Factors Associated With Antiretroviral Therapy Nonadherence

In Older Adults With HIV

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Abstract

Factors Associated With Antiretroviral Therapy Nonadherence in Older Adults With HIV

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The advent of antiretroviral therapy (ART) has contributed to a significant decrease in the number of deaths resulting from HIV/AIDS infections. Despite the decline in mortality rates for the total population of those infected with HIV, adults aged 50 years and older who are HIV+ have continued to have higher mortality when compared to younger HIV+ persons. This disparity exists in part because of inadequate ART adherence. However, the reasons for this disparity have not been fully evaluated, particularly among older women.

The purpose of this study was to describe the factors associated with antiretroviral therapy nonadherence and treatment adherence self-efficacy in HIV+ adults aged 50 years and older. The specific aims were to:

(1) Describe the demographic, HIV disease-specific and psychosocial factors associated with adherence outcomes in African American women aged 50 years and older who are infected with HIV and are nonadherent to ART regimens.

(2) Describe gender or racialized differences in factors associated with adherence outcomes in older HIV+ African American women compared to other older adults who are HIV+.

This descriptive study involved a secondary analysis of baseline data collected from the 426 African American (n = 87 women and 168 men) and White American (n = 30 women and 141 men) participants in the *"PRIME"* study (Dr. Sheryl Catz, PI), a telephone-based antiretroviral therapy adherence and quality of life intervention in older Americans living with HIV. Predictor variables for this analysis included demographic factors, HIV disease-related factors, and psychosocial factors. Dependent variables included primarily, self-reported 7 day ART nonadherence and secondarily, treatment adherence self-efficacy. Cross-sectional data analysis involved descriptive statistics, comparisons and analysis of covariance (ANCOVA) using SPSS.

Although African American women had the highest levels of ART nonadherence, their levels of nonadherence were not statistically different than the other ethnic/gender groups. ART nonadherence was strongly correlated with social functioning, perceived stress and depression severity in the men. Treatment self-efficacy was strongly correlated with social functioning, depression and patient-provider interactions across each of the groups. Neither ethnic nor gender differences contributed to the differences in ART nonadherence or treatment adherence self-efficacy across the groups.

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I would like to express my deepest gratitude to:

DEDICATION

This is dedicated to my son, Sterlyn, for being the person that you are.

&

To my mother, Ms. Pat, for having been the person that you were.

CHAPTER I: INTRODUCTION TO THE STUDY

Since the time when the human immunodeficiency virus (HIV) was first identified in

1984, over 1 million Americans have become infected with HIV, a disease that attacks the

body's immune system and decreases the body's ability to fight the infections that a normally

healthy immune system would easily conquer (Hall, 2006) . As time progresses, the body's

defenses progressively weaken and become incapable of fighting various opportunistic infections

(Hall, 2006). Subsequently, without proper treatment a person who is infected with HIV could

succumb to acquired immunodeficiency syndrome (AIDS), which is the usual cause of death in

people infected with HIV (CDC, 2009).

Antiretroviral therapies (ART) are medications that combat the effects of HIV disease

(Nachega, Mugavero, Zeier, Vitoria & Gallant, 2011). In the United States, these medications

are readily available and easily accessible (Gonzalo, Garcia Goni, & Munoz-Fernandez, 2009).

The effectiveness of ART has allowed HIV to become a treatable chronic condition, and the life

expectancy for those infected with HIV has significantly improved (Palella et al., 1998). Today,

people living with HIV/AIDS are living longer, healthier lives while managing their HIV infections

as any other chronic health condition (Vance, Struzick, & Masten, 2008).

Despite the availability of ART, the HIV/AIDS-related death rate has reached epidemic

proportions in racial and ethnic minority communities, and African American women are bearing

the heaviest burden of this disease (Espinoza, Hall, Hardnett, Selik, Ling & Lee, 2007). These

women have often been described as being older, poor, unemployed, with histories of past alcohol

or substance abuse, and they frequently live in rural settings (Winningham et al., 2004). They may

have less than optimal ART adherence, which may have contributed to the higher HIV-related

mortality in African American women aged 50 years and older (Levine et al., 2007) .

Background and Significance

African American women over the age of 50 have experienced disproportionate rates of HIV infections and AIDS-related mortality during the last decade (Centers for Disease Control and Prevention, 2011). Despite the significant declines in the incidence of new HIV infections for the general population in 2005, the HIV incidence rate has remained unchanged in older African American women (McDavid, Li, & Lee, 2006). During this same year, when African American women made up only 11% of the United States population, they accounted for 67% of the new HIV infections and 36% of the new AIDS cases (Centers for Disease Control and Prevention, 2006). By 2010, HIV had become so prevalent in the African American community that it was ranked as the 3rd leading cause of death for African American women aged 50 years and older (Centers for Disease Control and Prevention, 2006).

It has been reported that African American women have the lowest level of ART adherence when compared to all other ethnic groups of similar age (McNabb, Ross, Abriola, Turley, Nightingale & Nicolau, 2001). It is these differences in ART adherence that may be responsible for the disproportionate mortality rate in African American women compared to other ethnic or gender groups (Hader, Smith, Moore & Holmberg, 2001).

Antiretroviral Therapy (ART)

Antiretroviral therapies were developed as therapeutic agents that help the body combat the effects of HIV disease (Palella et al., 1998). These medications disrupt the HIV virus at different points in the cell's reproductive cycle, and they work by reducing the HIV viral load, decreasing the body's inflammatory response, helping to maintain adequate immunologic function and decreasing susceptibility to antiretroviral resistance (Chesney, 2003; Paterson et al., 2000). Shortly after their inception, these medications were shown to significantly decrease the mortality rates associated

with HIV/AIDS (Paterson et al., 2000). Over time, the utilization of ART has become an integral component of the medical management of people living with HIV/AIDS, and the use of ART has become a vital component for survival with HIV (Paterson et al., 2000). Although these medications do not cure HIV, they have been shown to be effective in prolonging life and decreasing complications that might occur as a result of being infected with HIV/AIDS (World Health Organization, 2003). However, to obtain the most benefits from the medications, strict adherence of greater than 90 – 95% of the prescribed ART regimen is vital in order to prevent immunologic failure and subsequent death (Paterson et al., 1999).

Adherence to Antiretroviral Therapy

Adherence is defined as "the extent to which a person's behavior corresponds to the recommended treatment from providers" (World Health Organization, 2003). There is no "gold standard" for measuring adherence to antiretroviral therapy (Wagner, Justice, Chesney, Sinclair, Wessman & Rodriguez-Barradas, 2001). However, the methods to access adherence may include pill counting, reviewing of refill records and conducting biological assays (Osterberg & Blaschke, 2005). The most common way in which adherence is measured is by the patient's own self report (Cohen et al., 2004).

Adherence to ART medications can be influenced by several factors such as age-related physical challenges, medication side effects, the patient's relationship with their provider, social support, substance abuse, and depression (Applebaum, Richardson, Brady, Brief, & Keane, 2009; Reynolds et al., 2004; Wagner, 2002). In order to effectively decrease the rate of mortality associated with HIV/AIDS within the population of African American women age 50 and older, it is necessary to understand how such factors may influence an older African American woman's

adherence to ART regimens (Gant & Welch, 2005; Locher, Pargament, & Duggan, 2007; Sankar, Luborsky, Schuman, & Roberts, 2002).

The majority of the literature on aging and ART adherence has been focused on how aging with HIV/AIDS has predicted ART adherence in older adults (Manfredi, 2004; Shah, He, & Klotman, 2006; Sherr et al., 2009); how medication toxicities and co-morbid conditions in older adults have influenced ART adherence (Kilbourne, Justice, Rabeneck, Rodriguez-Barradas, & Weissman, 2001; Luther & Wilkin, 2007; Magalhaes, Greenberg, Hansen, & Glick, 2007); how the complexities of the therapeutic regimen have affected ART adherence in older adults (Trotta et al., 2002); and how increased mortality occurs in older adults who are not adherent to ART (French et al., 2009). Recent findings have determined that age, ethnicity, gender, and socioeconomic status were not predictive of ART adherence (Justice, 2010).

The problem with the ART adherence research is that most studies have not focused on the needs of older African American women who are HIV positive. Much of the ART adherence research has focused on gay men or on individuals younger than age 50 (Detels et al., 2012; Teitelman, Tennille, Bohinski, Jemmott, & Jemmott, 2011). Although many studies have included older adults with HIV in the population being studied, only a sparse amount of original research has focused specifically on the factors that have influenced ART adherence in older African American women, and this is the demographic group that has experienced the highest HIV/AIDS mortality in the United States (Johnson et al., 2010; Prejean, 2011) .

Purpose and Specific Aims

The purpose of this study was to answer the question, *"What influences ART nonadherence in older African American women?"* by describing the factors that are associated with nonadherence to antiretroviral therapy (ART) in African American women age 50 and older who are infected with HIV. The specific aims are to:

Aim 1: Describe the demographic, HIV disease-specific, and psychosocial factors that are associated with adherence outcomes in older African American women who are infected with HIV and are nonadherent to ART regimens. Adherence outcomes include, primarily, degree of actual nonadherence to ART regimens and, secondarily, HIV treatment adherence self-efficacy.

Aim 2: Describe gender or racialized differences in factors that predict adherence outcomes in older African Americans who are HIV+ compared to other older adults who are HIV+. Adherence outcomes include, primarily, degree of self-reported nonadherence to ART regimens and, secondarily, HIV treatment adherence self-efficacy.

Conceptual Framework

The conceptual framework for this study was developed based on Ajzen's (1985) theory of planned behavior (TPB). This framework is based on the premise that a person's intentions are predictive of their actions (Ajzen, 1985). A main construct of the TPB is self-efficacy, which Bandura (1977) defined as "a person's belief in his or her ability to perform a specific task." Self-efficacy is a key feature of the TPB, and it can explain the effects of the factors that impact adherence (Sirur, Richardson, Wishart & Hanna, 2009). This theory has been used to predict condom use in youth (Heeren, Jemmott, Mandeya, & Tyler, 2007; Jemmott et al., 2007) to describe medication adherence in adults (Chisholm, Williamson, Lance, & Mulloy, 2007; Lewis, Askie, Randelman & Shelton-Dunston, 2010) and to examine the intentions to utilize HIV counseling in

various age groups (Gebreeyesus, Boer & Kuier, 2007; Kakoko, Astrom, Lugeo & Lie, 2006). This theory has also been utilized to determine if factors such as beliefs (about medications), attitudes (formed by interactions with the environment), and perceived behavioral control (or self-efficacy) influence intentions to adhere to ART medication (Grierson, Koelmeyer, Smith & Pitts, 2011; Vissman et al., 2011). This theory offers an appropriate framework to examine the factors that are associated with ART nonadherence behaviors in older African American women who are HIV+ (Saaal & Kagee, 2012).

To further expand the framework, a review of the current literature pertaining to ART nonadherence in HIV+ African American women was conducted.   The search utilized the following electronic databases: Pub Med, EBSCO, and Web of Science. The key words utilized were: African American, antiretroviral therapy, ART, HIV, medication adherence, AND women OR older adults. No limitations were placed on the years of publications. This review helped to further develop a conceptual framework which identified multiple factors that might account for the underutilization of antiretroviral therapies in older African American women who are HIV+. The framework is illustrated in Figure 1. The components of the conceptual framework that pertain to the factors that influence ART nonadherence in older adults include:

1) Demographic factors such as age, ethnicity, gender, educational level, employment status, and annual income;

2) Disease-related factors such as duration of HIV, duration of ART, perceived HIV symptom severity and history of AIDS; and

3) Psychosocial factors such as having a personal history of alcohol abuse, intravenous drug use, the patient and provider's relationship, social support, perceived stress, and depression. See Figure 1.

