the chosen 66 words usage in written patient material

Content validity of the REALM was based on health care terms commonly used in written material, health care forms, and related posters (Davis et al., 1993). These terms are those that adult patients should recognize such as body parts and illnesses (Davis et al., 1991). The terms were sent to experts to review. Only terms with 100% agreement were retained.

Predictive validity for the shortened REALM was conducted and compared with other measures of literacy such as the Slosson Oral Reading Test-Revised (SORT), the Wide Range Achievement Test (WRAT), and the Peabody Individual Achievement Test-Revised (PIAT-R), [(Davis et al., 1991; Davis et al., 2006; Osborn et al., 2007; Paasche-

Orlow et al., 2005)]. Raw scores for these literacy measures were compared using Pearson correlation coefficients. Correlations between the REALM and the SORT-R, the PIAT-R, and the WRAT-R were 0.96, $p < 0.001$, 0.97, $p < 0.001$, and 0.88, $p < 0.001$, respectively (Davis et al., 1993). In this study, 73% of the patients scored below ninth grade levels on the REALM and the SORT, and 75% of the patients scored below ninth grade levels on the PIAT and the WRAT-R (Davis et al., 1993). Based on these analyses, the REALM was determined to be a valid tool to screen for low literacy levels in adults.

HBCS. The Hill-Bone Compliance Scale (HBCS) is a measure used to assess adherence to antihypertensive regimens. The measure assesses behaviors based on three subscale domains associated with hypertension. These subscale domains are decreased sodium intake, taking medication or medication compliance, and keeping related appointments (Kim et al., 2000).

The HBCS takes approximately five to eight minutes to complete. Scores for the HBCS are determined based on 14 questions that contain information related to antihypertensive regimen adherence using a Likert Scale format of all of the time (4), most of the time (3), some of the time (2), and none of the time (1), (Kim et al., 2000). Scores from the HBCS range from 14-56, with 56 being the maximum score, indicating a higher rate of non-adherence (see Appendix E). Lastly, the measure can be broken up into subscales based on the three measures of hypertensive treatment (Kim et al., 2000). The subscales include sodium intake (items 3-5), medication compliance (items 6-8), and keeping related appointment (1, 2, 9-14) domains. According to Kim et al. (2000), these subscales were theoretically derived.

The HBCS was tested for reliability by Kim et al. (2000) using two different samples of AA participants. Chronbach's alpha of 0.74 was obtained in the first sample, and 0.84 in the second sample, confirming acceptable reliability.

Content validity of the HBCS scale was determined based on a panel of three physicians and five nurses who were specialists in hypertensive research and practice. After assessing the questions on the measure for relevance, representation of the behavioral subscales, appropriateness for AA population and clarity, 100% agreement among the healthcare specialists was achieved on the 14 items. Subsequently, two literacy experts analyzed the questions for difficulty and deemed the questions to be appropriately written at a fifth grade level (Kim et al., 2000).

Construct validity was supported using factor analysis (Kim et al., 2000). Factor analysis predicted a three-factor solution (the three factors that explained the most variance), based on the HBCS's theoretically established three dimensional subscales (sodium intake, keeping appointments, medication compliance). The eigenvalue (minimum 1.0) of the first factor was 3.74 and dropped to 1.66 for the second factor in the first sample, while the comparison group's eigenvalue was 4.97 and dropped to 1.65. More specifically, results of this factor analysis supported the three theoretical factors and the use of the HBCS measure's 14 items as a single factor in the assessment of adherence to high blood pressure regimens.

A correlational analysis was used to assess the HBCS predictive validity. Subsequently, the correlational analysis was done to see if adherence predicted the following: baseline blood pressure levels, blood pressure control post one year in the first

sample, and blood pressure control post three years in the comparison group. In addition, Kim et al. (2000) used the total scores of the HBCS and the measure's subscales to correlate baseline blood pressure levels and control status in both samples at baseline, at one year post baseline in the first sample, and at three years in the second sample. Results of the statistical analysis indicated higher correlations ($p < 0.05$) between the HBCS's total score and the measure's subscales scores in both samples. More specifically, results from this study showed that a high compliance (adherence) score had an association with blood pressure control, indicating more normalized blood pressure readings were apparent for those who adhered to their antihypertensive regimen.

Both Kim et al. (2000) and Krousel-Wood, Munter, Jannu, Desalvo and Re's (2005) study concluded that the HBCS holds reliability in its use in settings involving older Whites and AAs with hypertension. Kim et al (2000) concluded that the HBCS possessed high internal consistency reliability and predictive validity in the assessment of adherence to blood pressure regimens at two different intervals in AA patients in urban settings. Krousel-Wood et al. (2005) concluded that the use of the HBCS was feasible and thus reliable in outpatient settings involving elderly White and AA hypertensive patients. Furthermore, the medication compliance subscale in Krousel-Wood et al's (2005) study showed internal consistency and reliability (Chronbach's alpha of 0.68). However, Kim et al's (2000) study, did not report Chronbach's alpha for any of the HBCS measures subscales, which is a limitation in the comparison of the two studies.

Cronbach's alpha was conducted with the sample in this study to determine internal reliability of the HBCS. A Cronbach's alpha of .73 for the HBCS was achieved indicating satisfactory reliability. The total HBCS score was used in the analysis.

Demographic Questionnaire. The Demographic Questionnaire (DQ) was created by the research team responsible for the research study. The specific questions in the DQ were designed according to the issues that the research team identified as potential contributors to the adherence of a hypertensive regimen and that fit with the model guiding the research. The originally developed DQ contained 10 questions (see Appendix G) and was utilized in the pilot study to establish clarity of the survey questions and feasibility of the questionnaire for the proposed population. Changes were made to the DQ based on feedback from participants in the pilot study (see Appendix H). The final version of the DQ contained 16 questions, phrased clearly to enhance understanding and to facilitate participant completion of the questionnaire. The specifics of the changes are discussed in the pilot study results section.

Data Analysis Plan

Data analysis began with pre-analysis data screening for the three general assumptions involved in multivariate statistical analysis that are normality, linearity, and homoscedasticity. In addition testing for collinearity and interaction effects of the variables in the model was conducted followed by systematic model building and ending with multiple regression.

Table 1 (see below) illustrates the variables for the REALM, HBCS, and the DQ, along with the statistical tests used, followed by discussion of the data analysis plan. A

data entry and analysis was done using SPSS 17.0 for Windows software. After assessing for the assumptions of multivariate statistical analysis, collinearity, and interaction effects, descriptive statistics were conducted to describe the predisposing, reinforcing, and enabling factors. Spearman Rho correlations were conducted to assess for correlations among the predisposing, reinforcing, and enabling factors and adherence to antihypertensive regimen (HBCS) and health literacy (REALM). Finally, multiple regression analysis was conducted to explain the effects of the independent variables predisposing, reinforcing, and enabling on the dependent variable adherence to an antihypertensive regimen (HBCS) and health literacy (REALM). Dummy variables were created for the categorical variables in order to conduct multiple regression analysis (see Table 1).

Summary

A descriptive, correlational design was used to explain the association of predisposing, reinforcing, and enabling factors that are related to health literacy levels and adherence to antihypertensive regimens in older AA adults. A convenience sample of 108 English speaking AAs, ages 50 years and older was targeted. A pilot study was done to determine the feasibility of the DQ, REALM, and HBCS within the targeted population. Findings from the pilot study assisted in clarifying questions on the DQ, and were used to address issues encountered while administering the REALM and HBCS. Data analysis enabled the researcher to use descriptive statistics to describe the sample, and to explore the sample characteristics outlined by two modified versions of Green and Kreuter's (2005) PPM. Multiple regression analysis helped in explaining the effects of

the three factors on the participants' adherence to their antihypertensive regimens and their health literacy levels. Multiple regression analysis also assisted in assessing for relationships among the demographic variables, the HBCS and the REALM.