Figure 1. Conceptual Framework

HIV Disease Factors
Duration of HIV
Duration of ART
HIV Symptom Severity
History of AIDS

Demographic Factors
Age
Ethnicity
Gender
Educational Level
Employment Status
Annual Income

Psychosocial Factors
Alcohol or IVDU Abuse
Patient-Provider Relationship
Social Functioning
Perceived Stress
Depression

Adherence Outcomes

ART Nonadherence

&

Self-Efficacy
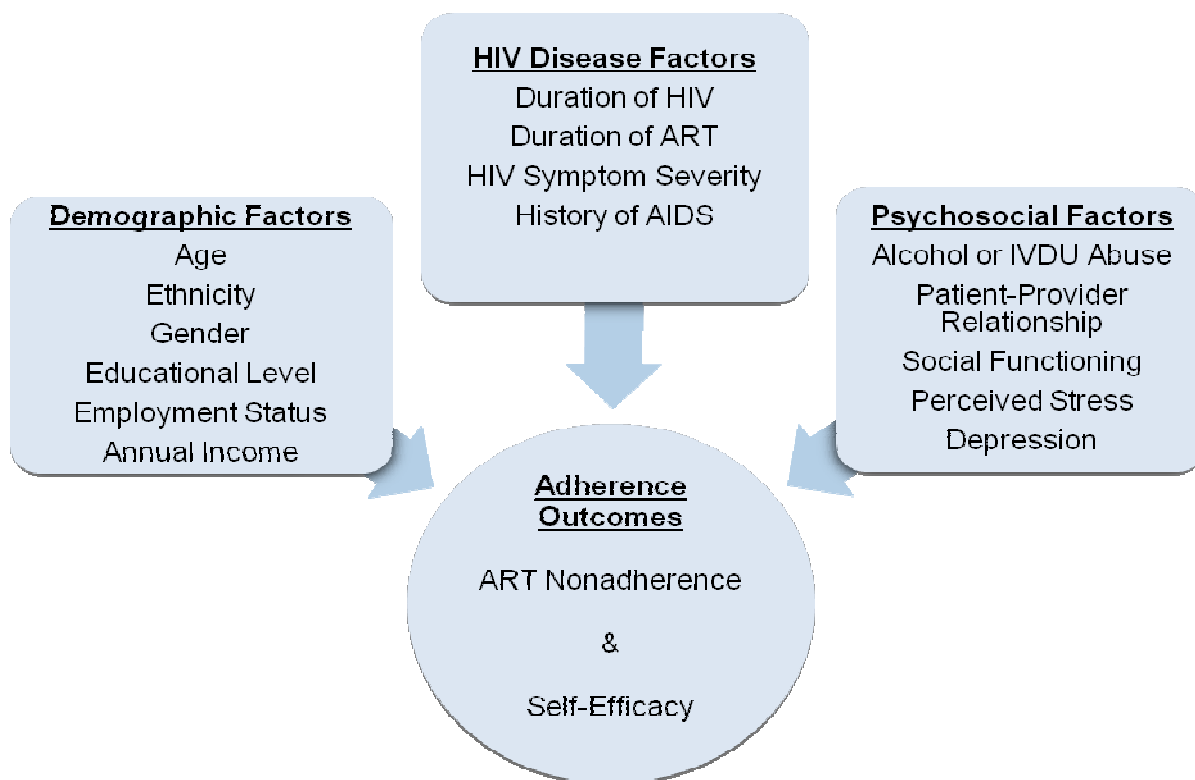
Organization of Dissertation Chapters

This dissertation has been organized in a way to convey the results of the primary study as a compilation of three distinct manuscripts. Each manuscript has been designed to meet the established guidelines and criteria for publication in a specific journal (that is listed on a cover sheet). Each journal was chosen based on the observed research priorities for that particular journal as indicated by articles that were recently published. Chapter 1 contains a brief introduction and overview of the complete study. Chapter 2 provides a critical review of the literature regarding the factors associated with ART (non)adherence in older African American women. Chapter 3 provides details of the results for Aim 1 as a manuscript entitled *"Factors associated with ART nonadherence in older African American women with HIV."* The results for Aim 2 are detailed in Chapter 4 in the form of a manuscript entitled *"ART nonadherence in Older Adults with HIV."* Chapter 5 contains a summary of the findings for the overall study. Study limitations, clinical considerations and suggestions for future research are also provided.

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CHAPTER II: Manuscript #1

Factors Associated with Antiretroviral Therapy Nonadherence

In Older African American Women with HIV: A Literature Review

Submitted to the *Journal of the National Medical Association* (*JNMA)*

Factors Associated with Antiretroviral Therapy Nonadherence

In Older African American Women with HIV: A Literature Review

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Abstract

Problem: The advent of antiretroviral therapy (ART) has contributed to a significant decline in HIV/AIDS-related deaths for the total population. However, HIV+ African American women aged 50 or older continue to have higher morbidity and mortality when compared to other HIV+ persons. It has been suggested that the increased mortality rate in older African American women is associated with nonadherence to ART. However, the factors that are associated with ART nonadherence in this population are poorly understood.

Purpose: The purpose of this study was to evaluate the current state of the science pertaining to the factors that are associated with decreased nonadherence to antiretroviral therapy in older African American women.

Methods: An exhaustive search of multiple library databases was conducted to determine the state of the science regarding research on ART nonadherence in older HIV+ African American women.

Results: Nonadherence to ART in older African American women is multifaceted, and may be influenced by demographic factors, HIV disease-related factors, and/or psychosocial factors.

Conclusion: Few studies have been conducted specifically on older African American women to determine which factors have the most influence on their nonadherence to ART. Further research is needed to determine which interventions would be effective in helping to facilitate adherence to ART in older African American women.

Key words: African Americans, antiretroviral therapy, HIV, medication adherence, women

Running Head: ART & Older African American Women

Introduction

From 1985 -1990, the demographic group that had the highest incidence of HIV infections was mainly composed of single, 25 - 44 year old, middle-class, White, homosexual males.[1, 2] However, since 1996 during what is now commonly referred to as the post-HAART era in the United States, the epidemiological face of those most afflicted with HIV has changed.[3] In 2005, people aged 50 and older in the US accounted for approximately 15% of the new HIV diagnoses, 19% of all AIDS diagnoses, 24% of persons living with HIV/AIDS, and 35% of the AIDS-related deaths for that year.[4] During the same year, 26% of those newly diagnosed HIV infections occurred in women age 50 years old or older.[4] Approximately 50% of those older women were single, sexually active, and members of either a racial or ethnic minority group.[5] These women were more likely to be African American, reside in rural areas, had limited income, had less than 12 years of education, and were more likely to have been exposed to HIV via heterosexual transmission. [6, 7] The Centers for Disease Control and Prevention have estimated that approximately 1 in every 30 black women will be diagnosed with HIV in the near future.[4]

African American women have the highest incidence of HIV/AIDS-related deaths compared to any other group of Americans.[8] Although the National Center for Health Statistics reported in 2010 that there had been a decrease in the mortality rates from HIV/AIDS-related deaths across every ethnic group in the last decade due to the availability and use of antiretroviral therapies, African American women accounted for approximately 25% of the 85,000 AIDS-related deaths in people over the age of 50 in the United States.[9] When the HIV/AIDS mortality rates from 1987-2005 were reviewed, Rubin et al. were able to show that the death rates for HIV+ African Americans had increased from being approximately three times higher than HIV+ White

Americans during the pre-HAART era to being about five to eight times higher than for HIV+ White Americans in the post-HAART era.[10]

Despite the availability of ART, there continues to be a disproportionately higher burden of HIV/AIDS-related mortality in older African American women compared to any other demographic group. [11, 22] The health disparity that exists in older African American women may be grounded within the sociopolitical constructs of poverty, sexism, racism, stigma and discrimination.[23, 24] African American families, the majority of which are headed by women, continue to struggle with the long-term effects of historical trauma including a disproportionate amount of poverty, high unemployment rates, isolation in rural communities, family violence and the prevalence of alcoholism and substance abuse.[25, 26] As a consequence of her circumstances, an older African American woman's ability to successfully adhere to ART regimens may be adversely affected and poor health outcomes related to living with HIV/AIDS are more likely to occur.[23]

The purpose of this paper is to provide an overview of the current literature related to the factors that are associated with adherence to antiretroviral therapy (ART) in HIV+ African American women aged 50 and older. Therefore, guided by the health disparities literature on medication adherence in African Americans, a search was conducted to determine the state of the science regarding research on African American women and adherence to ART. The search strategies for this project included a comprehensive review of the literature contained in the following databases: Pub Med, EBSCO, and Web of Science. The key words utilized were: HIV, HAART, antiretroviral therapy, medication adherence, patient adherence AND African American women OR older adults. Inclusion criteria identified were that the studies included subjects who were age 50 years and older. The types of studies sought included both

quantitative and qualitative investigations. There were no restrictions placed on the dates for journal articles. The measured outcome being sought was ART medication (non)adherence.

Demographic Factors

Demographic factors such as age, gender, and ethnicity can directly impact ART adherence levels in African American women who are HIV+.[12, 13] When investigating whether sociodemographic factors predicted early discontinuance of ART, Asad et al. studied a population of 3,654 individuals (40% African American women) that had recently started taking ART.[13] After controlling for age, gender, ethnicity and area of residence, the researchers found that sociodemographic factors such as being of African American descent, female gender and younger age were predictive of early discontinuation of specific ART regimens.[13] Golin et al. investigated similar concepts in their study of 140 subjects, which included 27% African Americans and 20% women.[14] These authors concluded that being of African American ethnicity and having lower income, less education, history of alcohol use, as well as higher frequency of medication dosing in their regimen contributed to nonadherence to ART.[14]

The study by Gerber sought to determine if differences between different ethnic groups existed in medication adherence in a sample of over 400 Medicaid recipients (58% African American, mean age, 78.3; 41% White, mean age 76.8).[15] The evidence revealed that being of African American descent was associated with running out of medications early and with not following provider's orders for the prescriptions. In contrast to the above, the results of the 149 people (67% African American) surveyed by Ferguson et al. did not indicate that ethnicity or gender produced statistically significant differences in terms of ART adherence.[16]

A prospective study by Singh et al. evaluated the impact that social and psychological factors had on ART adherence in 123 HIV+ people.[17] This study revealed that the

sociodemographic factors of age, income, employment status, education and drug use did not affect adherence, and non-Whites *were* more likely to be nonadherent with ART.[17] Paterson's findings also reported that sociodemographic factors such as sex and employment status did not influence ART adherence.[18] However, it is important to note that both of these studies had small sample sizes with very few non-White participants. The participants in Paterson's study were composed of 100% White Americans and 96% males, and Singh's study was made up of 72% White Americans and 93% males.[17, 18] Although the sample characteristics reflected the demographic group most affected by HIV during the early years of the epidemic, it is difficult to generalize the findings to the older African American women who are the most impacted currently with HIV.

Older adults with HIV may experience age-related cognitive changes which may impair their adherence to ART regimens. Ettenhofer, Hinkins, Castellon et al. included 66% African Americans over age 50 and 19% women over age 50 in a study to determine if increased age was of itself predictive of poorer adherence in older versus younger adults with HIV.[19] The results of their study indicated that although older adults had higher levels of adherence compared to younger adults, the neurocognitive disorders associated with aging negatively affected their adherence to ART.[19] Barclay, Hinkin, Castellon et al. included 68% African Americans and 22% women in a study that evaluated the predictive effects of age, beliefs and self-efficacy on ART adherence.[20] The findings also demonstrated that older adults were more adherent to ART, but the levels of cognitive disease impacted their ability to adequately adhere to ART. Hinkin et al. also found comparable results which demonstrated that older adults were frequently were more adherent to ART compared to younger adults in the absence of cognitive impairments.[21]

The interplay of multiple social and political factors associated with trust, intimate relationships, control and power issues serve to restrict some African American women to a low socioeconomic status.[27] In her study regarding the factors that increased an African American women's risk of becoming infected with HIV, Mallory found that lack of knowledge regarding their risks, power differentials in relationships, and intravenous drug use contributed to the increased incidence of HIV/AIDS infections in women compared to men.[24] These same socially constructed issues may also limit the attainment of knowledge regarding the importance of initiating and adhering to antiretroviral therapy in African American women who are infected with HIV.[28, 29]

Socioeconomic factors can influence adherence to antiretroviral therapeutic regimens. Within the general population, socioeconomic factors such as level of education, employment status and income levels have been associated with mortality rates in individuals with chronic diseases. Link and Phelan argued that the poor health of an individual should be viewed as a societal problem in which people with low socioeconomic status (SES) are at increased risk of having poorer health outcomes related to having less access to health care, poorer patient-provider relationships, and decreased social support than those with higher SES.[30] In regards to HIV, Rubin, Colen and Link conducted a study that evaluated the impact that socioeconomic status had on the HIV/AIDS mortality rates of African American and White Americans.[31] Their study indicated that when compared to White Americans, African Americans with lower SES had a higher rate of HIV/AIDS-related mortality in the post-HAART era than the pre-HAART era.[31]

A person's education level can have a profound effect on their adherence to ART regimens.[32] According to Bailey, Ferguson & Voss, the level of education had more of an impact on a patient's ability to manage a medication regimen than many other factors including the type of

medication a person is prescribed.[33] Kalichman, Catz and Ramachandran revealed that HIV+ African Americans who had low levels of health literacy were more likely to be nonadherent to ART, even when controlling for educational level.[34] Research has shown that people with low literacy have difficulty adhering to prescribed treatment regimens because they may not be able to read or identify their medication.[35]

Due to limited access to education, many African American women may also have limited knowledge regarding the importance of initiating as well as adhering to antiretroviral therapy.[36, 37] Gifford, Bormann, Shively, Wright, Richman and Bozzette evaluated the factors predictive of adherence in 133 HIV+ adults who were taking multiple antiretroviral medications.[38]   In this cohort study, which included a total of 22% African American participants, and 14% women, with 18% of the total sample population aged 50 or older, the researchers indicated that being of African American descent and lacking a college degree were directly related to having higher rates of nonadherence to ART compared to the younger, mostly male, White participants of the study.[38] These studies point out the important role that educational level has on ART adherence.

Psychosocial Factors

As older African American women confront the challenges associated with living with HIV/AIDS, they may also have to manage the complex psychosocial factors that impact their adherence to ART regimens such as stress, depression, social support, substance abuse and the nature of the patient-provider relationship.[39.] An interpretive study by Roberts and Mann described the six common barriers to ART adherence reported by the 20 women who made up their study's sample population and ranged in age from 25-54 years. [40] Some of the participants reported the barriers that made it difficult to adhere to ART regimens included social relationships, medication

beliefs, medication regimens, daily schedules, and body weight and medication side effects. Konkle-Parker, Erlen and Dubbert also conducted a qualitative evaluation of 20 HIV+ individuals living in the Deep South in which 80% of the study participants were African American and 40% of the participants were women.[41] The barriers to ART adherence that were highlighted in this study included being in denial of the disease, life stress, burdens associated with having to plan more, medication difficulties, shame and social stigma.[41] Each of these factors accounted for some of the difficulties that contributed to ART nonadherence in older African American women.

Depression is one of the most common mental health disorders experienced by older African American women with HIV.[42] The effects of depression on adherence to ART in older adults who are HIV+ can be challenging to address, and the prolonged effects can lead to negative outcomes such as suicidal ideation.[43] Depression in conjunction with perceived lack of social support can contribute to nonadherence of ART in both African American men and women.[44] In their study involving HIV+ minority women, Catz, Gore-Felton and McClure found that when compared to White women, minority women experienced higher levels of depressive symptoms related to limited coping and perceived social support.[45] Turner, Laine, Cosler and Hauck found that depression commonly occurred in HIV+ women, and it contributed to the women being less adherent to their ART regimens when compared to men, which could lead to poor health.[46] Springer, Chen and Altice discovered that if symptoms of depression were improved, women with substance abuse issues were more likely to be adherent to ART than when their depression was not well controlled.[47]

Recent studies have provided evidence that social support from family, friends, co-workers and others can increase a woman's self-efficacy to adhere to ART, make her feel capable of maintaining and managing her health care needs, and ensure adherence to

antiretroviral medications for African American women.[48, 49 50, 51, 52] Edwards evaluated the relationship between social support and ART adherence in African American women.[53] The results of her study of 33 African American women between the ages of 20-49 indicated that perceived social support could act as both a barrier as well as a facilitator of adherence to ART.[53] Edwards proposed that social support served to facilitate ART when women had young children and supportive family members, whereas having a husband who was HIV+, being in a turbulent relationship or having feelings either of being unloved, uncared for or stigmatized served to act as barriers to ART adherence.[53]

Alcohol and substance abuse can have a negative influence on adherence to antiretroviral medications. Several authors who studied older women with histories of drug use have revealed that there are some inherent difficulties in demonstrating a relationship between psychosocial factors and medication adherence.[50, 51, 52] The increased prevalence of alcoholism and substance abuse within communities that have large ethnic minority groups has increased their risks for HIV infection, morbidity and mortality related to HIV/AIDS and their nonadherence to ART.[54, 55] Golin et al. conducted a prospective study of 140 HIV+ individuals who had personal histories of substance abuse.[14] Their study revealed that overall, 95% of the study's participants had an ART adherence rate equal to approximately 71%.[14] Alcohol users were 66% adherent to ART regimens, nondrinkers were 74% adherent, those who abused drugs were 59% adherent and those who did not abuse drugs were 72% adherent to their ART regimens.[14]

When studying ART adherence in 137 crack cocaine users (100% African American, 27% women), Crisp, Williams, Timpson and Ross found that their compliance with ART regimen was not affected by their drug use.[56] The study by Robinson, Westfall, Mugaver et al. included 50% African Americans, 25% female and 11% adults older than age 50, provided evidence which

indicated that African American patients and those with a history of intravenous drug use were more likely to be nonadherent to their medications as prescribed, and they were more likely to discontinue ART.[57] It is important to note that in this study, gastrointestinal toxicity contributed to the discontinuation of ART in intravenous drug users as well as those without insurance.[57] Another study of HAART adherence in HIV+ African American women with a history of drug abuse found that although "forgetting to take the medication" was a significant barrier to adherence, the existence of positive social support systems helped to overcome the barriers contributing to medication nonadherence.[58]

The patient-provider relationship can have an important influence on adherence to ART regimens in older African American women.[7, 37] Meredith, Jeffe, Mundy, and Fraiser observed that the patient-provider relationship between HIV-infected women and their primary care providers proved to have an important positive influence on adherence to antiretroviral medication regimens.[59]   Similar findings by Altice, Mostashari and Friedland revealed that participants who had a history of intravenous drug use also reported that their relationship with their provider had a positive influence on their ART medication adherence. [60]

The relationship with the provider may also have a negative influence on ART adherence. Bogart, Wagner, Galvan and Banks described how historical distrust of medical institutions has continued to impact the patient-provider relationship for African Americans as well as their adherence to ART regimens.[61] These researchers found that the belief that African American were intentionally infected with HIV negatively impacted a patient's willingness to take antiretroviral medications.[61] Whetten, Reif, Swartz, et al. described how beliefs in a conspiracy theory were more prominent in members of minority groups, and the way in which these beliefs decreased the utilization of antiretroviral medications and contributed to the distrust of health

care providers.[62] These studies emphasized how a person's beliefs about HIV could affect their relationship with their health care providers.

Disease-related Factors

Adherence to ART regimens in older women is a complex process that may be influenced by their physical and psychological well-being. As a result of normal aging processes, many older women are at high risk of developing physiologic, neurologic and metabolic disorders.[63] In addition, many HIV+ women over the age of 50 may have chronic health conditions or illnesses such as diabetes, hypertension, impaired cognition and depression which may be exacerbated by either their HIV disease or the ART regimen.[64]

Adherence to ART regimens can also be affected by medication side effects, which can interfere with a person's activities of daily living and result in a decreased quality of life.[65] These side effects may negatively impact ART adherence in older women who are infected with HIV.[64] The side effects most commonly associated with the use of antiretroviral medications include skin conditions, cardiovascular problems, gastrointestinal problems, and metabolic problems. [66] Plankey, Bacchetti, Jin, et al. found that nonadherence to highly active antiretroviral therapy medications could be negatively influenced by an older woman's perceived negative body images related to increased body fat associated with HAART medications.[67] Kremer and colleagues'examination of the factors that influenced medication adherence also revealed that a patient's perception of negative side effects to their body greatly impacted their adherence to the ART medication regimen.[68]

Symptoms associated with the normal aging process can serve as barriers to ART adherence in African American women aged 50 years or older who are infected with HIV.[69] It has been reported that as women advance through the normal aging process, confounding physical symptoms

such as hot flashes, mood swings and issues with body image negatively influence adherence to ART regimens.[40, 64, 70] These uncomfortable symptoms occur frequently during menopause, and their subsequent occurrence while on ART regimens can make it difficult for women to ascertain if these symptoms should be attributed to the normal aging process, to their chronic HIV condition, or to medication side effects.[71] Regardless of the origin of the symptom, many women have mistakenly attributed common menopausal symptoms to their antiretroviral regimen and subsequently discontinued the use of their antiretroviral medications.[72]

Discussion

This review has highlighted the current state of the science regarding factors that influence ART adherence in older African American women who are HIV positive. Only a few studies have been generated that have focused exclusively on the factors that influence nonadherence to ART. The factors that contribute to the nonadherence to ART are multifaceted. These factors may be related to patient-centered (e.g., demographics), disease-related (e.g., HIV symptom severity) or provider factors (e.g., positive patient-providers interactions).

African American women have been dramatically impacted by HIV disease. These women experience higher HIV/AIDS mortality rates than any other gender or ethnic group. Their susceptibility to this disease may be directly related to having poor level of adherence to their antiretroviral regimens. When ART noncompliance is less than optimal, these women may face increased physical symptoms, decreased quality of life and poor life expectancy. Therefore, in order to lessens the possibility of African American women aged 50 and older; to having a poor outcome related to being infected with HIV/AIDS, one must first understand that factors influencing their adherence may serve as either a facilitator or a barrier for treatment adherence. Research on these factors is critical for clinicians to utilize evidence-based treatment modalities, promote effective self-care practices, and enhance ART medication adherence with culturally-sensitive practice models that incorporate the norms, customs, and traditions of older African American women with HIV (Williams, Ekundayo, Udezulu, & Omishakin, 2003). HIV is a devastating disease, and it is time to decrease its effects on ethnic minority and rural communities.

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CHAPTER III: Manuscript #2

The Factors Associated with Antiretroviral Therapy Nonadherence In

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**The Factors Associated With Antiretroviral Therapy Nonadherence In
Older African American Women With HIV**

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Abstract

HIV+ African American women aged 50 or older continue to have high HIV/AIDS-mortality rates. This may be due to the low ART adherence levels observed in this population. The purpose of this study was to describe the factors that were associated with treatment self-efficacy and ART nonadherence in older African American women who are HIV+. This study involved a secondary analysis of baseline data from 87 African American women involved in a telephone-based ART adherence and quality of life intervention study. Outcomes variables were ART nonadherence and treatment adherence self-efficacy. Positive correlations existed between treatment adherence self-efficacy and patient-provider interactions ($r = .26$) and social functioning ($r = .32$). Negative correlations were evident between treatment adherence self-efficacy and duration of time on ART ($r = -.24$), HIV symptom severity ($r = -.26$) and perceived stress ($r = -.28$). The correlation between ART nonadherence and HIV symptom severity was also significant ($r = .25$).

Keywords: adherence, African Americans, antiretroviral therapy, HIV, women

Introduction

The incidence of HIV/AIDS cases in African American women has reached epidemic proportions. From 1993–2004 there was a 40% increase in the number of newly diagnosed cases of HIV/AIDS in African American women (Centers for Disease Control & Prevention, 2005). In 2010, when African American women constituted only 12% of the female population, the rate of new HIV infections in African American women was equivalent to 64% of all of the newly diagnosed HIV infections (Centers for disease Control & Prevention, 2011). Similarly, the prevalence of HIV infections in African American women has been estimated to be 15 times higher than in White women, and the rate of AIDS in African American women has been estimated to be 22 times higher than in White women (CDC, 2011). Future predictions have indicated that approximately 1 in every 30 African American women will be diagnosed with HIV in the near future (CDC, 2008).

Older African American women have a disproportionately higher rate of HIV/AIDS mortality when compared to their White counterparts (Byrd et al., 2007; Crook & Peters, 2008; National Institute on Aging, 2009). During 2008, African American women accounted for approximately 25% of the 85,000 AIDS-related deaths in people over the age of 50 in the United States (CDC, 2009). Despite the availability of antiretroviral therapy, HIV was the fourth leading cause of death for African American women between the ages of 45-54 (CDC, 2008). This increased mortality rate has been associated with decreased levels of adherence to ART regimens by older HIV+ African American women (French et al., 2009).

Antiretroviral Therapy

Antiretroviral therapy (ART) has been shown to be effective in decreasing the rates of morbidity and mortality associated with HIV/AIDS infections (Paterson et al., 2000). When taken as directed, these medications have been successful in prolonging life, maintaining adequate immunologic function, and decreasing the body's inflammatory response in those infected with HIV (Chesney, Ickovics, Hecht, Sikipa, & Rabkin, 1999; Paterson et al., 1999). In order to maintain effective therapeutic levels of ART medications within the body, at least 90% of the prescribed regimen needs to be consumed (Gulick, 2006). Lower levels of adherence to ART regimens increased the risk that a detrimental health effect such as virologic failure will occur (Hecht et al., 1998). This in turn, could lead to increased HIV/AIDS mortality rates (Schackman et al., 2007; Sethi, Celentano, Gange, Moore, & Gallant, 2003).

Older African American Women and ART Adherence

It has been suggested that the higher HIV/AIDS mortality rates observed in older HIV+ African American women may be due to poor compliance with their prescribed ART (Gellad, Haas, & Safran, 2007; Gerber, Cho, Arozullah, & Lee, 2010). It has been reported that the average rate of adherence to ART in older women in general varies from approximately 60% - 88% compared to the 25% - 47%, which is similar to average rates of adherence to medication regimens prescribed for other chronic health conditions (Islam, Muntner, Webber, Morisky, & Krousel-Wood, 2008; Nichol, Knight, Priest, Wu, & Cantrell, 2010; Puskas et al., 2011). However, detrimental effects may occur if levels of ART adherence are less than 90-95% (Paterson et al., 1999). These effects may include increased rates of virologic failure, immune suppression and the development of viral resistance (Gardner et al., 2008). Each of these could progress to the point of the patient developing an AIDS-defining illness and increased mortality

(Schackman et al., 2007). However, there has been limited research focused on the ART adherence in older African American women with HIV. Therefore, the reasons behind their lack of compliance with the medication regimen remains poorly understood.

There is a significant amount of research on adherence that has determined that patient factors, HIV disease-related factors and psychosocial factors influence adherence to antiretroviral therapy (Stone, 2012). In regards to the patient-specific factors, higher levels of ART nonadherence in older African American women has been positively correlated with lower levels of education and past history of alcohol or drug abuse (Harzke et al., 2004; Kalichman, Catz, & Ramachandran, 1999; Reynolds et al., 2004; Simoni, Frick, & Huang, 2006; Waldrop-Valverde, Osborn, Rodriguez, Rothman, Kumar & Jones, 2010). In addition, decreased levels of ART adherence have been related to the increased length of time since HIV diagnosis, the length of time since beginning ART, and the frequency of occurrence of HIV-associated symptoms (Silverberg, Leyden, Quesenberry, & Horberg, 2009).

Psychosocial factors that have been found to be negatively correlated with ART adherence in older African American women include, lack of social support, poor interactions between the patient and provider, perceived stress and a diagnosis of depression (Beach, Keruly, & Moore, 2006; Catz, Kelly, Bogart, Benotsch, & McAuliffe, 2000; Edwards, 2006; Johnson et al., 2006). Moneyham and colleagues (2000), as well as many others (Asch et al., 2003; Kacanek et al., 2010; Vosvick, Martin, Smith, & Jenkins, 2010), have shown depression has a large impact on level of medication adherence among all age groups (Asch et al., 2003; Kacanek et al., 2010; Vosvick, Martin, Smith, & Jenkins, 2010).

What is certain is that the reasons for the decreased levels of ART adherence in older African American women are multifaceted (Amico et al., 2007; Anastos et al., 2005; Williams,

Ekundayo, Udezulu, & Omishakin, 2003). What remains unclear is which of the factors have the most influence on adherence to ART in older African American women.

Purpose of this Study

Although there have been many studies on factors that influence ART adherence, few studies have focused on the specific factors associated with ART adherence in older HIV+ African American women (DiMatteo, 1982; Gant & Welch, 2005; Sankar, Luborsky, Schuman, & Roberts, 2002). The purpose of this study was to describe the factors associated with ART nonadherence in older African American women who are HIV+. This study sought to identify the demographic, HIV disease-related and psychosocial factors that were associated with nonadherence to ART and to assess the impact that the sociodemographic differences had on the degree of nonadherence to ART. African American women bear the greatest burden of the HIV epidemic (Rose et al., 2008). A better understanding of the factors that contribute to ART nonadherence in older African American women has the potential to increase the likelihood of developing age-appropriate, gender- and ethnic-specific interventions that would be effective in decreasing the HIV/AIDS-related mortality rate within this group (Hahn, 2003).