Table 1

Data Analysis Variables

Variable	DQ Question # or Instrument	Statistical Test
Predisposing	Predisposing	Predisposing
Age	DQ Question #1 (see Appendix H)	Descriptives, Spearman Rho, Multiple regression (MR)
Education (dummy variable)	DQ Question #2 (see Appendix H)	Descriptives, Spearman Rho, MR
Read Healthcare Information (dummy variable)	DQ Question #14 (see Appendix H)	Descriptives, Spearman Rho, MR
Understand Healthcare Information (dummy variable)	DQ Question #15 (see Appendix H)	Descriptives, Spearman Rho, MR
Reinforcing Factor	Reinforcing Factor	Reinforcing Factor
Healthcare Status (dummy variable)	DQ Question #8 (see Appendix H)	Descriptives, Spearman Rho, MR
Enabling Factors	Enabling Factors	Enabling Factors
Receipt of Healthcare (dummy variable)	DQ Question #10 (see Appendix H)	Descriptives, Spearman Rho, MR
Income (dummy variable)	DQ Question #7 (see Appendix H)	Descriptives, Spearman Rho, MR
Comorbidities (dummy variable)	DQ Question #16 (see Appendix H)	Descriptives, Spearman Rho, MR
Health Literacy	REALM (see Appendix D)	Descriptives, Spearman Rho, MR
Behavior	Behavior	Behavior
Adherence to Antihypertensive regimen	HBCS (see Appendix E)	Descriptives, Spearman Rho, MR

CHAPTER IV

RESULTS

Results of the data analyses are presented in this chapter. Descriptive statistics were used to describe the sample which included the independent variables for the predisposing factors (age, education, reading written prescription information, and understanding written prescription information), reinforcing factor (health status), and enabling factors (income, receipt of healthcare, comorbidities, and health literacy levels). Descriptive statistics were also used to explore sample characteristics. Multiple regression analysis was used to explain the effects of predisposing, reinforcing, and enabling factors on adherence (HBCS) and health literacy (REALM) levels and to assess for relationships between the demographic variables, the HBCS, and the REALM. There were 2 models. In the first model, adherence was regressed on the variables representing the predisposing, reinforcing, and enabling factors. In the second model, health literacy was regressed on the predisposing, reinforcing, and enabling factors. Multiple regression analyses were conducted to explain the association of the independent variables (predisposing, reinforcing, and enabling) on the dependent variable adherence to an antihypertensive regimen (HBCS) and on the dependent variable health literacy (REALM) in AA adults ages 50 and older.

Data Analysis

SPSS 17.0 was used to conduct the data analyses. Frequencies were conducted on all variables to assess for incomplete data and extreme values. No missing data were noted. This is believed to be due to the researcher assessing for incomplete responses in the presence of the participants. If items were left blank, the researcher informed the participant of their right to either answer the incomplete responses or to leave the item blank. The participants stated they inadvertently skipped over the item and then chose to answer the questions. The researcher recalls minimal times where this incident took place. An extreme value was noted in the 'read written prescription information' (readmedinfo) frequency. After reviewing the data, it was concluded that the researcher had coded the value incorrectly. The value for the variable was corrected according to the participant's documented response.

Assessment for Violations of Assumptions

Since multiple regression analysis was used to test the research questions, assessment of assumptions was conducted including tests for normality, linearity, multicollinearity, and homoscedacity. In addition, testing for outliers was conducted.

Normality. Normality in multivariate analysis is important and can be assessed using various methods including examining residuals and the distributions of the variables (Tabachnick & Fidell, 2007). Assumptions for normality were assessed for violations of assumptions using standardized residual histograms and normal probability (P-P) plots. According to Tabachnick and Fidell (2007), it is unnecessary to screen individual variables for normality in multiple regression analysis if the residual plots

appear normal. Although univariate normality does not guarantee multivariate normality (Tabachnick & Fidell, 2007), individualized assessments of the independent variables against the output variable were completed without noted major violations of assumptions. Therefore transformations of the data were not necessary.

Linearity. According to Mertler and Vannatta (2005) and Tabachnick and Fidell (2007), linearity is examined using standardized residual scatterplots. The assumptions of linearity in multivariate statistics include straight line relationships between all pairs of variables (Tabachnick & Fidell, 2007). In addition, the nonlinear relationships are not used in the model unless they are transformed. The scatterplots should form a rectangularly shaped distribution with equal distributions along the center of the plot (Mertler & Vannatta, 2005). Assessments of linearity in this study were completed using standardized residual scatterplots. Significant violations of linearity were not apparent in the examination of the residual scatterplots. The scatterplots exhibited a rectangular shaped distribution with values clustered around the zero line. Therefore, transformations of the data were not necessary.

Multicollinearity. Variables are known to sometimes provide similar information which increases their potential to problematically correlate with each other (Munro, 2001). This existence of moderate to high intercorrelations of variables is known as multicollinearity and should be assessed prior to regression analysis by examining a correlation matrix (Mertler & Vannatta, 2005). Multicollinearity was assessed using correlation statistics for all variables. Since the variables were either interval or ratio scale Spearman Rho correlations were conducted. Results indicated a moderate

correlation ($r = .532, p < 0.01$) between the variables 'read prescription information' and 'understand prescription information'. Statistical analysis can be used to decide if a variable should be excluded from the model or one may 'self-decide' (Tabachnick & Fidell, 2007). The variable 'read prescription information' was deleted from the model. It was concluded that 'read prescription information' and 'understand prescription information' were redundant measures and 'understand prescription information' was the variable that more specifically addressed the variable of interest in that an individual can read prescription information but not understand it.

Tolerance statistics and variance inflation factor are the preferable statistical methods used to assess multicollinearity (Mertler & Vannatta, 2005). The tolerance statistic assesses collinearity of the independent variables and the values should be greater than 0.1 on analysis. Measures of tolerance were examined in this study and acceptably ranged from .698 to .923. The variance inflation factor (VIF) relates to the predictor variable(s) indicating the existence of a strong linear association and should be less than 10.0 (Mertler & Vannatta, 2005). The VIF values in this study were examined and ranged from 1.084 to 1.432 with no indication of multicollinearity once the variable 'read prescription information' was removed.

Homoscedasticity. Homoscedasticity can be correctly assumed when the variability of values in one variable are quite similar to the other variable in a regression analysis (Mertler & Vannatta, 2005; Tabachnick & Fidell, 2007). Residualized scatterplots of the variables that have an apparent similar width are acceptable indicators of homoscedacity (Tabachnick & Fidell, 2007), which was evident for this study.

Outliers. Univariate outliers are apparent on the P-P plots (Tabachnick & Fidell, 2007) and were evident in this assessment. The detection of outliers in smaller data sets can be done using simple measures such as examining frequency statistics or visually examining histograms (Mertler & Vannatta, 2005). After identifying the outlier, further investigation is required to determine if the outliers were related to data entry errors. In the event that the outliers were not an error and are found to be legitimate values, then the outliers can remain in the data set. If the outliers are found to have a significant influence on the analysis, additional steps can be taken to reduce the relative influence. Further data analysis with and without the outliers can also be conducted (Mertler & Vannatta, 2005). One outlier was evident in the HBCS variable. A visual investigation was conducted within the HBCS variables to make certain that the value was entered correctly. The extreme value of the HBCS variable was found to be entered correctly for participant 117. This participant had the highest score ($HBCS_{total} = 49$) of all on the HBCS measure. An assessment for violations of normality was completed removing the outlier and the analysis results did not indicate a significant influence. Because the value was a true score for the participant and normality was not affected, the one outlier was not deleted from the HBCS variable.

Sample Characteristics

A sample of 108 participants was required to complete the research study according to the a priori power analysis. AAs were recruited from subsidized housing developments that primarily housed older AAs and 2 churches with predominately AA populations. Recruitment efforts initially resulted in 125 participants. Three of the

participants were younger than 50 years of age, not meeting the eligibility requirements necessary to participate in the study. One participant withdrew from the study after completing the consent form and responding to a few questions on one of the measures. This participant did not offer an explanation regarding the decision to withdraw. The final sample consisted of 121 AA participants; 61 male and 60 female.

Demographic Questionnaire Findings

Descriptives. The ages of the participants ranged from 50 to 87 years with a mean age of 59.75 ($SD= 7.94$). Approximately 54% of the participants were between the ages of 50 and 58. Seventy percent of the participants reported education levels up to 12th grade or equivalent. The remaining 30% reported having completed some form of post high school education such as a technical trade, community college, or a degree from a university or college. Sixteen percent of the participants reported being married while the remaining 84% indicated they were single, which included their being divorced, widowed, or separated from their spouse. The majority (82%) of the participants reported living alone and residing in subsidized housing (78%) while a little over half (59%) were unemployed. Only 25% reported working fulltime and 27% were retired. The majority (88%) of the participants had income levels of less than \$20,000 per year. When asked to rate their health status, 60% rated their health status as fair or poor while the remaining 40% rated their health status as good or excellent. Approximately 35% of the participants had no form of insurance while 49% had some form of government assisted insurance. Forty-six percent of the participants received their healthcare services from facilities that do not require up front co-payments such as free healthcare clinics, the public health

department, or the emergency room. Fifty-one percent of the participants reported having hypertension for 5 or more years, and 79% reported having taken antihypertensive medication for five or less years. When presented with the question of whether they understood the written prescription information, 59% reported understanding the information ‘often.’ Eighty one percent of the participants reported having at least one comorbidity in addition to their high blood pressure. The two most common comorbidities were high cholesterol (12%), and high cholesterol with diabetes (11%). Nineteen percent reported having no comorbidities.