Methods

Study Participants

Participants were recruited as part of "PRIME," a telephone-based antiretroviral adherence and quality of life intervention for HIV+ persons aged 50 and older. This NIH-funded randomized controlled trial, recruited from ten different community-based AIDS Service Organizations (ASOs) in nine states across the United States (Arizona, California, Illinois, Massachusetts, Michigan, Pennsylvania, Texas, Washington, and Wisconsin) through posters, flyers and direct mailings. A total of 1100 persons were screened, and from the 452 that met the criteria for inclusion in the PRIME study, the baseline survey results of the African American women (n=87) were analyzed for this study. Each participant was compensated with $30 for completing the baseline telephone assessment. Human subjects' approval for the study was obtained from the Group Health Human Subjects review board.

Measures

Demographic information. Demographic background information included participant age, ethnicity, gender, sexual identity, relationship status, educational level, employment status, disability status, and annual income. These measures were assessed through patient self-report.

HIV-related medical information. Relevant HIV disease-related medical information included duration of HIV disease (in years), length of time on antiretroviral treatment (in years), perceived HIV symptom severity and history of AIDS (yes/no). Perceived HIV symptom severity was evaluated using a 23-item checklist of current HIV symptoms (Folkman et al., 1996). Participants rated each symptom on a 5-point scale from 1(not present) to 5 (very severe), which produced a symptom frequency and a symptom severity score on a scale that ranged from 0 - 80. Higher scores indicate increased levels of HIV symptoms severity.

Substance Use History. The 3-item Alcohol Use Disorders Identification Test (AUDIT-C; Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998) was used to evaluate the history of alcohol use.   The measurement scale for the AUDIT-C is based on three questions: *"How often did you have a drink containing alcohol in the past year?", "How many drinks did you have on a typical day when you were drinking in the past year*?" and "*How often did you have six or more drinks on one occasion in the past* year?" The measurement scale ranged from 0 – 12. Higher scores indicated higher levels of alcohol use, and the mean frequency was reported. In addition, intravenous drug use (IVDU) history was assessed by asking participants two questions: *"Have you ever injected any drug on your own, without medical supervision?"*; *"Have you injected any drug in the past 3 months?"* These questions were answered either as yes or no.

Social Functioning. The Social Functioning subscale from the SF-36v2 Health and Well-Being survey (Ware & Kosinski, 2001) was used. This questionnaire has been demonstrated to be a valid measure of social functioning in people with HIV. The measurement scale ranged from 1 (not at all) to 5 (extremely), and the composite scale score ranged from 0 – 100. Higher scores indicate greater higher social functioning levels.

Positive Patient-Provider Relationship. An 8-item questionnaire developed by Johnson et al. (2006) was used to evaluate and measure the perceived quality of the interactions between the patient and the provider based on how patients rated these interactions. Responses to questions were answered on a 4-point scale that corresponded to "never," "some of the time," "most of the time," and "every time." The participant's average item score was utilized in the analysis. Higher scores indicate more positive patient-provider interactions.

Perceived Stress. The 4-item version of the Perceived Stress Scale (PSS; Cohen & Lichtenstein, 1990) was utilized to evaluate the overall level of stress experienced by

participants. Items were rated on a 5-point scale from "never" to "very often." After reverse scoring of positive items, ratings from the items are summed to yield a perceived stress score. The scale ranged from 4 – 20. Higher scores indicate greater stress.

Depression. Depression was measured by the Patient Health Questionnaire (PHQ-8), an 8-item modified version of the PHQ-9 depression scale (Kroenke, Spitzer, & Williams, 2001) that omits one suicidal ideation item. The 8-item PHQ measures the frequency with which major depression symptoms were experienced over a 2-week period. The scale ranged from 0 – 24, and for the purposes of this study, depression was defined as a score of 10 or more on the PHQ-8.

ART Nonadherence. The primary outcome, the degree of nonadherence to ART, was assessed using Golin's Self-Report of Medication Non-Adherence questionnaire (Golin et al., 2002) for the 7-day period prior to obtaining the baseline data. Patients were initially asked to recall their HIV medications, and a brief assessment of their understanding of the medications was done. The patients were then asked to recall how many doses of each of their HIV medications were missed in the last 7 days and how much they had actually taken (Golin et al., 2002). The measure of adherence was calculated as the ratio of total doses missed to total doses which should have been taken. The obtained percentage of adherence was subtracted from 100% to yield the percent of ART nonadherence. This variable was analyzed as a continuous variable equal to the percentage of doses missed in the 7-day period prior to baseline.

Treatment Adherence Self-Efficacy. For the secondary dependent measure, treatment adherence self-efficacy, participants were asked to indicate their level of confidence that they could achieve a certain task (Johnson et al., 2006). They indicated their confidence level on a scale from 0 up to 10 with 0 meaning "you think you cannot do it at all," and 10 meaning "you are certain you can do it." For example, one question asked "How confident are you that you can

stick to your treatment schedule even when your daily routine changes?" This variable was analyzed as a continuous variable representing the average rating on the 13 items on the treatment adherence self-efficacy scale. The scores ranged from 0 to 130.

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) version 18 (PASW Statistics 18, SPSS, Inc., 2009, Chicago, IL.) was used for all of the analysis. Initially, data were analyzed with descriptive statistics including measures of central tendencies (means, and standard deviations) to determine the distributions of each of the study variables . Frequency distributions of each of the study variables were examined. The primary analysis estimated the correlation of continuous/ordinal predictor variables with each of the two outcome variables, ART nonadherence and treatment adherence self-efficacy, and tested if these correlations were different from zero. Analysis of variance was utilized to determine if categorical variables were associated with ART nonadherence and treatment adherence self-efficacy. The goal was to determine if mean differences existed between the predictor variables related to the dependent variables.

Results

Descriptive Characteristics

Table 1 summarizes the characteristics of the 87 African American women who participated in the study. These participants ranged in age from 49 to 66. Sixty-one percent were between the ages of 50 – 54, and the mean age was 54 years ($SD = 3.7$). Ninety-three percent of the women self-identified as being heterosexual, 67% had graduated from high school, and over 30% reported having some college education. Eighty-two percent were either receiving social security disability payments or had applied for disability payments, and 81% earned less than $20,000 per year.

The study participants had been diagnosed with HIV for an average of 13 years. Their mean score on the HIV symptom severity scale was 7 (range = 0 – 80), and the participants had been taking antiretroviral therapy for an average of 11 years, and 47% had previously been diagnosed with AIDS.

The participants reported having minimal alcohol use with an average score of 1 on the AUDIT-C survey. Thirty-six had prior history of IVDU, but none of the participants had used any intravenous drugs in the 3 months prior to entering the study. Their mean social functioning score was 69 and most had very positive patient-provider interactions ($M = 4$). Their levels of perceived stress varied from 4 – 18, and the average stress score was 9. Most participants reported minimal levels of depression at baseline ($M = 6$), and only 4.9% of the women's scores were consistent with having moderate or severe depression as indicated by having a PHQ score equal to 10 or higher. The women reported that they had missed approximately 6% of their scheduled ART doses during the 7-day period prior to the baseline survey. average treatment adherence self-efficacy score was Mean = 111 ($SD = 19.91$).

Correlations of Patient Characteristics with Treatment Adherence Self-Efficacy

Bivariate analysis revealed significant correlations between several of the study variables and self-efficacy. Social functioning showed the most significant association with treatment adherence self-efficacy ($r = .32$), with the next highest association being the patient-provider relationship ($r = .26$), with higher levels of social functioning and higher ratings of the patient-provider relationship corresponding to higher levels of self-efficacy. Significant, negative correlations were evident between treatment adherence self-efficacy and duration of time on ART ($r = -.24$), HIV symptom severity ($r = -.26$) and perceived stress ($r = -.28$) at $\alpha = .05$ level. These associations corresponded to having less treatment adherence self-efficacy. There were no statistically significant associations between level of self-efficacy and age, annual income, duration of HIV disease, and level of alcohol use. Table 2 provides the complete analysis.

Correlations of Patient Characteristics with ART Nonadherence

There was a significant association between ART nonadherence and the HIV symptom severity level ($r = .25$), which showed that when participants had increased HIV symptom severity, there was a responding increase in the level of ART nonadherence. While the association between the level of perceived stress and the level of ART nonadherence almost reached statistical significance with $p < .10$, ($r = .18$), there were no statistically significant correlations between ART nonadherence and age, annual income, duration of HIV disease, duration of ART, alcohol use, patient-provider interactions, social functioning or level of depression. See Table 2.

Difference in Mean Self-Efficacy and ART Nonadherence

There were no significant differences in the mean levels of self-efficacy or ART nonadherence and sexual identity, relationship status, SES, history of AIDS or IVDU.

Clinical Considerations

- Nonadherence to ART in older African American women is multifaceted, and may be influenced by demographic factors, HIV disease-related factors, and psychosocial factors.

- The perceived HIV symptom severity may negatively influence both ART nonadherence and treatment adherence self-efficacy.

- Positive patient-provider relationships are associated with higher adherence self-efficacy as well as less ART nonadherence.

Discussion

The goal of this study was to provide insights regarding the factors that were associated with ART nonadherence and treatment adherence self-efficacy in older African American women who were HIV+. The demographic characteristics of the sample population of women were composed of a regionally diverse mix of individuals predominantly from the northern, central and western parts of the United States. The participants in this study were mainly single, heterosexuals in their mid-50's. Compared to participants in other ART adherence studies, these women were fairly well educated, the majority having graduated from high school (Waldrop-Valverde et al., 2010). Unlike many older adults who are aging with HIV, these women had good social support (Grov, Golub, Parsons, Brennan, & Karpiak, 2010). Similar to the findings in other studies, they also had very positive interactions with their primary care provider as evidenced by an average rating of 4 out of 4 on the positive patient-provider interaction scale (Thrasher, Earp, Golin, & Zimmer, 2008).

This HIV symptom severity in this population of HIV+ African-American women age 50 and over, had higher HIV symptoms severity and higher levels of stress were associated with

higher levels of ART nonadherence. Although it had been previously reported that stress and depression were frequently found as comorbid conditions in those with HIV, surprisingly, neither stress nor depression were significantly associated with either treatment adherence self-efficacy or ART nonadherence (Atkins et al., 2010; Vosvick et al., 2010).

Just as interesting, the African American women had comparable levels of positive patient-provider interactions compared to the 3 other ethnic/gender groups in the study. Results from previous studies have indicated that African Americans, in general, less positive relationships than their White counterparts. However, that did not seem to hold true for this study.

Results from previous studies have indicated that African Americans had, in general, less positive relationships with their health care providers than their White counterparts. However, that did not seem to hold true for this study.   The African American women in this study had very high regard for their providers, as evidenced by an average rating of 4 out of 4 on the positive patient-provider interaction scale.

Study Limitations

This study had several limitations. The most obvious limitation is the fact that this was a biased sample. The participants in this study had to not only chose to volunteer to participate, but they also had to make the first contact which is usually the hardest step and indicates this was a highly motivated group. These participants might also be people who have more overall self-confidence in their ability to participate fully in a research study compared to those who did not choose to participate in the study. In addition, the recruitment for the study occurred in multiple sites that were located in Northern, Midwestern and Northwestern states. However, many surveillance reports have found a higher incidence of HIV in African American women living in the rural, southern regions of the United States (Reif, Whetten, & Thielman, 2007). Therefore, the results from this study may not be generalized to those who reside in the rural, Southeastern United States.

Conclusions

Nonadherence to ART in older African American women is multifaceted, and may be influenced by demographic factors, HIV disease-related factors, and psychosocial factors. It is evident that a significant health disparity exists within America. Yet, an explanation for the HIV/AIDS mortality disparity remains unclear. This study was undertaken in order to generate new knowledge that helps to facilitate the development of ethnically-relevant and gender-specific healthcare interventions that help to decrease the HIV/AIDS-related mortality that many HIV+ African American women may face in their future. Although insightful data was obtained, much work remains to be done.

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Table 1
Descriptive Characteristics of the African American Women at Baseline (N= 87)

Characteristics	African American women N = 87 n (%)	
Age, years		
50 – 54	53 (60.9)	
55 - 59	26 (29.9)	
> 60	8 (9.2)	
Sexual Identity		
Homosexual	2 (2.3)	
Heterosexual	81 (93.1)	
Bisexual	2 (2.3)	
Transgendered	1 (1.1)	
Relationship Status		
Married/Partnered	18 (20.7)	
Separated/Divorced	19 (21.8)	
Single	35 (40.2)	
Widowed	15 (17.2)	
Education Level		
Less than HS grad	29 (33.3)	
HS grad	29 (33.3)	
Some College	24 (27.6)	
College grad or higher	5 (5.7)	
Employment Status		
Employed	10 (11.5)	
Unemployed	6 (6.9)	
Disabled	71 (81.6)	
Annual Income		
$0 - $10,000	50 (57.5)	
$10,001 - $20,000	20 (23.0)	
> $20,000	15 (17.2)	
History of AIDS		
% Yes	40 (47.1)	
% No	45 (52.9)	
History of IVDU		
% Yes	31 (35.6)	
% No	56 (64.4)	
IVDU in last 3 months		
% Yes	0	
% No	87 (100)	
	M (SD)	Range
Age, years	54 (3.7)	49 – 66
Duration of HIV, years	13 (5.3)	1– 24
Duration of ART, years	11 (4.7)	.08 – 25
HIV Symptom Severity	7 (8.1)	0 – 40
Alcohol Use	1 (2.2)	0 – 9
Social Functioning	69 (25.6)	12.5-100
Patient-PCP Interactions	4 (0.6)	1.63 – 4
Perceived Stress	9 (3.3)	4 – 18
Depression Severity	6 (5.0)	0 – 19
Adherence Self-Efficacy	111 (19.91)	35 - 130
ART Nonadherence	6 (9.3)	

Note. HS = High School; AIDS = Acquired Immunodeficiency Syndrome; IVDU = Intravenous Drug Use; HIV = Human ImmunodeficiencyVirus; ART = Antiretroviral Therapy; PCP = Primary Care Provider.