Research Questions

First Aim. The first specific aim for this research was to explore adherence to antihypertensive regimens and health literacy levels in AAs ages 50 and older who have been diagnosed with HTN and subsequently prescribed an antihypertensive regimen. The first question that was addressed for this specific aim is:

- What are the adherence scores to antihypertensive regimens of older adult African Americans?

Frequencies were used to report this information. The overall mean HBCS total score was 24. Fifty one percent of the participants had HBCS total scores of 24 or higher. The lowest score was 14 (.8%) and the highest was 49 (.8%). This finding indicated that about half of the participants were not adhering to their antihypertensive regimens.

The second question that was addressed was:

- What are the health literacy levels of older adult African Americans?

Frequencies were used to report this information. The mean total REALM score was 46, with scores ranging from “0” (indicating that the participant was not able to read healthcare-related written material) to 66 (indicating a perfect REALM Score). Approximately 13% of the participants had total REALM scores at the ‘third grade or below’ range indicating low literacy levels and difficulty reading health information, such as prescription information. Approximately 55% of the participants had total REALM scores in the ‘fourth to eighth grade’ range indicating moderate literacy levels, and only 32% had total REALM scores in the high school range. According to Davis et al. (1991), participants within the moderate range or below may struggle reading healthcare literature and will do better if the material is written at a lower literacy level. Those reading at the high school level are functionally literate and should be able to read healthcare literature and comply with healthcare instructions (Davis et al., 1991). In conclusion, these findings indicated that the majority (68%) of the participants were not able to adequately read and understand written healthcare information and were functioning with inadequate health literacy levels.

Second Aim. The second specific aim was to explain predisposing, reinforcing, and enabling factors that may influence adherence to antihypertensive regimens and health literacy levels in AA adults ages 50 and older. The first question that was addressed related to this specific aim is as follows:

- To what extent do predisposing factors (age, education, and understand prescription information), a reinforcing factor (health status), and enabling factors (income, receipt of healthcare, comorbidities, and health literacy) explain

adherence (HBCS) to antihypertensive regimens in older Adult African American's ages 50 and older?

Spearman Rho analyses were used to answer this question (see Table 2) along with multiple regression analyses for both models. Significant correlations were found between adherence and age ($r=-.249, p< 0.01$) indicating younger participants tended to be non-adherent with their antihypertensive regimen as were lower educated participants ($r=-.200, p<0.05$). Those with a poorer health status were also more likely not to adhere to their antihypertensive regimen ($r=-.267, p< 0.01$). Participants who were older were more likely to understand prescription information ($r=.237, p<0.01$). Older participants were also more likely to receive private health care ($r= .414, p<0.01$) and had higher income levels ($r= .190, p<0.05$). Those with higher education levels were more likely to report an 'excellent or good' health status ($r=.232, p< 0.05$), have higher income levels ($r=.391, p< 0.01$) and have higher literacy scores ($r=.505, p<0.01$). Those who understood prescription information had higher literacy scores ($r=.242, p<0.01$), and were more likely to receive private health care ($r=.196, p<0.05$). Those with higher income levels were more likely to report an 'excellent or good' health status ($r=.186, p<0.05$), receive private health care ($r=.334, p<0.01$) and had higher literacy scores ($r=.236, p<0.01$). Last, those who had more than one comorbidity were more likely to understand prescription information ($r=.192, p<0.05$), and were more likely to receive private health care ($r=.235, p<0.01$).

Table 2

Spearman Rho Correlation with Predisposing, Reinforcing, and Enabling Factors with HBCS and REALM (N= 121)

Variable	1	2	3	4	5	6	7	8	9	10
HBCStotal	1.00	-.249**	-.200*	-.141	-.102	-.267**	-.101	-.082	.042	-.101
Age	-	1.00	.025	.237**	.180*	.083	.190*	.414**	.168	-.049
Edu	-	-	1.00	.112	.204*	.232*	.391**	.119	.099	.505**
UnderstdRxinfo	-	-	-	1.00	.532**	.081	.044	.196*	.192*	.242**
ReadRxinfo	-	-	-	-	1.00	-.027	.110	.221*	.130	.424**
Healthstat	-	-	-	-	-	1.00	.186*	.085	.065	.003
Income	-	-	-	-	-	-	1.00	.334**	.117	.236**
HCreceipt	-	-	-	-	-	-	-	1.00	.235**	.051
Comorbids	-	-	-	-	-	-	-	-	1.00	.052
REALM	-	-	-	-	-	-	-	-	-	1.00

*Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Standard multiple regression were conducted for Model # 1 with all of the independent variables in the predisposing, reinforcing, and enabling factors to explain adherence to antihypertensive regimens and were entered as one block to assess the effect of all possible predictor variables within the three factors (see Table 3). Regression results indicated that the overall model significantly predicted adherence to antihypertensive regimens ($R^2 = .164$, $F = 2.738$), (8, 112), $p < 0.01$. However, the variables

only explained 16% of the variance in adherence. Age ($\beta = -.247, p < .01$) and Health Status ($\beta = -.180, p < .05$) were the only significant predictors of adherence to antihypertensive regimen indicating that those who were younger and reported ‘poor’ or ‘fair’ health status were more likely to not adhere to their antihypertensive regimen.

Table 3

Multiple Regression Analysis with Predisposing, Reinforcing, and Enabling Factors with Adherence (HBCS) (N= 121)

Variable	β	t	p
Age	-.247	-2.485	.014 *
Edu	-.086	-.833	.407
UnderstdRxinfo	-.091	-.978	.330
Healthstat	-.180	-2.003	.048*
Income	-.013	-.138	.891
HCreceipt	.091	.885	.378
Comorbids	.149	1.642	.103
REALM	-.162	-1.602	.112

* $p < 0.05$

$R^2 = .164$

$F = 2.738$

The second question addressed Model #2 and was:

- To what extent do predisposing factors (age, education, and understand prescription information), a reinforcing factor (health status), and enabling factors (income, receipt of healthcare, and comorbidities) explain health literacy in older Adult African American's ages 50 and older?

Standard multiple regression was conducted with all of the independent variables in the predisposing, reinforcing, and enabling factors to explain health literacy and were entered as one block to assess the effect of all possible predictor variables within the three factors (see Table 4). Regression results indicated that the overall model significantly predicted health literacy ($R^2 = .269$, $F = 5.594$), (7, 113), $p < 0.01$ but explained only 27% of the variance. Education ($\beta = .446$, $p < 0.001$) and Understand Prescription Information ($\beta = .228$, $p < 0.01$) were the only significant predictors contributing to health literacy indicating that those who were more highly educated were more health literate and those who were more health literate were also better able to understand prescription information.

Table 4

Multiple Regression Analysis with Predisposing, Reinforcing, and Enabling Factors with Health Literacy (REALM) (N= 121)

All variables	β	t	p
Age	-.054	-.584	.560
Edu	.446	5.178	.000***
UnderstdRxinfo	.228	2.728	.007**
Healthstat	-.050	-.595	.553
Income	.079	.905	.367
HCreceipt	-.076	-.794	.429
Comorbids	-.005	-.054	.957

** $p < 0.01$

*** $p < 0.001$

$R^2 = .269$

$F = 5.594$

Summary

One hundred twenty one AAs ages 50 years and older were recruited from subsidized housing developments and churches to explore health literacy and adherence to antihypertensive regimens. Descriptive analysis, correlations, and two separate multiple regression models were used to examine the predisposing, reinforcing, and enabling factors that contributed to adherence and health literacy. More than half of the participants were ages 50 to 58, representing the ‘younger’ age range of the sample. The mean age of the sample was 59. Less than half of the participants had more than a high

school education. The majority of the participants had low income levels, had HTN for at least 5 years, had been taking medications for five or less years, and had at least one comorbidity. Most of the participants were not adhering to their antihypertensive regimens and were functioning with inadequate health literacy levels. In addition, those who were in the 'younger' age range and self-reported a 'fair' or 'poor' health status were more likely not to adhere to their antihypertensive regimen. Those who were higher educated were more literate and understood prescription information. Both models tested were significant but explained only 16% and 27% of the variance.

CHAPTER V

DISCUSSION

The overall purpose of this research was to explain the association of predisposing, reinforcing, and enabling factors that are related to adherence to antihypertensive regimens in AA adults ages 50 and older using a modified version of Green and Kreuter's (2005) Precede-Proceed model. A second purpose was to explain predisposing, reinforcing, and enabling factors that are related to adherence to hypertensive regimens and health literacy in AA adults ages 50 and older. This chapter provides an interpretation of this study's research findings, limitations, implications for nursing, and recommendations for future research.