Table 2
Correlations of Patient Characteristics with Self-Efficacy and ART Nonadherence in the African American Women

	Correlations			
	Self-Efficacy		Nonadherence	
Variables	r	p	r	p
Age	.077	.48	-.081	.46
Annual Income	.067	.54	-.081	.46
Duration of HIV	-.055	.62	-.035	.75
Duration of ART	-.247*	.02	.015	.89
HIV Symptom Severity	-.266*	.01	.253*	.02
Alcohol Use	-.007	.95	.072	.51
Patient-PCP Interaction	.263*	.01	-.138	.20
Social Functioning	.316**	.00	-.113	.30
Perceived Stress	-.289*	.01	.176†	.10
Depression Severity	-.193†	.08	.124	.26

Note. HIV = Human Immunodeficiency Virus; ART = Antiretroviral Therapy; PCP = Primary Care Provider.
†= $p \leq .15$, * = $p \leq .05$, ** = $p \leq .01$

Table 3
Differences in Mean Self-Efficacy and ART Nonadherence by Level of Binary Study Variables in the African American Women

	Associations			
	Self-Efficacy		ART Nonadherence	
	M (SD)	p	M (SD)	p
Sexual Identity				
LGBT	122 (6.06)	.24	5 (6.73)	.67
Heterosexual	111 (20.29)		7 (9.43)	
Relationship Status				
Married/Partnered	111 (21.49)	.92	6 (7.10)	.84
Single	112 (19.64)		7 (9.78)	
Education Level				
Less than HS grad	112 (20.24)	.90	6 (11.78)	.70
HS grad or higher	111 (19.92)		7 (7.80)	
Employment Status				
Employed	114 (12.45)	.73	5 (9.90)	.69
Unemployed	111 (20.73)		7 (9.23)	
History of AIDS				
% Yes	109 (18.80)	.39	7 (11.20)	.82
% No	113 (21.32)		6 (7.33)	
History of IVDU				
% Yes	115 (14.50)	.28	8 (11.69)	.36
% No	110 (22.28)		6 (7.62)	
IVDU in the last 3 months				
% Yes	0		0	
% No	111 (19.91)		6 (9.25)	

Note. LGBT = Lesbian/Gay/Bisexual/Transgendered; HS = High School; AIDS = Acquired Immunodeficiency Syndrome; IVDU = Intravenous Drug Use
†= $p \leq .15$, * = $p \leq .05$, ** = $p \leq .01$

CHAPTER IV: Manuscript # 3

Antiretroviral Therapy Nonadherence in Older Adults with HIV

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Antiretroviral Therapy Nonadherence in Older Adults with HIV

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Abstract

Background: The human immunodeficiency virus (HIV) is now considered to be a chronic health condition that requires strict adherence to pharmacologic regimens in order to maintain a healthy body and increase life expectancy.

Purpose: 1) To compare the characteristics of four gender/ethnicity groups among those HIV+ and age 50 and over and 2) to compare the groups regarding which factors were associated with the dependent variables, ART nonadherence or treatment adherence self-efficacy.

Methods: Data from 426 HIV+ adults age 50 years old and older who participated in a telephone intervention were evaluated. Analysis utilized mean comparisons, correlational techniques and multivariate regression.

Results: The factors associated with ART nonadherence and self-efficacy varied among the four ethnic/gender groups. HIV symptom severity was significantly associated with ART nonadherence and self-efficacy in three of the four ethnic/gender group. No ethnic or gender differences were evident.

Conclusions: The assessment and management of HIV symptoms should occur at every health care encounter in order to help decrease HIV symptomatology, improve self-efficacy and ART adherence. Knowledge about these factors may help to facilitate culturally appropriate interventions.

The Changing Epidemiology of HIV/AIDS

Historical data from the Centers for Disease Control and Prevention (CDC, 1986) provided an account of the early years of the HIV epidemic. From 1985-1990, the demographic group that had the highest incidence of HIV infections consisted of single, 25 - 44 year old, middle-class, White, homosexual males (CDC, 1986; Rumley, Shappley, Waiver & Esinhart, 1991). Between 1992 and 2004, the prevalence of HIV infections in people over the age of 50 began to exceed the rate previously found in those younger than 50 (Byrd, Fletcher, & Menifield, 2007; Paul, Martin, Lu, & Lin, 2007). It was during this time period, when the mean age of those diagnosed with HIV began to rise, that the CDC revised the HIV classification scheme to signify that, in regards to HIV infections, those aged 50 years and older who were HIV+ would henceforth be categorized as an "older adult" with HIV (CDC, 1995).

Over the course of the next decade, during what is now commonly referred to as the post-HAART era in the United States, a noticeable shift in the demographical characteristics of those most afflicted with HIV had begun to change (Jones, Brandt, & Moselio, 2009; Mack & Ory, 2003). By 2005, approximately 15% of the new HIV diagnoses occurred in those aged 50 years old or older, and people over age 50 who were HIV+ comprised 19% of the people with an AIDS diagnosis and 35% of the AIDS-related deaths for that year (Centers for Disease Control and Prevention, 2008). In 2006, it was estimated that of the 56,330 individuals living with HIV across the United States, approximately 10% were age 50 or older (Hall et al., 2008)). Consequently, it has been estimated that by the year 2015, approximately 50% of the people infected with HIV will be over the age of 50 (Smith, 2005).

This was also the time period when the prevalence of HIV/AIDS began to have a significant impact on poor, heterosexual men and women from minority groups (CDC, 2002). A recent

surveillance report of the 37 states with confidential HIV testing indicated that while African Americans made up only 14% of the United States population in 2008, they represented 52% of the total number of new HIV diagnoses reported for that year (CDC, 2009). In comparison, White Americans (who made up 68% of the total population in the reported states in 2008) comprised only 29% of those newly diagnosed with HIV (CDC, 2010). Estimates indicated that the incidence of HIV in African Americans over age 50 is approximately 12 times higher than in White Americans (CDC, 2008). A recent review of the mortality rates from 1987-2005 by Rubin et al. (2010) indicated that the HIV-related deaths for HIV+ African Americans had increased from being approximately 3 times higher than HIV+ White Americans during time prior to the use of ART becoming the standard of care, to being about 5 to 8 times higher than for HIV+ White Americans in the post-HAART era. Consequently, in 2006, HIV was ranked as the ninth leading cause of death for all African Americans during that year (CDC, 2009).

In 2006, 26% of those newly diagnosed with HIV infections were women age 50 years old or older (CDC, 2008). Approximately 50% of these older women were single, sexually-active members of either a racial or ethnic minority group (Brennan et al., 2009). These women were more likely to be African American, reside in rural areas, have limited income, have less than 12 years of education, and were more likely to have been exposed to HIV via heterosexual transmission (Reif et al., 2007; Schable, Chu, & Diaz, 1996). Many of the women were unaware of their HIV+ status, and they often received their initial HIV+ diagnosis when hospitalized for an AIDS related illness (Johnson et al., 2010).

Antiretroviral Therapy (ART)

During the first decade of the HIV epidemic, the majority of the people infected with HIV died as a result of having an AIDS-defining illness (Cohen et al., 2002). However, in 1996

antiretroviral therapies were developed as therapeutic interventions to help the body combat the

effects of the HIV disease (Altice & Friedland, 1998). These medications help the body to

combat the effects of this disease by reducing the HIV viral load, decreasing the body's

inflammatory response, helping to maintain adequate immunologic function and decreasing the

body's susceptibility to antiretroviral resistance (Paterson et al., 1999). These medications have

become an integral component of the medical management of people living with HIV/AIDS

(Chesney, Morin, & Sherr, 2000).   As a result of the effectiveness of ART medications, HIV has

become a treatable chronic condition, and the life expectancy for those infected with HIV has

significantly improved (Palella et al., 1998). Today, persons living with HIV/AIDS (PLWHA)

can look forward to living longer, healthier lives while managing their HIV infections as they

would any other chronic health condition (Manfredi, 2002).

Although ART has been demonstrated to be effective in warding off the harmful effects

of HIV, older adults who are HIV+ have continued to have higher AIDS-related mortality

compared to younger people who are infected with HIV (Luther, 2007). The factors that have

been associated with the higher HIV/AIDS mortality in older adults include being diagnosed

later in the course of the disease, having poor immune functioning due to aging, having multiple

comorbid disorders and having neurocognitive disorders associated with aging to name a few

(Barclay et al., 2007; Tarantino et al., 2010). It has been documented that older adults who do

not have any cognitive impairment have better adherence to medications and their medication

treatment self-efficacy improves over time (Ettenhofer, Foley, Castellon, & Hinkin, 2010).

Purpose

The purpose of this study is to explore whether there are gender or racialized differences in the factors that are associated with adherence outcomes in older African American women who are HIV+ compared to other older adults who are HIV+. Adherence outcomes include, primarily, degree of self-reported nonadherence to ART regimens and, secondarily, HIV treatment adherence self-efficacy. Comparisons of the demographic factors, HIV disease-related factors and psychosocial factors of the 426 African Americans and White Americans who participated in the "PRIME" telephone-based intervention were conducted in order to determine if gender or racialized differences in factors that were associated with adherence outcomes in older HIV+ African American women compared to other HIV+ older adults.

Adherence to ART

Adherence can be defined as "the extent to which a person's behavior corresponds to the recommended treatment from providers" (World Health Organization, 2003). Adherence is usually reported as a single proportion of doses taken, divided by the number of prescribed doses over a given period of time (Hays, Taylow & Sackett, 1979). For most chronic health conditions, consuming 80% of prescribed medications are considered to be an adequate level of medication adherence to maintain the health status of those with chronic health conditions (Chapman et al., 2005). Most older adults who have been prescribed one or more medications to control a chronic health condition are usually only around 50% adherent to their prescribed medication regimen (Lucas, Wu, & Cheever, 2004).

In regards to ART adherence, Mayers (1998) reported that the target level of ART adherence to maintain should be at least 95% in order to prevent the occurrence of antiretroviral drug resistance and to ensure positive health outcomes for those infected with HIV. The Mayers'

(1998) study was soon followed by the highly referenced work by Paterson et al. (1999), which concurred with the previous author's assertion that maintaining ART adherence level of 95% or greater was of the utmost important to prevent virologic failure as well as virologic resistance. More recently, it has been demonstrated that when ART adherence is equivalent to 95% or more of the prescribed ART medication regimen, then good clinical outcomes are more likely to occur (Simoni, Pearson, Pantalone, Marks, & Crepaz, 2006), suppressed HIV virologic loads are maintained (Erlen, Cha, Kim, Caruthers, & Sereika, 2010) and optimal CD4 counts may be achieved in those infected with HIV (Read, Mijch, & Fairley, 2003).

Measurements of ART Adherence

Maintaining adequate adherence to antiretroviral medication regimens has been demonstrated to be the most effective way to decrease the HIV viral load, reduce the risk of drug resistance and prevent mortality (Altice & Friedland, 1998). However, adherence is very difficult to measure. Although no "gold standard" for measuring adherence to ART exists, there are, however, multiple surveillance methods that may be utilized to evaluate the level of adherence to the prescribed ART medication regimens (Martin et al., 2009). Common instruments that are used to measure adherence to ART in the United States include the patient's self report, unannounced pill counts, pharmacy refill rates, electronic monitoring and therapeutic measures of evaluation (Grossberg & Gross, 2007; Kerr, Walsh, Lloyd-Smith, & Wood, 2005; Simoni et al., 2006).

The most commonly utilized method for measuring ART adherence is by the patient's own self report (Besch, 1995). This method utilizes a patient's recall about the frequency with which they took their medications, usually on a 3-, 7-, or 30-day recall (Read et al., 2003). Although it has been demonstrated that a patient's self-report of ART adherence can

overestimate levels of adherence by as much as 20% (Cramer et al., 1989), when compared to electronic measures, patient recall has been shown to accurately correlate with changes in viral load (Mannheimer et al., 2002; Wagner, Ferrando, & Rabkin, 2000).

Unannounced pill counts and pharmacy refills are relatively inexpensive measures of adherence. In essence, the patient will bring the pill containers either to the clinic or pharmacy, and a staff member will count the pills (Martin et al., 2009). These methods require minimal effort by the patients, but the cost of coming to the facility may be prohibitive to some (Liu et al., 2007). These methods are also time-consuming for the clinical staff, and they provide only a moderate level of correlation to measures of virologic status (Hugen et al., 2002).

Electronic drug monitoring is an adherence measure that commonly utilizes a device called a medication event monitoring system (MEMS) pill bottle cap. A microchip is embedded in the pill bottle cap and each time the bottle is opened, a date and time is recorded and stored to be downloaded at a later date (Berg & Arnsten, 2006). This measure has been found to be an effective method to improve the actual adherence to HAART medications, and it provides the best correlation with virologic data (Berg & Arnsten, 2006). However, this measure has also been known to underestimate adherence and it is expensive (Dilorio et al., 2008).

Therapeutic blood monitoring, which entails performing a blood draw to monitor the CD4 counts and viral load levels in the blood every 3-4 months, has been shown to accurately correlate with other measured levels of adherence to ART (Hugen et al., 2002; Liu et al., 2001).

Demographic Factors

Social disparities in health can be directly influenced by a person's age, race, ethnicity, and gender (Williams, Mohammed, Leavell, and Collins, 2009). When investigating whether sociodemographic factors predicted early discontinuance of ART, Asad et al. (2008) studied a

population of 3,654 individuals (40% African American women) who had recently started on ART. After controlling for age, gender, ethnicity and area of residence, the researchers found that sociodemographic factors such as being of African American descent, female gender and younger age were predictive of early discontinuation of specific ARTs. Golin et al. (2002) investigated similar concepts in their study of 140 subjects, which included 27% African Americans and 20% women. These authors concluded that being of African American ethnicity and having lower income, less education, history of alcohol use, as well as higher frequency of medication dosing in their regimen contributed to nonadherence to ART.

Gerber, Cho, Arozullah and Lee (2010) sought to determine if racialized differences existed in medication adherence in a diverse sample of over 400 Medicaid recipients (58% African American, mean age, 78.3; 41% White, mean age 76.8). The evidence revealed that being of African American descent was associated with running out of medications early and with not following provider's orders for the prescriptions (Gerber et al., 2010). In contrast, the study by Ferguson et al. (2002), involving 149 people (67% African American), demonstrated that neither ethnicity nor gender produced statistically significant differences in terms of ART adherence.

The results of a prospective study by Singh et al. (1999), which evaluated the impact that social and psychological factors had on ART adherence in 123 HIV+ people, were consistent with those reported by Ferguson. This study revealed that the sociodemographic factors of age, income, employment status, education and drug use did not affect adherence. However, these authors then went on to say that non-Whites were more likely to be nonadherent with ART (Singh et al., 1999). Paterson's findings (2000) also reported that sociodemographic factors such as sex and employment status did not influence ART adherence. However, it is important to note

that both of these studies had small sample sizes with very few non-White participants. Paterson's study was composed of 100% White, 96% males, and the Singh (1999) study was made up of 72% Whites and 93% males. Although these sample characteristics reflect the demographic group most affected by HIV during those times, it is difficult to generalize to other groups these findings regarding the psychosocial factors that influence adherence to ART.

As people age, the effects of cognitive disease in HIV+ adults have consistently impaired their adherence to ART regimens. Ettenhofer et al. (2009) indicated that although older adults had higher levels of adherence compared to younger adults in general, the neurocognitive disorders associated with aging negatively affected their adherence to ART. Barclay et al. (2007) evaluated the predictive effects of age, beliefs and self-efficacy on ART adherence. Their study, which included 68% African Americans and 22% women, demonstrated that although older adults were more adherent to ART than younger adults, the presence of cognitive diseases could impact their ability to be adequately adherent to ART (Barclay et al., 2007). Hinkin et al. (2004) also demonstrated that older adults were more adherent to ART compared to younger adults.

The interplay of multiple social and political factors associated with trust, intimate relationships, control and power issues serve to retain women in low socioeconomic status (Sikkema, Wagner & Bogart, 2000). Several studies have undertaken the challenge of determining if gender differences are associated with adherence to ART in women. Social constructions of gender roles have served to keep women financially dependent on their partners, and these constructs may have also limited the attainment of knowledge regarding the importance of initiating and adhering to antiretroviral therapy (Locher et al., 2007; Robison et al., 2008).

Within the general population, socioeconomic factors such as education, employment and income have been loosely associated with mortality levels in individuals with chronic diseases. Link and Phelan (1995) argued that the poor health of an individual should be viewed as a societal problem in which people with low SES are at increased risk of having poorer health outcomes related to having less access to health care, poorer patient-provider relationships, and decreased social support than those with higher SES. In regards to HIV, Rubin, Colen and Link (2010) conducted a study that evaluated the impact that socioeconomic status had on the HIV/AIDS mortality rates of African American and White Americans (Ruben et al., 2010). In this study it was found that when compared to White Americans, African Americans had a higher rate of HIV/AIDS-related mortality in the post-HAART era than the pre-HAART era. (Ruben et al., 2010).

There is evidence that a person's literacy level can have a profound effect on their adherence to ART regimens (Kalichman et al., 2000). According to Bailey (1995), the level of education had more of an impact on a patient's ability to manage a medication regimen than many other factors including the type of medication a person is prescribed. Kalichman, Catz and Ramachandran (1999) found that HIV+ African Americans who had low levels of health literacy were more likely to be nonadherent to ART, even when controlling for educational level. Additional research has shown that people with low literacy have difficulty adhering to prescribed treatment regimens because they may not be able to read or identify their medication (Kalichman et al., 2000).

Many women may also have limited knowledge regarding the importance of initiating as well as adhering to antiretroviral therapy due to limited access to education (Byrd et al., 2007; Oramasionwu, Skinner, Ryan, & Frei, 2009). Gifford et al. (2000) evaluated the factors

predictive of adherence in 133 HIV+ adults who were taking multiple antiretroviral medications. In this cohort study, composed of 14% women, 22% African Americans and 18% aged 50 or older, the findings indicated that being of African American heritage and lacking a college degree were associated with nonadherence to ART.

Disease-related Factors

Adherence to ART regimens in older women is a complex process that may be influenced by their physical and psychological well-being. As a result of normal aging processes, many older women are at high risk of developing physiologic, neurologic and metabolic disorders (Chapman, Petrilla, Benner, Schwartz, & Tang, 2008; Nguyen & Holodniy, 2008). In addition, many HIV+ women over the age of 50 may have chronic health conditions or illnesses such as diabetes, hypertension, and impaired cognition which may be exacerbated by either their HIV disease or ART regimen (Fan, Maslow, Santoro, & Schoenbaum, 2008; Vance, Struzick, & Childs, 2010).

The severity of HIV symptoms may also adversely affect older African American women's adherence to ART regimens (Lyon & Munro, 2001). Common symptoms have included fever, nausea, vomiting, abdominal pain, and abnormal distributions of body fat (Gao, Nau, Rosenbluth, Scott, & Woodward, 2000; Silverberg, Jacobson, French, Witt, & Gange, 2009). These symptoms occur frequently with ART use and can interfere with a person's activities of daily living and result in a decreased quality of life (Simoni et al., 2010).

Treatment effects such as the timing of dosing, the required number of pills to be taken and the treatment side effects can have an adverse effect on adherence to antiretroviral regimens. Yuan, L'Italien, Mukherjee, and Iloeje (2006) evaluated 3,414 HIV+ patients in their study concerning the factors that influenced a patient's adherence to ART. Their study indicated that

having a high pill burden (>15 pills/day) was an important factor in the discontinuation of ART (Yuan et al., 2006). In their use of surveys to collect data from a cross-section of women living with HIV/AIDS, Stone and Hogan (2001) found that if patients were burdened with a complex drug regimen that required taking pills more than 3 times a day, they were more likely to miss scheduled doses of ART. In addition, there are many side effects commonly associated with the use of antiretroviral medications such as skin conditions, gastrointestinal problems, and metabolic problems. Plankey et al. (2008) found that nonadherence to highly active antiretroviral therapy medications could be attributed to medication side effects.

Psychosocial Factors

As older adults confront the challenges associated with living with HIV/AIDS, they may also have to manage the complex psychosocial factors that impact their adherence to ART regimens such as stress, depression, level of social support, substance abuse and the nature of the patient-provider relationship (Santoro, Fan, Maslow, & Schoenbaum, 2009).

Substance abuse can have a negative influence on adherence to antiretroviral medications (Chesney, 2000). The increased prevalence of alcoholism and substance abuse within communities that have large ethnic minority groups has increased their risks for HIV infection, increased morbidity and mortality related to HIV/AIDS and their nonadherence to ART (Adimora & Schoenbach, 2005; Forna et al. 2008; Parrish et al., 2008). The prospective study conducted by Golin et al. (2002) of 140 HIV+ individuals with personal histories of substance abuse revealed that 95% of the study's participants were approximately 71% adherent to their ART regimens. Alcohol users were 66% adherent to ART compared to nondrinkers who were 74% adherent, and those who took drugs were only 59% adherent compared to those who did not take drugs who were 72% adherent to their ART regimens.

When studying ART adherence in 137 crack cocaine users (100% African American, 27% women), Crisp, Williams, Timpson, & Ross (2004) found that their compliance with ART regimen was not affected by their drug use. In contrast, the study by Robinson et al. (2008), which included 50% African Americans, 25% female and 11% adults older than age 50, provided evidence which indicated that African American patients and those with a history of intravenous drug use were more likely to be nonadherent to their medications as prescribed, and they were more likely to discontinue ART.

It has been suggested that the patient-provider relationship may affect adherence to ART regimens (Byrd et al., 2007; Oramasionwu et al., 2009; Weitz et al., 2000). Meredith, Jeffe, Mundy, and Fraiser (2001) observed that the patient-provider relationship between HIV-infected women and their primary care providers proved to have an important positive influence on adherence to antiretroviral medication regimens. Crisp et al. (2004) as well as Altice et al. (2001) found that participants who had a history of IV drug use considered their patient-provider relationship to be positive. Kalichman, Cherry & Cain (2005) demonstrated that brief behavioral interventions delivered by nurses also had a positive impact on adherence to ART. Other studies have shown that the patient-provider relationship was viewed as being more positive and having more importance to White patients rather than to African American patients (Meredith, Jeffe, Mundy, & Fraiser 2001). These examples emphasize the important role that the relationship between older HIV+ patients and their health care providers could have on a patient's self-efficacy for managing their HIV medication regimen.

Social support is a psychosocial factor that has been strongly correlated with adherence to antiretroviral medications in older African American women (Konkle-Parker, Erlen, & Dubbert, 2010). Social support from family, friends, co-workers and others can increase a woman's self-

efficacy to adhere to ART, and it can promote a woman's sense of being capable of actively participating in meeting her health care needs (George et al., 2009). Edwards (2006) evaluated the relationship between social support and ART adherence. The results of her study of a young cohort of 33 African American women between the ages of 20-49 indicated that perceived social support could act as both a barrier as well as a facilitator of adherence to ART. Other studies have provided evidence that social support was a beneficial component to ensure adherence to antiretroviral medications for African American women (Murphy, Lu, Martin, Hoffman, & Marelich, 2002; Simoni et al., 2009). However, these same authors who studied older women with a history of drug use have revealed that there were some inherent difficulties in correlating psychosocial factors with medication adherence (Edwards, 2006; Murphy et al., 2002).

Depression is one of the most common mental health disorders experienced by older adults with HIV (Hays et al., 2000). The effects of depression on adherence to ART in older adults who are HIV+ can be challenging to address, and the prolonged effects can lead to negative outcomes such as suicidal ideation (Vance et al., 2010). Depression in conjunction with perceived lack of social support can contribute to nonadherence of ART in both men and women (Gonzalez et al., 2007)). In their study involving HIV+ minority women, Catz, Gore-Felton and McClure (2002) found that when compared to White women, minority women experienced higher levels of depressive symptoms related to limited coping and perceived social support. Turner, Laine, Cosler and Hauck (2003) found that depression commonly occurred in HIV+ women, and it contributed to the women being less adherent to their ART regimens which could lead to poor health.

Methods

Participants

Participants were recruited as part of a larger telephone antiretroviral adherence and quality of life intervention for HIV+ persons aged 50 and older (Catz, 2012). Recruitment occurred in ten different community-based AIDS Service Organizations (ASOs) from nine states across the United States (Arizona, California, Illinois, Massachusetts, Michigan, Pennsylvania, Texas, Washington, and Wisconsin) through posters, flyers and direct mailings.   The baseline survey results of the African American women (n=83) compared to those for White women (n=30), White men (n=141) and African American men (n=166) were analyzed for this study. Each participant was compensated with $30 for completing the baseline telephone assessment.

Measures

Demographic information. Demographic information included the participant's age, ethnicity, gender, relationship status, educational level, employment status, disability status, and annual income. All of this information was obtained from self-reported survey data.

HIV-related medical information. Relevant medical history information, including time since HIV diagnosis (years), length of antiretroviral treatment (years), history of AIDS (yes/no) and perceived HIV symptoms, were assessed through patient self-report. Perceived HIV symptoms were evaluated using a 23-item checklist of current HIV symptoms (Folkman et al., 1996). Respondents rated each symptom on a 5-point scale from "not present" to "very severe," yielding a symptom frequency and a symptom severity score that ranged from 0 - 80. Higher scores indicate higher perceived HIV symptom severity.

Substance Use History. The 3-item *Alcohol Use Disorders Identification Test* (AUDIT-C; Bush, 1998) was used to evaluate prior year history of alcohol use. The measurement scale for the AUDIT-C is based on 3 questions: "How often did you have a drink containing alcohol in the past year?", "How many drinks did you have on a typical day when you were drinking in the past year?", and "How often did you have six or more drinks on one occasion in the past year?" The score ranged from 0 – 12. In addition, injection drug use history was assessed by asking participants 2 questions: "Have you ever injected any drug on your own, without medical supervision?" and "Have you injected any drug in the past 3 months?"

Social Functioning. The Social Functioning subscale from the SF-36v2 Health and Well-Being survey was used to assess social functioning (Ware, 2000). The scores ranged from 1 (not at all) to 5 (extremely), and this questionnaire has been demonstrated to be a valid measure of social functioning in people with HIV (Riley et al., 2003). The composite score ranged from 0 – 100. Higher scores equate to higher social functioning.

Patient-Provider Relationship. An 8-item questionnaire developed by Johnson et al. (2006) was used to evaluate and measure the perceived quality of the patient-provider relationship. This measure was used to determine the quality of the interactions between the patient and the provider based on how patients rated their interactions with heath care providers. Responses to questions were answered on a scale that ranged from 1 – 4 which corresponded to "never," "some of the time," "most of the time," and "every time." Mean scores were utilized in the analysis.