Interpretation of Research Findings

First Aim Question 1. The first question used to address this specific aim dealt with the adherence scores of older adult African Americans. Adherence scores were measured using the HBCS total scores with higher scores indicating non-adherence. Over half of participants had HBCS total scores of 24 or higher indicating that over half of participants were non-adherent to their antihypertensive regimens. This is similar to research conducted by Gatti et al. (2009) who found a 53% non-adherence rate to prescribed general medications among AA women. They found negative beliefs about medications and younger age significantly associated with non-adherence. Bosworth et

al. (2008) also found a 50% non-adherence rate for the African American participants in their study. They found that AAs were more likely than Whites to have inadequate baseline blood pressure control defined as equal to or greater than 140/90 mmHg. Factors they found that explain this disparity were being older and reporting hypertension medication non-adherence. Heckler et al. (2007) studied AAs and found that believing diet, age, and weight were related to hypertension was associated with lower systolic blood pressure and adherence to a medical regimen for hypertension. However 69% of their subjects had uncontrolled blood pressure (>140/90) and 83% were overweight or obese. There were no sex or age differences. These findings indicate that health beliefs related to hypertension have an effect on adherence to hypertensive regimens. Health beliefs related to hypertensive regimens have not been extensively studied. These studies highlight the need for further study within this area.

First Aim Question 2. Very few participants had total REALM scores in the low literacy level range while more than half had total REALM scores in the moderate literacy level range. A total of 70% reported literacy levels up to the 12th grade or equivalent. This finding may reflect the socioeconomic status of participants from subsidized housing. Rental payments for subsidized housing are often income based. More specifically, most of the participants lived in subsidized housing and had limited income levels. Bosworth et al. (2008) found that 45% of AA participants in their study had less than 12th grade health literacy levels based on their REALM scores. Unlike Bosworth et al. (2008) this study found well over half of the participants had less than

12th grade health literacy levels. However, Kalichman and Rompa (2000) found similar results to this study where 79% of the participants reported less than 12th grade education levels as did Arozullah et al. (2006) who found that more than half of participants had literacy levels at the eighth grade level or less while only 25% reported not completing high school. Both of these studies included largely AAs but also Whites and Latinos. All of these studies indicate that overall AAs literacy levels are low which makes it difficult for them to understand prescription and hypertensive regimens given them by healthcare providers. The need for healthcare literature which includes prescription drug information written at lower literacy levels was supported by a study conducted by Banta et al. (2009) with findings suggesting efforts to improve healthcare outcomes should focus on health literacy levels in diverse populations.

Second Aim Question 1. Age was found to significantly explain adherence indicating younger participants tended to be non-adherent to their antihypertensive regimen. About half of the participants in the current study were between the ages of 50 and 60 and comprise the ‘younger’ population. Younger participants were found to be more non-adherent to their antihypertensive regimen possibly because they did not understand the seriousness of their illness or they may not thoroughly understand what is expected of them in caring for their hypertension. Gatti et al. (2009) found similar results with younger participants less adherent than older participants as did Banta et al. (2009). Being older and adherent may be related to the older participants recognizing their immortality where younger people are generally not as concerned with this. For example

50 to 60 is the age when a person typically is first diagnosed with diseases such as diabetes, hypertension, and high cholesterol. Having a lifestyle changing diagnosis at a 'young' age may create difficulty in accepting this because of not feeling or appearing sick and possibly consider themselves as too young to be sick.

Due to the current healthcare focus on primary health and illness prevention, people are living longer (CDC, 2009). The current healthcare trend of illness prevention encourages healthy living on a daily basis instead of waiting for middle adulthood to prepare for a conservative style of living. Middle adulthood was typically age 40 but since people are living longer, it is now considered as age 50 or older. Participants in this study younger than age 62 did not qualify for Medicare while those older in age in this study met the age qualification for Medicare. Having appropriate healthcare coverage may explain the older participants' adherence to their antihypertensive regimens when compared to the younger participants. Last, older participants having reached their 'golden years' may be focusing on their life span and mortality and therefore were more adherent to their health care regimens. Hekler et al. (2008) found older age to be associated with higher levels of adherence supporting the findings in this study. However, Bosworth et al. (2008) found that younger populations had higher medication adherence scores.

Health status was also found to significantly explain adherence to antihypertensive regimens indicating that those who reported 'poor or fair' health status were more likely to not adhere to their antihypertensive regimen. Banta et al. (2009) also

found a significant relationship between adherence and poor health status using a sample of hypertensive participants. In the current study, the relationship between poor health and adherence was as expected in that not adhering to an antihypertensive regimen would directly influence one's health status. More specifically, participants who reported poor health may not understand the correlation between adherence to a hypertensive regimen and their poor health highlighting a population in need of interventions. A focused intervention for this population geared towards strategies that would assist in their adhering to their antihypertensive regimens could also result in their reporting a better health status. Examples of potential interventions include inquiries of specific issues that interfere with their ability to adhere to their regimens and the development of strategies addressing the issues. More specifically, since participant findings in this study indicated affordability issues due to low finances, a plan exploring cost-saving efforts that would allow antihypertensive medications to be purchased at minimal cost is needed. Pharmaceutical companies could develop these programs in partnership with government assistance programs. Reduced medication cost would assist in freeing up participant finances for use in hypertension management.

Other significant findings include participants with lower educational levels were more likely not to adhere to their antihypertensive regimen and those with higher education had higher literacy scores. As for education, Mika et al. (2005) and Schloman (2004) found similar results with participants without a high school diploma having lower literacy scores. Similar to findings in the current study, Banta et al. (2009) found that

participants who were non-adherent, had lower education levels than their adherent counterparts. The Agency for Healthcare Research and Quality (AHRQ, 2007) also found that participants with low health literacy levels were 12 to 18 times more likely to lack the ability to comply with their health care regimens. Corbie-Smith et al. (1999) in their study concluded that patients belonging to minority groups or ethnic backgrounds who may have limitations associated with their formal education, including limited literacy levels, and cultural and linguistic barriers often have difficulty comprehending written medical information provided to them which undeniably contributes to non-adherence to health care regimens.

Safeer and Keenan (2005), and Wolf, Gazmararian, and Baker (2007) found that participants with inadequate health literacy skills were subject to having higher rates of non-adherence to their medical regimens. They concluded that limited health literacy had an association with adherence to medical regimens. However, in the current study a significant association between adherence and health literacy was not found. One possible reason may be that participants in this study completed the adherence questionnaire (HBCS) purposely indicating low adherence hoping to receive assistance with their medical regimen from the researcher. Another possible reason is that this study found older participants to be more adherent and to have higher levels of education. In addition, most of the participants had been diagnosed with hypertension for at least five years, allowing time to adjust to their diagnosis and to develop a moderate level of understanding their antihypertensive regimen. However, the insignificant association

between adherence and health literacy creates opportunities for further research as there are unanswered questions that need further study.

Second Aim Question 2. Education and understanding prescription information significantly explained health literacy. Participants who had higher levels of education were more health literate and those who more health literate could understand the written prescription information. With few participants indicating that they completed some form of post high school education and fewer completing high school, this finding represents a small portion of the participants in this study. Paasche-Orlow et al. (2005) found that low health literacy levels were more prevalent in minorities with lower levels of education. Similarly, Morrow et al. (2006) found that older, less educated adults had lower health literacy levels. Koo et al. (2006) found that persons with low health literacy and low education levels were less likely to seek written health information. It is not surprising that those with higher education levels are more literate and are able to comprehend healthcare information. These findings suggest that interventions to improve health literacy levels and comprehension of health information need to focus on those persons who lack a high school education.

Limited levels of health literacy were also found to have a strong association with socioeconomic factors such as lower levels of education, minority groups, and older age (Paasche-Orlow & Wolf, 2007). In the current study 68% of participants literacy levels were at the 8th grade level or lower. This finding indicates the need for health information including prescription information to be written at 6th to 8th grade levels. The older

participants in this study had higher levels of health literacy, more likely related to their higher levels of education.

von Wagner, Steptoe, Wolf, Wardle's (2009) study found an association between low health literacy and positive healthcare outcomes. Sudore et al. (2006) found low literacy rates were associated with poor health and illnesses such as diabetes and depression, and poor access to health care. Wolf, Gazmararian, and Baker (2005) found an association between low health literacy and all-cause mortality among Medicare recipients. In the current study no significant relationship was found between health literacy and health status. This is possibly due to the self-reporting of health status which may represent some bias. More specifically, the participants may have had different perceptions of a 'poor' health status or unspecified reasons for reporting a 'poor' health status. Since a definitive definition was not given, participant bias' according to their personal perceptions may explain this finding.