Perceived Stress Scale. The 4-item version of the Perceived Stress Scale (PSS; (Cohen & Lichtenstein, 1990) was utilized to evaluate the overall level of stress experienced by participants. Items were rated on a 5-point scale from "never" to "very often." After reverse

scoring of positive items, ratings from the items were summed to yield a perceived stress score. The scale ranged from 4 – 20. The higher the score, the higher the level of perceived stress.

Depression. Depression was measured by the Patient Health Questionnaire (PHQ-8), an 8-item modified version of the PRIME-MD PHQ-9 depression scale that omits one suicidal ideation item (Kroenke, Spitzer, & Williams, 2001). The 8-item PHQ measures the frequency with which major depression symptoms were experienced over a 2-week period (Kroenke et al., 2009). The scale ranged from 0 – 24. For the purposes of this study, depression was defined as a score of 10 or more on the PHQ-8.

ART Nonadherence. The Golin Self-Report of Medication Non-Adherence questionnaire (2002) was utilized to measure the rate of ART nonadherence for the 7-day period prior to obtaining baseline data. This variable was analyzed as a continuous variable equal to the percentage of doses missed in the 7-day period assessed prior to baseline. Patients were initially asked to recall their HIV medications, and a brief assessment of their understanding of the medications was done. The patients were then asked to recall how many doses of each of their HIV medications were missed in the last 7 days and how much they had actually taken (Golin et al., 2002). The measure of adherence was calculated as the ratio of total doses missed to total doses which should have been taken. The obtained percentage of adherence was subtracted from 100% to yield the percent of ART nonadherence. This variable was analyzed as a continuous variable equal to the percentage of doses missed in the 7-day period prior to baseline.

Treatment Adherence Self-Efficacy. For the secondary dependent measure, treatment adherence self-efficacy, participants were asked to indicate their level of confidence that they could achieve a certain task (Johnson et al., 2006). Adherence self-efficacy was analyzed as a continuous variable representing the average rating on the 13 items on the treatment adherence

self-efficacy scale (score range = 0-130). Participants indicated their level of confidence in their abilities on a scale from 0 up to 10 with 0 meaning "you think you cannot do it at all" and 10 meaning "you are certain you can do it." For example, one question asked "How confident are you that you can stick to your treatment schedule even when your daily routine changes?" Higher scores indicate higher mean levels of self-efficacy.

Statistical Analysis

Initially, data were analyzed with descriptive statistics (including frequency distributions, means, standard deviations and ranges) to determine the distributions of each of the study variables. Bivariate correlations were utilized to determine if the continuous and ordinal variables were significantly related to the dependent variables, ART nonadherence and treatment adherence self-efficacy. Categorical variables were all dichotomized and t-tests were used to determine if they were significantly related to the two outcomes. The goal was to determine if mean differences existed between each of the predictor variables related to the dependent variables, ART nonadherence and treatment adherence self-eefficacy. Finally, analyses of covariance (ANCOVA) were utilized as a multivariate regression technique, examining the four subgroups as independent factors, with relevant interaction terms. This multivariate model incorporated variables from the bivariate analyses that were shown to be highly correlated with ART nonadherence and self-efficacy at the $\leq .15$ level.

Results

Characteristics of the Study Population

There were 426 participants who met the established inclusion criteria for the main study and were African American or White. Participants were placed into specific groups based upon their self-identified ethnicity and gender. We divided the study population into four ethnic/gender groups: African American women (n = 87 or 20.3% of total), White women (n = 30 or 7%), African American men (n = 168 or 39%), and White men (n = 141 or, 33%). Table 4 provides a complete overview of the characteristics of the study population.

Demographic Factors. There were significant differences in age among the four ethnic/gender groups (p =. 03). Participants ranged in age from 49 – 75. The African American women and the African American men each had a mean age of 54 years old which was younger than the mean age for both the White women (*M* = 55) and the White men (*M* = 56). The majority of the African American women (93.1%) as well as the White women (86.7%) self-identified as heterosexual. Only 56% of the African men reported being heterosexual, and the majority of White men self-identified as homosexual (65%). Significant differences existed in the relationship status of the participants (p < .01). At least 50% of the men from both groups were single, compared to 40% of the African American women and 33% of the White women.

There were significant differences in terms of the socioeconomic status of the study population (p < .001). White Americans had significantly more education compared to the African Americans with 74% of the White men and 50% of the White women having obtained either some college education or had graduated from college. However, only 40% of the African American men and 33% of the African American women had obtained some college education. There were also significant differences in the annual income between the ethnic/gender groups.

Three of the four ethnic/gender groups had an average income of less than $10,000 annually including 59% of the African American women, 62% of the White women, and 64% of the African American men, but only 32% of the White men earned less than $10,000. The majority of White men (42%) earned between $10,000 - $20,000 annually. There were no significant differences in employment status ($p = .90$) among the four ethnic/gender groups.

HIV Disease-Related Factors. Significant differences existed in the duration of HIV disease among sample participants ($p < .01$). White men had been living with HIV for an average of 17 years which was significantly different from African American women ($M = 13$), White women ($M = 13$) and African American men ($M = 14$). There were also significant differences in the length of time that ART had been prescribed among sample participants ($p < .01$). White men had been prescribed ART for the longest time ($M = 13$) which was approximately 2 years longer than African American women (M = 11), White women ($M = 11$) and African American men ($M = 11$). The majority of White women (70%) and White men (60%) had been previously diagnosed with AIDS, whereas less than 36half of the African American women (47.1%) and African American men (47.6%) had ever been diagnosed with AIDS ($p =.03$). No significant differences in HIV Symptom Severity existed among the sample population ($p =.39$).

Psychosocial Factors. Mean differences existed in the amount of alcohol used by women and men. Both groups of women reported minimal use of alcohol ($M = 1$) compared to the two groups of men that both reported mild use of alcohol ($M = 2$). Three of the four ethnic/gender groups had a positive history of IVDU which included 36% African American women, 35% African American men and 33% White men had a history of IVDU. However, 57% of the White women had used intravenous drugs in the past. In the 3 months prior to entering the study, none of the African American women had used any intravenous drugs.

However, 6.7% of the White women, 4.2% of the African American men and 6.4% of the White men acknowledged having recent IVDU. There were no mean differences in the reported levels of social functioning ($p = .10$), patient-provider relationships ($p = .10$), perceived stress ($p = .11$), or depression severity ($p = .17$). Table 4 contains the complete summary of the results.

Association of Study Variables with Self-Efficacy in the Four Ethnic/Gender Groups

Bivariate analysis revealed significant correlations between the study variables and self-efficacy among the ethnic/gender groups. Significant, positive correlations were evident between self-efficacy and the patient provider interactions and social functioning in African American women and self-efficacy and social functioning in White women; self-efficacy and patient-provider interactions and social functioning in African American men; and self-efficacy and age, patient-provider interactions and social functioning in White men. Significant, negative correlations existed between self-efficacy and duration of ART, HIV symptom severity, and perceived stress in African American women; self-efficacy and HIV symptom severity, perceived stress, and depression severity in African American men and White men. Table 5 provides complete summaries of the correlations of patient characteristics with self-efficacy.

Association of Study Variables with ART Nonadherence in the Four Ethnic/Gender Groups

Bivariate analysis revealed significant correlations between the study variables and ART nonadherence for some of the ethnicity/gender groups. Significant, positive correlations were evident between ART nonadherence and the level of HIV symptom severity in African American women, African American men and White men; and between ART nonadherence and the duration of ART in White women. There were also significant, positive correlations between ART nonadherence and perceived stress and depression in the African American and White men.

In contrast, there was a significant, negative association between ART nonadherence and social functioning in the African American men and White Men; and there was also a significant, negative correlation between ART nonadherence and the patient-provider interactions in White men. Table 6 provides a complete summary of the correlations of patient characteristics with ART nonadherence.

Analysis of Covariance

The analysis of covariance indicated that there were no significant differences among the four ethnic/gender groups regarding which factors were associated with self-efficacy and ART nonadherence (Tables 7 and 8).

Discussion

A descriptive analysis of the data from 426 HIV+ participants who were 50 years old or older was conducted. The primary objective of this study was to determine if ethnic or gender differences existed that could account for lower levels of ART adherence among African American women who had been previously reported. Prior studies indicated that African American women experienced greater HIV/AIDS mortality rates when compared to other ethnic/gender groups due to significant differences in their patient-provider relationship status, HIV-disease related factors and psychosocial factors such as high levels of depression or prior history of intravenous drug use (Johnson, 2003).

When comparing the African American women in this study to the other ethnic/gender groups, there were few significant differences. Surprisingly, the African American women had very similar characteristics to those found in the White men, and they were less similar to the White women and African American men. Prior studies had reported that having poor patient-provider relationships, higher levels of stress and/or depression, and lower levels of education were common characteristics found in older African American women with HIV (Lillie-Blanton, 2010; Waldrop-Valverde, 2010). However, the results for the current sample population of group of HIV+ older adults were somewhat inconsistent with what had previously been reported. The majority of these participants had completed high school, they had lower levels of stress, and lower levels of depression compared to the White women, African American men and White men. In addition, the African American women had higher average scores for their patient-provider relationship. Consistent with prior studies, there were not significant differences in the factors that were associated with ART nonadherence or treatment adherence self-efficacy among the four ethnic/gender groups.

Study Limitations

One limitation to the study is the fact that the participants were recruited as a convenience sample. Although this is a very good method to get participation in a study, one has to consider that these are individuals who volunteered and may not have any problems with disclosure. There are a large proportion of people who might feel stigmatized, and therefore, would not be likely to call to participate in the study. The majority of HIV+ adults who participated in this study lived in the Northeastern, Southwestern, Midwestern or Western United States. Individuals in those locations might have a very different level of understanding and tolerance than those in the southern states where there is now a higher incidence of new HIV infection in those who are older, female, poor and living in rural areas (McDavid et al., 2006). Therefore, these results may not be generalizable to women living in the Southeastern United States.

This study did not ascertain information regarding the participant's type of insurance coverage. Although most people who are HIV+ in the United States have their HIV medications covered by federal grants, it might have been useful to know if the amount of medical coverage had any impact on the ART adherence levels for the participants. However, as the number of people who are aging with HIV increases, there is the potential for increased cost of care for those with HIV.

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Table 4
Descriptive Characteristics of the Sample Population by Ethnic/Gender Group at Baseline (N= 426)

Variables	African American Women N = 87	White Women N = 30	African American Men N = 168	White Men N = 141	Total Sample N = 426	p values
	n (%)	n (%)	n (%)	n (%)	n (%)	
Age, years						
50 – 54	53 (60.9)	20 (66.7)	103 (61.3)	72 (51.1)	248 (58.2)	.21
55 - 59	26 (29.9)	6 (20.0)	47 (28.0)	42 (29.8)	121 (28.4)	
≥ 60	8 (9.2)	4 (13.3)	18 (10.7)	27 (19.1)	57 (13.4)	
Sexual Identity						
Homosexual	2 (2.3)	0	53 (31.5)	92 (65.2)	147 (34.5)	.00**
Heterosexual	81 (93.1)	26 (86.7)	94 (56.0)	34 (24.1)	235 (55.2)	
Bisexual	2 (2.3)	2 (6.7)	18 (10.7)	14 (9.9)	36 (8.5)	
Transgendered	1 (1.1)	2 (6.7)	1 (0.6)	0	4 (0.9)	
Relationship Status						
Married/Partnered	18 (20.7)	7 (23.3)	36 (21.4)	35 (24.8)	96 (22.5)	.01*
Separated/Divorced	19 (21.8)	12 (40.0)	34 (20.2)	25 (17.7)	90 (21.1)	
Single	35 (40.2)	10 (33.3)	86 (51.2)	74 (52.5)	205 (48.1)	
Widowed	15 (17.2)	1 (3.3)	12 (7.1)	7 (5.0)	35 (8.2)	
Education Level						
Less than HS grad	29 (33.3)	4 (13.3)	36 (21.4)	8 (5.7)	77 (18.1)	.00**
HS grad	29 (33.3)	11 (36.7)	64 (38.1)	29 (20.6)	133 (31.2)	
Some College	24 (27.6)	8 (26.7)	42 (25.0)	48 (34.0)	122 (28.6)	
≥ College grad	5 (5.7)	7 (23.3)	26 (15.5)	56 (39.7)	94 (22.1)	
Employment Status						
Employed	10 (11.5)	1 (3.8)	19 (11.6)	18 (13.3)	48 (11.7)	.90
Unemployed	6 (6.9)	2 (7.7)	10 (6.1)	7 (5.2)	25 (6.1)	
Disabled	71 (81.6)	23 (88.5)	135 (82.3)	110 (81.5)	339 (82.3)	
Annual Income						
$0 - $10,000	50 (58.8)	18 (62.1)	106 (64.2)	44 (31.7)	218 (52.2)	.00**
$10,001 - $20,000	20 (23.5)	11 (37.9)	39 (23.6)	59 (42.4)	129 (30.9)	
≥ $20,000	15 (17.6)	0	20 (12.1)	36 (25.9)	71 (17.0)	
History of AIDS						
% Yes	40 (47.1)	21 (70.0)	80 (47.6)	84 (59.6)	225 (53.1)	.03*
% No	45 (52.9)	9 (30.0)	88 (52.4)	57 (40.4)	199 (46.9)	
History of IVDU						
% Yes	31 (35.6)	17 (56.7)	59 (35.1)	46 (32.6)	153 (35.9)	.10†
% No	56 (64.4)	13 (43.3)	109 (64.9)	95 (67.4)	273 (64.1)	
IVDU last 3 months						
% Yes	0	2 (6.7)	7 (4.2)	9 (6.4)	18 (4.2)	.12†
% No	87 (100)	28 (93.3)	161 (95.8)	132 (93.6)	408 (95.8)	