Other significant findings in the current study include older participants were more likely to understand written prescription information, and receive private healthcare. This reflects a population that is older, who desires to access and understand their health-related information, and therefore seek out health care. Although age and education were not correlated, those with higher education levels were more likely to report a more stable health status, have higher income levels, and have higher literacy scores. Brown, Lombardi and Herrera (2003) found similar results between education and functional health literacy with higher education having a direct influence on functional

health literacy. The higher education level correlations in the current study reflect a group that is more health literate and willing to take charge of their personal health while those with lower educational levels reflect a group that may not fully understand their antihypertensive regimen and therefore not adhere to it. Participants, who were more likely to understand prescription medications, were more likely to receive private health care, have more than one comorbidity, and have higher literacy scores. Once again this reflects a population that is in charge of their personal health.

Participants who had higher income levels were older, were more likely to receive private health care, and were more health literate reflecting a more advantaged group. These participants were also more likely to report a more stable health status, reflecting participants that understand their health condition are likely to see a health care provider. Last, participants who were more likely to receive private health care had more than one comorbidity.

The income levels in this study were low with most having an annual income of less than \$20,000. This annual income level may impede their aspirations in wanting to spend their money on seeing a physician or buying medications. In addition, most of the participants lived alone and lived in subsidized housing. These statistics (low income, single, income based housing) tend to generate a focus geared more towards overcoming economic difficulties than spending money on health care. In other words, their financial limitations may interfere with their ability to afford things outside of what they consider to be their daily necessities of food and shelter.

Participants with higher incomes were found to be more health literate. This finding is supported by research conducted by Morrow et al. (2006), NCES (2003b), and Schoenberg (1997). They found income level, participants' ability to access healthcare (i.e. private healthcare practice, a free clinic, etc) and having more than one health conditions (comorbidities) were significant factors associated with a person's health literacy. Koo, Krass, and Aslani (2006) found similar results in their investigation of various factors (capable of reading, understanding, and acting on health related information) that influence whether or not a patient seeks written medical information (WMI). They found that low health literacy levels correlated with decreased seeking and reading of WMI.

Modified version of Green and Kreuter's (2005) PPM. Two modified versions of Green and Kreuter's (2005) PPM were used to guide this study. The first model focused on adherence as an outcome variable while the second model focused on health literacy as an outcome variable. Both models provided guidance in defining the variables within the predisposing, reinforcing, and enabling factors that significantly explain adherence and health literacy in AAs ages 50 and older. However, the variables in the first model only explained 16% of the variance in adherence and the second model only explained 27% of the variance in health literacy. Therefore, the models did not provide support in identifying the majority of significant variables that explain adherence and health literacy levels in this population.

Limitations

Self-reported data (HBCS and demographic questionnaire) were used to solicit responses in this research. Measures obtained by self-report may not always elicit the most accurate responses as persons tend to exaggerate their responses (Osterberg & Blaschke, 2005). However, self-reports are one of the most frequently used methods to collect data and are also less expensive than other methods (Osterberg & Blaschke, 2005). Self-reporting the adherence data on the Hill-Bone Compliance Scale may have increased the risk of inaccuracies or false reports by the participants to antihypertensive regimens in an effort to please or impress the researcher. In addition, negative effects pertaining to conditions associated with co-morbidities, and individualized circumstances related to a person having multiple diagnoses and thus requiring several medications and regimens may have skewed the statistical results of this research.

Most of the participants had annual income levels less than \$20,000 and the majority of participants lived in subsidized housing. These factors limit the ability to generalize this information to populations in other areas. The target age of the sample was 50 years of age and older. The participants were not required to provide identification. Not requiring identification of age may have attracted participants who did not meet the age inclusion criteria. Identification was not required in order to increase the researcher-participant trust. Proof of a participant's hypertension status and an associated health care regimen was also not required. Therefore the participants could have been

younger than was specified on their demographic forms, may not have been diagnosed with hypertension, and not be on an antihypertensive regimen.

The REALM had to be researcher administered while the other surveys were self administered. This led to lapses in the time in administration of the REALM to the participant groups. The time was even longer if the participants needed help in completing the other surveys. Because the REALM had to be researcher administered, the researcher lost some of the participants due to the time it took with each individual participant. The researcher did not document the number of participants that needed assistance in completing the surveys. This information may have been beneficial in explaining some of the information that was otherwise lost in the data collection period of this study.

A few participants at all sites requested that the researcher assess their blood pressures. This was different from what occurred during the pilot study data collection phase where potential participants stated that they were skeptical to participate if their blood pressure would be taken. Based on the information received during the pilot study data collection, blood pressures were not obtained during this study's data collection period.

Additional limitations of this study included the convenience sample of participants coming only from Forsyth County. Having a sample from one minority group, and living in one county in a specific city minimizes the study's generalizability to other ethnicities and geographical areas. The majority of the participants for this research

came from subsidized housing communities, who may generally have lower socioeconomic backgrounds. Administering a health literacy level assessment and requesting the self-administration of an adherence measure to minorities who potentially have a low socioeconomic status, and reside in subsidized housing communities could be considered as an unfair assessment because of their underlying disadvantaged circumstances. However, participants from churches were included to balance the potential low socioeconomic status and increase variability in the study.

In spite of these limitations, this study was significant because effective interventions for antihypertensive regimens and adherence treatment for older adult AAs is limited and remains a complex phenomenon. In addition, older AA adults experience health care deficits associated with low levels of health literacy (Greenberg, 2001). Furthermore, the relationship between low levels of health literacy and health risk behaviors such as adherence to medical regimens had not been thoroughly investigated (Wolf, Gazmararian, & Baker, 2007). Finally, in-depth research endeavors exploring barriers that are associated with lower health literacy in AA populations are needed to assist in decreasing mortalities and morbidities associated with their non-adherence to their antihypertensive regimens.

Implications for Nursing

Nurses can play a large role in enhancing communication efforts in healthcare and improving adherence to medical regimens. In conjunction with the *Healthy People 2010* goals of improving health communication and adherence to hypertensive regimens, there

are several avenues available for nurses to assist older adult AAs in improving their health literacy levels and adherence to their antihypertensive regimens. First, nurses who work in various settings including hospitals, skilled nursing facilities and community centers, need to be aware that health literacy may be an issue for many of their patients. With this in mind, it is imperative for nurses to communicate with patients on a comprehensible level and to provide health care (hypertension) information at a 6th to 8th grade levels to ensure comprehension. When conducting patient teaching, having patients repeat or ‘teach-back’ what was taught is one way to ensure comprehension of the provided information. Nurses can also include health literacy assessment information in admission procedures to make certain that appropriate resources are available to the patient in a timely manner. Nurses need to be aware of the effect patients’ literacy levels have on health care cost. For example, in the US, cost related to decreased health literacy and the resultant patient care is between \$106 -\$238 billion yearly in preventable healthcare expenditures (Jukkala, Deupree, & Graham, 2009). Providing patients with comprehensible health care and prescription information improves health outcomes and reduces health care costs.

Second, nurse educators can make an effort to incorporate research findings and information on health literacy and adherence by creating environments that promote effective health communication. Training regarding usage of scientifically developed information or interventions along with consistent evaluation of these interventions regarding health literacy in clinical and academic settings is essential to the promotion of

this health communication initiative (USDHHS, 2000). This includes incorporating a health literacy component into the curriculum in an academic setting and assessing patient health literacy levels in hospital or clinic settings. Given that the US is a country with diverse populations that include minorities and various ethnicities, it is vital that graduate and undergraduate nursing students understand the implications of health literacy on patient health outcomes and that these implications are considered in daily nursing practice.

Third, nurses need to become more involved in the decision making process as it relates to interventions that lead to positive outcomes in hypertensive patients. Nurse researchers working in hospital settings and community centers caring for hypertensive patients should explore factors that influence adherence such as increasing access to healthcare information, and consider the health literacy levels of their health care populations in order to provide appropriate interventions and improve health outcomes. As found in this study, the disadvantaged groups who were most non-adherent were the younger elder AAs, who have less education and who reported a 'fair' or 'poor' health status.

Last, nurses can be patient advocates collaborating with pharmaceutical companies by sharing research results related to patients' literacy levels and issues that affect adherence to their antihypertensive health care regimens. Furthermore, nurses can encourage these companies to print prescription information at lower literacy levels to ensure broader comprehension of the information. Developing audience appropriate

information with a focus on the underserved is an intervention necessary to address minority populations that have disparate conditions associated with low health literacy.

Recommendations

According to the USDHHS (2000) *Healthy People 2010* report, communication should be used as a strategy to improve health outcomes. Communication regarding health is one of the necessary elements needed to enhance personal health and public health (USDHHS, 2000). This goal to improve health communication can be accomplished by enhancing a person's access to health information and increasing a person's ability to adhere to their healthcare regimens. To accomplish this, specific characteristics such as age, education, income, ethnicity, experience in successfully maneuvering through the healthcare system, attitudes or perspectives toward specific comorbidities, and willingness to access healthcare services must be considered (USDHHS, 2000). In addition, USDHHS (2000) has established a goal geared toward increasing the health literacy levels of those who lack adequate literacy skills, with a focus on underserved populations.

The *Healthy People 2010* report also addresses adherence to hypertensive regimens (USDHHS, 2000). A target of 50% of adults with hypertension whose blood pressure is under control has been set for 2010. Between the years 1988-1991, only 19% of those 18 and older had their blood pressure under control. Hypertension is called the "silent killer" and is known as a major risk factor for coronary heart disease, cardiovascular disease and heart failure. Hypertension is more prevalent among older

persons. As the US population continues to age and live longer, the problem of hypertension and its accompanying diseases becomes a critical factor that needs to be addressed. Although there are many treatments to treat hypertension and its accompanying disease states, it is realized that non-adherence is the major factor in prolonging the disease state (USDHHS, 2000). Experiences with long term management of hypertension have found that adherence to a hypertensive regimen is a major problem. For example, patients may choose not to fill prescriptions, may initiate a medical regimen only to abandon it after a few weeks or months, or may comply with only parts of the prescribed medial regimen. Research is needed to explain the determinants of adherence to ensure that patients stay with their prescribed hypertensive regimen. In addition, nurses and other health care providers play a vital role in determining if patients are adequately educated in the prescribed regimens and are adequately monitored to achieve the desired therapeutic response.

Increasing efforts aimed at closing the gaps related to the effects of low health literacy is essential in the reduction of health disparities (USDHHS, 2000). Recommendations to address health literacy related disparities should include dissemination of information that has been documented as effective in improving health literacy and antihypertensive adherence of AAs aged 50 years and older in appropriate publications and documents regarding healthcare disparities. Additional efforts as recommended by USDHHS (2000) are the distribution of audience appropriate material and the offering of health literacy programs in professional organizations, public

organizations and schools preparing health care providers. The development of appropriate health care material and training regarding effective utilization of the material will lead to measurable improvements in health literacy and adherence to health care regimens (USDHHS, 2000). In addition, USDHHS recommends greater community involvement and support and greater use of technology such as the internet to promote adherence to healthy life styles and pharmacological regimens.

Summary

Research involving health literacy is limited in the nursing literature. This is an issue that nurses can no longer ignore given their roles as patient providers, caregivers, and patient advocates. It is imperative for nurses to use comprehensible strategies for those with low health literacy in daily practice areas and to include health literacy assessment techniques in clinical and academic settings. The purpose of this study was to explain the association of predisposing, reinforcing, and enabling factors that are related to adherence and health literacy in antihypertensive regimens for AA adults ages 50 and older. Findings from 121 AA participants suggested that age and health status were significant predictors of adherence and education, and understanding prescription information were significant predictors of health literacy. The majority of the participants had low income levels, at least one comorbidity, and were functioning with inadequate health literacy levels. The ‘younger’ elder participants were more non-adherent to their antihypertensive regimens than participant’s ages 60 years and older.

Recommendations for future research include replication of this study with a larger AA population with consideration of including other minority groups for comparison. Research on basic interventions such as providing health and prescription information at lower reading levels and researching their effect on patient outcomes can be a beginning point for intervention research. Research is also needed investigating the relationship between the ‘younger’ (ages 50-60) and elder AA population. Studies should focus on this population’s health status and adherence to antihypertensive regimens to better understand why this age group is not seeking healthcare and are not adhering to their prescribed regimens. Finally, more nursing research using variables that may better explain health literacy and adherence to antihypertensive regimens is needed. Nurses spend the most time with patients and the time spent can be used to improve patient outcomes by better understanding the unexplained factors that influence health literacy and adherence to prescribed medical regimens.

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APPENDIX A

ACTUAL PRECEDE-PROCEED PLANNING MODEL

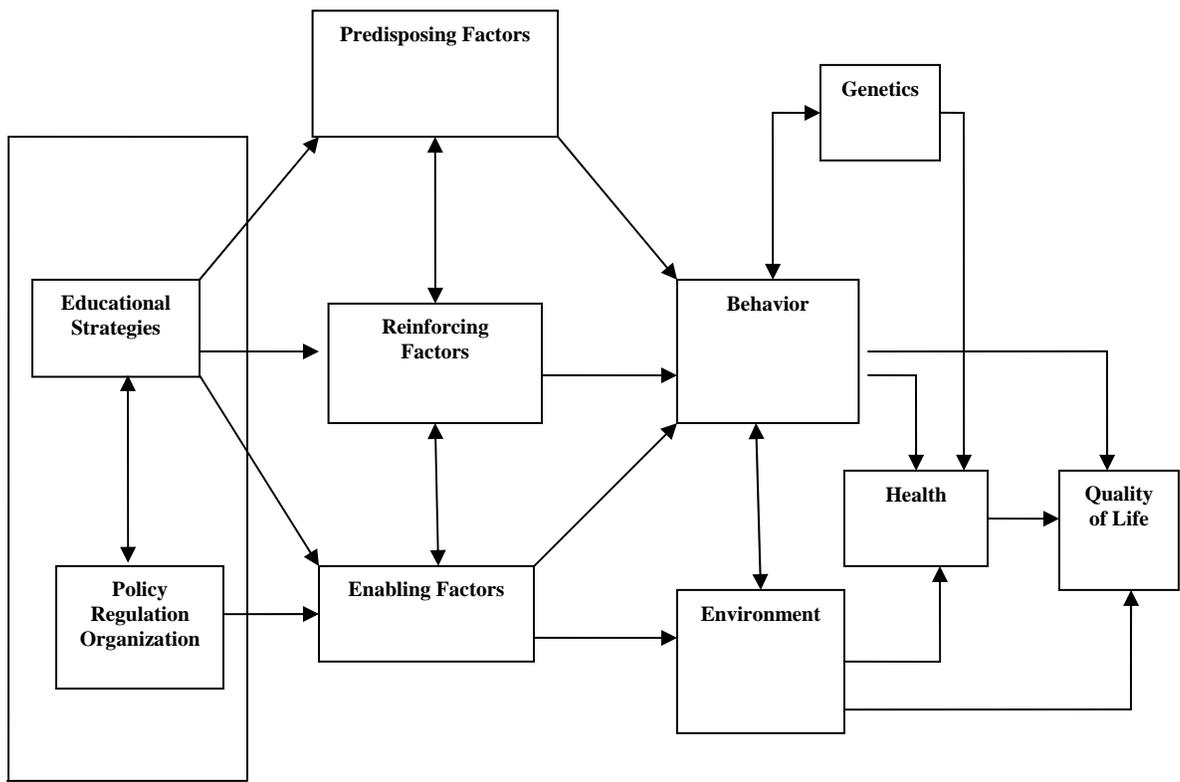
PRECEDE

Phase 4
Administrative and Policy Assessment
Assessment and Intervention Alignment

Phase 3
Educational and Ecological Assessment

Phase 2
Epidemiological, Behavioral, and Environmental Assessment

Phase 1
Social



Phase 5
Implementation Evaluation

Phase 6
Process Evaluation

Phase 7
Impact Evaluation

Phase 8
Outcome

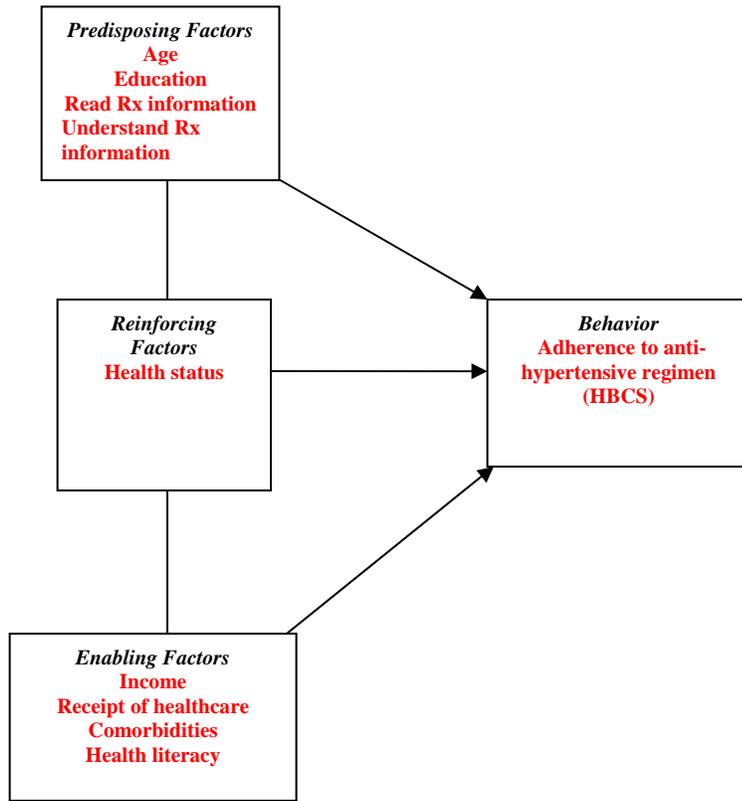
PROCEED

Glanz, Rimer, & Lewis (2002); Green & Kreuter (2005)