	M (SD)	Range	M (SD)	Range	M (SD)	Range	M (SD)	Range	M (SD)	Range	p
Age, years	54 (3.7)	49 – 66	55 (5.1)	50 – 70	54 (3.9)	50 – 69	56 (4.9)	50 – 75	55 (4.3)	49 – 75	.03*
Duration of HIV	13 (5.3)	1 – 24	13 (6.3)	2 – 24	14 (6.2)	1 – 30	17 (6.5)	0 – 29	15 (6.3)	0 – 30	.00**
Duration of ART	11 (4.7)	.08 – 25	11 (5.4)	1.42 – 20	11 (5.7)	.25 – 22	13 (5.6)	.08 – 25	12 (5.5)	.08 – 25	.00**
Symptom Severity	7 (8.1)	0 – 40	10 (9.6)	0 – 39	7 (9.4)	0 – 61	7 (8.1)	0 – 39	7 (8.7)	0 - 61	.39
Alcohol Use	1 (2.2)	0 – 9	1 (2.1)	0 – 11	2 (2.8)	0 – 12	2 (2.3)	0 – 10	2 (2.5)	0 – 12	.02*
Social Functioning	69 (25.6)	12.5 - 100	58 (28.3)	12.5 –100	69 (28.5)	0 – 100	63 (30.0)	0 – 100	66 (28.6)	0 – 100	.10†
Patient-PCP Interaction	4 (0.6)	1.63 – 4	3 (0.6)	1.38 – 4	3 (0.7)	1.38 – 4	3 (0.6)	1.38 – 4	3 (0.6)	1.38 – 4	.10†
Perceived Stress	9 (3.3)	4 – 17	11 (2.8)	4 – 17	9 (3.3)	4 – 18	9 (3.9)	4 – 20	9 (3.5)	4 – 20	.11†
Depression Severity	6 (5.0)	0 – 19	9 (4.9)	0 – 20	7 (5.9)	0 – 24	8 (6.0)	0 – 23	7 (5.7)	0 - 24	.17
Self-Efficacy	111 (19.9)	35 - 130	110 (17.3)	64 - 130	105 (21.8)	45 - 130	111 (18.3)	47 - 130	109 (20.2)	35 - 130	.01
ART Nonadherence	6.4 (9.3)		9 .2 (13.9)		9.0 (14.9)		6.3 (14.5)		7.6 (13.8)		.27

Note. AIDS = Acquired Immunodeficiency Syndrome; IVDU = Intravenous Drug Use
HIV = Human Immunodeficiency Virus; ART = Antiretroviral Therapy; PCP = Primary Care Provider
†= p ≤.15, * = p ≤ .05, ** = p ≤ .01

Table 5
Correlations of Patient Characteristics with Self-Efficacy in 4 Ethnic/Gender Groups

| | Self-Efficacy | | | | | | | | Interact. |
| | AAW | | WW | | AAM | | WM | | |
	r	p	r	p	r	p	r	p	P
Age	.077	.48	-.017	.93	.115†	.14	.237**	.00	.67
Annual Income	.067	.54	-.145	.44	.110	.16	.125†	.14	.67
Duration of HIV	-.055	.62	-.331†	.07	-.008	.92	-.145†	.09	.49
Duration of ART	-.247*	.02	-.335†	.07	.005	.95	-.058	.50	.15
HIV Symptom Severity	-.266*	.01	-.140	.46	-.400**	.00	-.480**	.00	.16
Alcohol Use	-.007	.95	.203	.28	-.069	.38	-.006	.95	.67
Patient-PCP Interaction	.263*	.01	.274†	.14	.296**	.00	.324**	.00	.99
Social Functioning	.316**	.00	.367*	.04	.443**	.00	.498**	.00	.68
Perceived Stress	-.289*	.01	-.239	.20	-.403**	.00	-.519**	.00	.55
Depression Severity	-.193†	.08	-.343†	.06	-.453**	.00	-.542**	.00	.20

Note. HIV = Human Immunodeficiency Virus; ART = Antiretroviral Therapy; PCP = Primary Care Provider.
†= $p \leq .15$, * = $p \leq .05$, ** = $p \leq .01$

Table 6
Correlations of Patient Characteristics with ART Nonadherence in 4 Ethnic/Gender Groups

| | ART Nonadherence | | | | | | | | Interact. |
| | AAW | | WW | | AAM | | WM | | |
	r	p	r	p	r	p	r	p	P
Age	-.081	.46	-.031	.87	-.092	.24	-.021	.81	.88
Annual Income	-.081	.46	-.038	.84	-.108	.17	-.150†	.08	.88
Duration of HIV	-.035	.75	.281†	.13	.063	.42	.050	.56	.52
Duration of ART	.015	.89	.405*	.03	.081	.31	-.085	.33	.07
HIV Symptom Severity	.253*	.02	.167	.38	.271**	.00	.304**	.00	.59
Alcohol Use	.072	.51	-.166	.38	.075	.34	.150†	.08	.44
Patient-PCP Interaction	-.138	.20	-.051	.79	-.008	.92	-.171*	.05	.44
Social Functioning	-.113	.30	.122	.52	-.217**	.00	-.173*	.04	.29
Perceived Stress	.176†	.10	.006	.97	.307**	.00	.251**	.00	.25
Depression Severity	.124	.26	-.015	.93	.229**	.00	.215*	.01	.54

Note. HIV = Human Immunodeficiency Virus; ART = Antiretroviral Therapy; PCP = Primary Care Provider.
†= $p \leq .15$, * = $p \leq .05$, ** = $p \leq .01$

Table 7
Differences in Mean <u>Self-Efficacy</u> by Level of Binary Study Variables in 4 Ethnic/Gender Groups

| | Self-Efficacy | | | | | | | | |
| | AAW | | WW | | AAM | | WM | | Interaction |
	Mean (SD)	*p*	*Mean (SD)*	*p*	*Mean (SD)*	*p*	*Mean (SD)*	*p*	*P*
Sexual Identity									
LGBT	122 (6.06)	.24	110 (23.51)	.98	104 (21.27)	.80	112 (18.43)	.54	.67
Heterosexual	111 (20.29)		109 (16.77)		105 (22.35)		110 (18.20)		
Relationship Status									
Married/Partnered	111 (21.49)	.92	110 (10.42)	.88	105 (21.72)	.94	112 (17.50)	.96	.99
Single	112 (19.64)		109 (19.11)		105 (21.86)		112 (18.68)		
Education Level									
Less than HS grad	112 (20.24)	.90	118 (13.40)	.89	103 (22.74)	.57	104 (21.21)	.20	.50
HS grad or higher	111 (19.92)		108 (17.66)		105 (21.56)		112 (18.12)		
Employment Status									
Employed	114 (12.45)	.73	107 (---)	.05	111 (23.01)	.46	113 (16.32)	.81	.88
Unemployed	111 (20.73)		110 (17.61)		104 (21.65)		111 (18.58)		
History of AIDS									
% Yes	109 (18.80)	.39	114 (12.34)	.20	103 (22.50)	.24	110 (20.31)	.11	.19
% No	113 (21.32		100 (23.68)		107 (21.03)		115 (14.67)		
History of IVDU									
% Yes	115 (14.50)	.28	113 (13.64)	.90	107 (19.21)	.31	109 (19.82)	.20	.23
% No	110 (22.28)		105 (20.85)		103 (23.020		113 (17.53)		
IVDU in last 3 months									
% Yes	0	---	108 (11.31)		107 (7.78)	.76	105 (25.49)	.24	.62
% No	111 (19.91)		110 (17.80)		105 (22.18)		112 (17.77)		

Note. LGBT = Lesbian/Gay/Bisexual/Transgendered; HS = High School; AIDS = Acquired Immunodeficiency Syndrome;
IVDU = Intravenous Drug Use
†= $p \leq .15$, * = $p \leq .05$, ** = $p \leq .01$

Table 8
Differences in Mean <u>ART Nonadherence</u> by Level of Binary Study Variables in 4 Ethnic/Gender Groups

	ART Nonadherence								Interaction
	AAW		WW		AAM		WM		
	Mean (SD)	*p*	*Mean (SD)*	*p*	*Mean (SD)*	*p*	*Mean (SD)*	*p*	*p*
Sexual Identity									
LGBT	5 (6.73)	.67	5 (10.71)	.58	10 (17.73)	.51	7 (15.52)	.62	.85
Heterosexual	7 (9.44)		10 (14.52)		8 (12.35)		5 (11.28)		
Relationship Status									
Married/Partnered	6 (7.10)	.84	14 (21.51)	.27	11 (12.08)	.40	9 (19.76)	.17	.69
Single	7 (9.78)		7 (10.98)		8 (15.61)		5 (12.31)		
Education Level									
Less than HS grad	6 (11.78)	.70	3 (4.15)	.39	11 (14.13)	.29	11 (9.89)	.39	.49
HS grad or higher	7 (7.80)		10 (14.80)		8 (15.10)		6 (14.76)		
Employment Status									
Employed	5 (9.90)	.69	0	.52	7 (17.71)	.75	7 (10.74)	.94	.92
Unemployed	7 (9.23)		9 (14.13)		9 (14.63)		6 (14.90)		
History of AIDS									
% Yes	7 (11.20)	.82	9 (15.21)	.94	9 (14.38)	.72	7 (16.78)	.26	.91
% No	6 (7.33)		9 (11.42)		9 (15.47)		5 (10.31)		
History of IVDU									
Yes	8 (11.69)	.36	7 (10.97)	.47	8 (13.57)	.71	7 (15.80)	.60	.71
No	6 (7.62)		11 (17.42)		9 (15.64)		6 (13.95)		
IVDU in last 3 months									
Yes	0	---	14 (15.15)	.59	1 (3.50)	.21	8 (7.19)	.72	.33
No	6 (9.25)		9 (14.12)		9 (15.11)		6 (14.92)		

Note. LGBT = Lesbian/Gay/Bisexual/Transgendered; HS = High School; IVDU = Intravenous Drug Use
†= $p \le .15$, * = $p \le .05$, ** = $p \le .01$

CHAPTER V: DISCUSSION OF THE STUDY

Study Overview

The main objective of this study was to describe the factors that were associated with ART adherence and treatment self-efficacy in older African American women. Baseline characteristics of 87 HIV+ African American women aged 50 and older were evaluated in relation to their level of ART nonadherence and treatment adherence self-efficacy.

The women who participated in this study had low rates of ART nonadherence, high rates of self-efficacy, more positive patient-provider interactions, high social functioning and low levels of depression. The results of this study confirm some of the previously held beliefs about the factors that influence ART adherence in older African American women as well as other older adults who are HIV positive. However, there were also new insights gained in regards to the factors that were correlated with ART adherence in older African American women.

The secondary objective of the study was to compare the older African American women to older White women, African American men and White men in order to determine if ethnic or gender differences had any impact on the factors that were found to be strongly correlated with ART nonadherence and treatment adherence self-efficacy.

Prior studies had reported that African American women had higher rates of nonadherence to ART due to factors such as having less income, more alcohol and IV drug use, higher levels of stress or depression, and poorer inteactions with their health care providers. However, differences in the self-reported ART adherence across the four groups were not found to be statistically significant. The African American women had equal, if not superior, rates of ART adherence at baseline when compared to the other ethnic/gender groups in the study.

Interestingly, there were not any statistically significant interaction effects of ethnicity or gender on the factors that correlated with self-efficacy or ART nonadherence.

Study Limitations

A major strength of this study is that the data were obtained as phone-based data from across a nine-state region that contained a cross-section of HIV+ adults over the age of 50 years. The nature of the telephone intervention provided the opportunity to have a diverse sample that is representative of older adults who are aging with HIV.

One limitation of the study is that all of the data were collected as self-reported data, rather than objective data. Although previous studies have shown high correlations between self-report and actual measured viral load, this measure of collection has the potential to exaggerate adherence. In addition, one cannot fully discount the possiblity that social acceptability might have influenced some of the answers provided by participants.

Another important consideration is the fact that these analyses focused on the 7-day period prior to enrollment as the measureable period for recall of results. This time frame may account for the finding that the majority of participants in the study were actually more than 90% adherent to their ART regimen during the prior 7 days. When considering interventions, it might be beneficial to evaluate a longer time frame.

Finally, the conclusions from this study may be limited by the fact that one of the groups had a very limited number of participants. Specifically, the group of White women (n=30) contained so few participants that the analysis might have been influenced by outliers.

Clinical Implications

To our knowledge, this descriptive study is one of the few studies that have attempted to generate data specifically about ART nonadherence and self-efficacy in adults over age 50 who are HIV positive. The results lay the groundwork to develop future intervention studies that delve further into the factors that influence medication adherence for those aging with HIV. This study indicates that a very positive relationship between the patient and provider could be utilized to provide more effective intervention during clinical visits to decrease HIV symptom severity, and increase ART adherence.

Future Research

Over the next few years, there will continue to be increased numbers of older adults who are either aging with previously diagnosed HIV or are newly diagnosed. It has been estimated that by the year 2015, approximately 50% of the people infected with HIV will be older than age of 50 (Smith, 2005). Therefore, it is of vital importance that further research is conducted to evaluate the influence of ethnicity or gender on ART nonadherence in older adults. These interventions will need to address cognitive and physical changes that may occur as a result of normal aging, but those changes have to be taken into account with the changes that may occur with long-term HIV infections. Positive communications with the provider will be a key factor in the continued health and self management of those who are aging with HIV.

VITA

Katryna McCoy grew up in the state of Georgia. She received a Bachelor of Science in Nursing degree from the Medical College of Georgia in 1996, and a Masters in Nursing from the University of Washington in 1999. After working numerous years in rural communities, she earned a Doctor of Philosophy in Nursing Science from the University of Washington in 2012.