APPENDIX B

MODIFIED STUDY PRECEDE-PROCEED PLANNING MODEL #1

PRECEDE

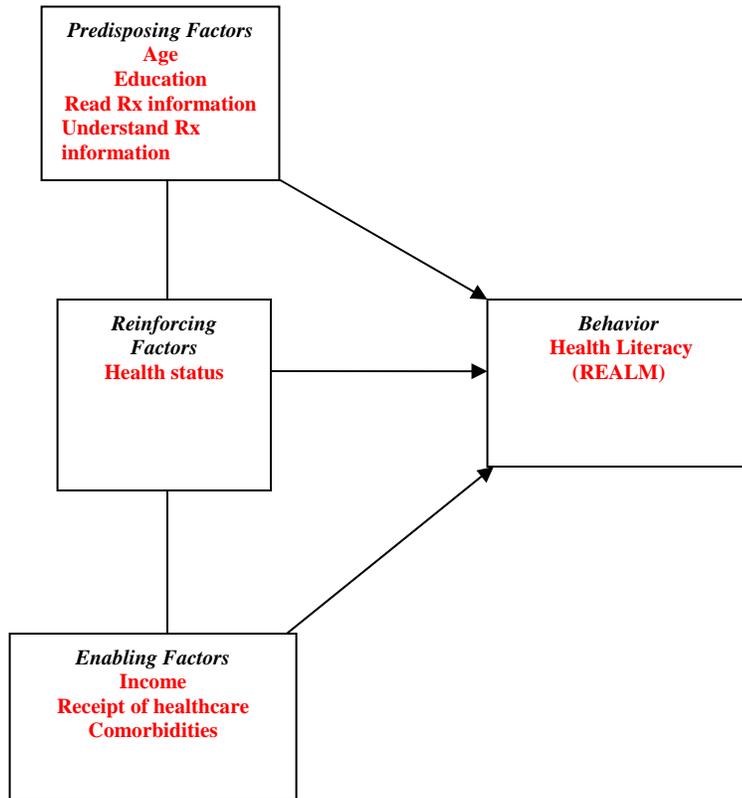


PROCEED

APPENDIX C

MODIFIED STUDY PRECEDE-PROCEED PLANNING MODEL #2

PRECEDE



PROCEDE

APPENDIX D

REALM

RAPID ESTIMATE OF ADULT LITERACY IN MEDICINE
(REALM)©

Terry Davis, PhD · Michael Crouch, MD · Sandy Long, PhD

Patient Name/
Subject # _____ Date of Birth _____ Ranking
Level: _____
Grade _____
Completed _____

Date _____ Clinic _____ Examiner _____

List 1	List 2	List 3
fat _____	fatigue _____	allergic _____
flu _____	pelvic _____	menstrual _____
pill _____	jaundice _____	testicle _____
dose _____	infection _____	colitis _____
eye _____	exercise _____	emergency _____
stress _____	behavior _____	medication _____
smear _____	prescription _____	occupation _____
nerves _____	notify _____	sexually _____
germs _____	gallbladder _____	alcoholism _____
meals _____	calories _____	irritation _____
disease _____	depression _____	constipation _____
cancer _____	miscarriage _____	gonorrhea _____
caffeine _____	pregnancy _____	inflammatory _____
attack _____	arthritis _____	diabetes _____
kidney _____	nutrition _____	hepatitis _____
hormones _____	menopause _____	antibiotics _____
herpes _____	appendix _____	diagnosis _____
seizure _____	abnormal _____	potassium _____
bowel _____	syphilis _____	anemia _____
asthma _____	hemorrhoids _____	obesity _____
rectal _____	nausea _____	osteoporosis _____
incest _____	directed _____	impetigo _____

SCORE	
List 1	_____
List 2	_____
List 3	_____
Raw	_____
Score	_____

APPENDIX E

HBCS

Hill Bone HBP Compliance Scale

ID # _____

(Please check the box that best fits your response)

	None of the time	Some of the time	Most of the time	All of the time
1. How often do you forget to take your medicine?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. How often do you decide not to take your HBP medicine?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. How often do you eat salty food?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. How often do you shake salt on your food before you eat it?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. How often do you eat fast food?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. How often do you make the next appointment before you leave the doctor's office?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. How often do you miss scheduled appointments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. How often do you forget to get prescriptions filled?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. How often do you run out of HBP pills?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. How often do you skip your HBP medicine before you go to the doctor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. How often do you miss taking your HBP pills when you feel better?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. How often do you miss taking your HBP pills when you feel sick?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. How often do you take someone else's HBP pills?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. How often do you miss taking your HBP pills when you are careless? HBP= high blood pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX F

FLYER

Do You Have High Blood Pressure?



If you are at least **50 years of age or older, African-American (Black), and have High Blood Pressure**, your participation is requested to participate in a research study being conducted by researchers at the University of North Carolina at Greensboro. You will be asked to complete 3 worksheets that ask questions about your blood pressure, your medication, and about your understanding of health care instructions. The results from the worksheets will assist healthcare providers in determining things that interfere with managing your blood pressure. The worksheets take about 15-30 minutes to complete. You will receive a Wal-Mart gift card in the amount of \$10 for your time. For more information, please call **Racquel Ingram (RN) at (336) 480-1134**.

APPENDIX G

PILOTED DEMOGRAPHIC QUESTIONNAIRE

Demographic Survey - African Americans with Hypertension

ID# _____

Please fill in the information requested by writing in the answer or placing a check next to the answer that best describes you.

1. How old are you? _____

2. What is the highest level of education you completed?
Less than 8th grade _____
8th grade level _____
Less than 12th grade _____
12th grade or GED equivalent _____
Technical or trade _____
Community college _____
University or college _____

3. What is your marital status?
Married _____
Single _____
Widow _____
Live with mate _____

4. Who do you live with?
I live alone _____
I live with husband/wife/mate _____
I live with another family member(s) _____
Please specify the family member(s) you live with _____

5. What community or subdivision do you live in? _____

6. What is your current work status?
Full-time (40 + hours per week) _____
Part-time (less than 40 hours per week) _____
I don't work at this time _____
Retired _____

7. What is the total yearly income in your family?
 0-9,999 _____
 10,000-19,999 _____
 20,000-29,999 _____
 30,000-39,999 _____
 40,000-49,999 _____
 50,000-59,999 _____
 Above 60,000 _____
8. Do you consider your health to be:
 Excellent _____
 Good _____
 Fair _____
 Poor _____
9. What kind of health insurance do you have?
 None _____
 Medicaid _____
 Medicare _____
 Private insurance _____
 Other (please specify) _____
10. Where do you go to receive health care?
 Private physician _____
 Free Clinic _____
 Health Department _____
 Emergency Room _____
 Other (please specify) _____

Thank you for taking the time to answer these questions. Your participation is greatly appreciated.

APPENDIX H

FINAL DEMOGRAPHIC QUESTIONNAIRE

Final Demographic Questionnaire- African Americans with Hypertension

ID# _____

Please fill in the information requested by writing in the answer or placing a check next to the answer that best describes you.

1. How old are you? _____

2. What is the highest level of education you completed?
Less than 8th grade _____
8th grade level _____
Less than 12th grade _____
12th grade or GED equivalent _____
Technical or trade (including military) _____
Community college _____
University or college _____

3. What is your marital status?
Married _____
Single _____
Widowed _____
Separated _____
Divorced _____

4. Who do you live with?
I live alone _____
I live with husband/wife/ _____
I live with significant other _____
I live with a friend _____
I live with another family member(s) _____
Please specify the family member(s) you live with (i.e. daughter,
cousin, grandson, etc.) _____

5. What community or subdivision do you live in? _____

6. What is your current work status?

- Full-time (40 + hours per week) _____
 Part-time (less than 40 hours per week) _____
 I don't work at this time _____
 Retired _____
7. What is the total yearly income in your family?
- 0-9,999 _____
 10,000-19,999 _____
 20,000-29,999 _____
 30,000-39,999 _____
 40,000-49,999 _____
 50,000-59,999 _____
 Above 60,000 _____
8. Do you consider your health to be:
- Excellent _____
 Good _____
 Fair _____
 Poor _____
9. What kind of health insurance do you have?
- None _____
 Medicaid _____
 Medicare _____
 Veterans Administration _____
 Private Insurance _____
 Government supplemental _____
 Other (please specify) _____
10. Where do you go to receive health care most of the time?
- Private Physician _____
 VA Hospital _____
 Free Clinic _____
 Health Department _____
 Emergency Room _____
 Other (please specify) _____
11. How long have you had hypertension (high blood pressure)?
- Less than two years _____
 Two to four years _____
 Five or more years _____
12. How long have you been taking medicine for your high blood pressure?
- Currently not taking medication _____
 Less than two years _____

Two to four years _____
Five or more years _____

13. How many different medications do you currently take? (please check only one)

None _____
One to two _____
Three to five _____
More than five _____

14. How likely are you to read written information about your prescription medicines?

Not at all _____
Sometimes _____
Often _____

15. How well do you understand the information provided about your medicine?

Not at all _____
Somewhat _____
Very well _____

16. What other health conditions do you have? (check all that apply)

History of Stroke or CVA _____
Diabetes _____
Cancer _____
High Cholesterol _____
Thyroid Disorder _____
Poor Circulation (peripheral vascular/arterial disorder) _____
Kidney or Renal Disorders _____
Other (please specify) _____

Thank you for taking the time to answer these questions. Your participation is greatly appreciated.

APPENDIX I

CONSENT FORM

**UNIVERSITY OF NORTH CAROLINA AT GREENSBORO
CONSENT TO ACT AS A HUMAN PARTICIPANT**

Project Title: **Health Literacy and Adherence to Antihypertensive Regimens in African Americans Ages 50 and Older**

Project Director: L. Louise Ivanov, DNS, RN & Racquel R. Ingram, MSN, RN, PhD©

Participant's Name: _____

What is the study about?

African Americans ages 50 and older who have high blood pressure are known to have some difficulty in sticking to the advice of their primary care provider's advice in managing their high blood pressure. We are trying to find out some causes of this difficulty.

Why are you asking me?

You are being asked to participate because you are:

African American

Age 50 or older

Have high blood pressure

Take high blood pressure medication

Cannot eat certain foods because of your high blood pressure

Able to follow directions

Have good eyesight

What will you ask me to do if I agree to be in the study?

If you agree to participate in this study, we will ask you questions about the reasons that stop you (in the past, at present, or in the future) from sticking to your doctor's advice related to your high blood pressure. We would like this information so that we can help persons better manage their health. We will use three worksheets to help us get this information. The items that will be asked on the worksheets include:

- Health Literacy (reading and understanding health related information)
- Demographic factors (where you live, your age, level of education, etc)
- Lifestyle and Behavioral Factors that stop you from sticking to your doctor's advice at present or in the future

- Socioeconomics (wages/income) that may affect your ability to stick to your high blood pressure treatment plan

It will take you about 15-30 minutes to complete the worksheets.

Is there any audio/video recording?

Recordings will not be used.

What are the dangers to me?

There are limited risks to you for participating in this study. Some of the questions that we ask may cause you to feel embarrassed. If you begin to feel embarrassed at any time, the worksheets can be read to you privately, or you may stop answering the questions and withdraw from the study without penalty or unfair treatment. You may also request to go to a private location within the area to ask the project director questions. The project directors will have the only access to your files and may be able to determine your identity. This information will remain confidential.

If you have any concerns about your rights or how you are being treated please contact Eric Allen in the Office of Research and Compliance at UNCG at (336) 256-1482.

Questions about this project or your benefits or risks associated with being in this study can be answered by Louise Ivanov who may be contacted at (336) 334-5105 or Racquel Ingram at (336) 480-1134.

Are there any benefits to me for taking part in this research study?

There are no direct benefits to participants in this study.

Are there any benefits to society as a result of me taking part in this research?

The information that you provide will assist health care professionals with the development of programs that may potentially affect you or others in better understanding health information provided to you.

Will I get paid for being in the study? Will it cost me anything?

After completing all worksheets you will receive a \$10 Wal-Mart gift card. You must complete all of the worksheets to receive the gift card. If you do not complete all of the worksheets, you will not be able to receive the gift card. There is no cost to you.

How will you keep my information confidential?

Your privacy will be protected. The worksheets that you fill out will only have a number on them and not your name. You will not be publicly identified by name or other identifiable information as being part of this study. The only place that your name will appear is on this consent form. No identifiable information will be used in presentations. The consent forms and the worksheets will be stored separately. Your information will be

stored in a locked file cabinet located at UNCG in the project director's office. The information that is stored in the computer will be password protected. All information obtained in this study is strictly confidential unless disclosure is required by law. The worksheets will be kept for 3 years after the end of the study and will then be shredded. The computer data will be kept for 5 years after the end of the study and will be deleted.

What if I want to leave the study?

You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.

What about new information/changes in the study?

If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

Do you have any questions for me about the study?

Voluntary Consent by Participant:

By signing this consent form you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 50 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by Racquel Ingram.

Signature: _____ Date: _____

APPENDIX J

DATA KEY

ID #

Age

How old are you?

Gender

- 1= Male
- 2= Female

Education

What is the highest level of education you completed?

- 1= Less than 8th grade
- 2= 8th grade level
- 3= Less than 12th grade
- 4= 12th grade or GED equivalent
- 5= Technical or trade (including military)
- 6= Community college
- 7= University or college

Maritalstat

What is your marital status?

- 1= Married
- 2= Single
- 3= Widowed
- 4= Separated
- 5= Divorced

Livewith

Who do you live with?

- 1= I live alone
- 2= I live with husband/wife
- 3= I live with significant other
- 4= I live with a friend
- 5= I live with another family member(s)
Please specify the family member(s) you live with (i.e. daughter,
cousin, grandson, etc.)

Commsubd

What community or subdivision do you live in?

- 1= Subsidized housing
- 2= Non-subsidized housing
- 3= No specification

Workstatus

What is your current work status?

- 1= Full-time (40 + hours per week)
- 2= Part-time (less than 40 hours per week)
- 3= I don't work at this time
- 4= Retired

Income

What is the total yearly income in your family?

- 1= 0-9,999
- 2= 10,000-19,999
- 3= 20,000-29,999
- 4= 30,000-39,999
- 5= 40,000-49,999
- 6= 50,000-59,999
- 7= Above 60,000

Healthstatus

Do you consider your health to be:

- 4= Excellent
- 3= Good
- 2= Fair
- 1= Poor

Healthinsur

What kind of health insurance do you have?

- 1= None
- 2= Medicaid
- 3= Medicare
- 4= Veterans Administration
- 5= Private Insurance
- 6= Government supplemental
- 7= Other (please specify)
- 8= Medicaid and Medicare
- 9= Several selected

HCreceipt

Where do you go to receive health care most of the time?

- 1= Private Physician
- 2= VA Hospital
- 3= Free Clinic
- 4= Health Department
- 5= Emergency Room
- 6= Other (please specify)
- 7= More than one selected

HTNyears

How long have you had hypertension (high blood pressure)?

- 1= Less than two years
- 2= Two to four years
- 3= Five or more years

HTNmedyrs

How long have you been taking medicine for your high blood pressure?

- 1= Currently not taking medication
- 2= Less than two years
- 3= Two to four years
- 4= Five or more years

NumHTNmeds

How many different medications do you currently take?

- 1= None
- 2= One to two
- 3= Three to five
- 4= More than five

ReadRxinfo

How likely are you to read written information about your prescription medicines?

- 1= Not at all
- 2= Sometimes
- 3= Often

UndstdRxinfo

How well do you understand the information provided about your medicine?

- 1= Not at all
- 2= Somewhat
- 3= Very well

Comorbids

What other health conditions do you have?

- 1= History of Stroke or CVA
- 2= Diabetes
- 3= Cancer
- 4= High Cholesterol
- 5= Thyroid Disorder
- 6= Poor Circulation
- 7= Kidney or Renal Disorders
- 8= Diabetes and High Cholesterol
- 9= None or no selection
- 10= CVA and High Cholesterol
- 11= High Cholesterol and Poor Circulation
- 12= Arthritis
- 13= Respiratory Disorders
- 14= Psych/Mental Health Disorders
- 15= Cancer and Other
- 16= CVA and Diabetes
- 17= Diabetes and Other
- 18= High Cholesterol and Other
- 19= Poor Circulation and Other
- 20= GI Disorders
- 21= Other

REALMtotal (0-66)

REALMgrdlvl

- 1= 3rd Grade and Below (0-18)
- 2= 4th to 6th Grade (19-44)
- 3= 7th to 8th grade (45-60)
- 4= High School (61-66)

HBCStotal (14 is lowest possible score; 56 is highest)

- 1= None of the time
- 2= Some of the time
- 3= Most of the time
- 4= All of the time