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COMPARISON OF THE EFFICACY OF ARV MEDICATIONS ALONE AND IN COMBINATION WITH HERBAL MEDICATIONS IN THE TREATMENT OF HIV AMONG NIGERIAN HIV+ PATIENTS

Abdulfattah Durojaiye

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A Dissertation Presented

by

ABDULFATTAH B. DUROJAIYE

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DEDICATION

This dissertation is dedicated to all the poor people in Nigeria, who continuously suffer in the midst of abundant national resources. Be steadfast: the glorious days are at hand – “When the great nations of the world will be at the shore of Nigeria, seeking to benefit from the prosperity of my beloved country”.

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ABSTRACT

COMPARISON OF THE EFFICACY OF ARV MEDICATIONS ALONE AND IN COMBINATION WITH HERBAL MEDICATIONS IN THE TREATMENT OF HIV AMONG NIGERIAN HIV+ PATIENTS

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Background/Purpose: There is disproportionate incidence of HIV in Sub-Saharan Africa in comparison to the rest of the world. Of the estimated 35.3 million people living with HIV, Sub-Saharan Africa has the highest level of HIV infections, accounting for 69% of global HIV infection in spite of having only 12% of the global population. Nigeria, with over 3.2 million people living with HIV, has the second highest HIV/AIDS burden in the world, next only to South Africa (5.6 million) whose population is approximately one third of Nigeria's population. According to the World Health Organization (WHO) an estimated 80% of Africans reportedly use herbal therapies in the treatment of many diseases (WHO, 2002). The use of herbal remedies in the treatment of HIV has gained currency in Nigeria. The purpose of this study was to investigate the efficacy of ARV- only therapy and a combined therapy of ARV and herbal medications

and to also investigate the effect of these treatment modalities on HIV symptoms and patients' quality of life among HIV patients in Nigeria.

Methods: This is a comparative analysis study designed to compare the efficacy of conventional antiretroviral (ART) medications with a combination therapy of ART and herbal therapies as they are already used by Nigerian HIV patients. The World Health Organization Quality of Life Instrument for HIV (WHOQOL-HIV BREF) and the Sign and Symptom Check-List for persons with HIV disease (SSC-HIV BREF) questionnaires were administered to 110 participants drawn from two groups of Nigerian HIV patients: those using conventional antiretroviral medications only and those using a combination of herbal remedies and conventional antiretroviral medications. Each group was composed of 55 participants. Physiological data (CD4 counts) was also collected for the two groups. Data generated from the study was analyzed using IBM SPSS Statistics 22 software. Both descriptive and inferential data analyses were used to analyze study results. Descriptive statistics was used to analyze the demographic data (age, gender, and ethnicity) while inferential statistics was used to draw conclusion from study data. Paired Sample test was used to determine the differences between baseline CD4 counts and post-treatment CD4 counts in both groups. Analysis of covariance (ANCOVA) was used to statistically adjust and control the differences noted in baseline CD4 counts between the two groups before comparative analyses of the two groups' CD4 counts were done. Independent t-test was used to compare the differences between ARV group and combined group.

Findings: There was a statistically significant difference between baseline CD4 counts and post- treatment CD4 counts after treatment with ARV only and combined

therapies. However, no statistically significant difference was noted in the overall quality of life of patients receiving ARV only and those receiving combined therapies (p=.211). Statistically significant difference was noted in social relationship domain (p=.028) and health satisfaction domain (p=.049) of the WHOQOL BREF instruments. No statistically significant difference was noted in all the sign and symptom factors evaluated except in the fever factor (p=.003) and sore throat factor (p=.013).

Conclusion: Findings from this study have shown that a vast majority of patients on combined therapy do so without disclosing the use of herbal remedies to their physicians and care providers. It is expected that physicians and care providers would incorporate this knowledge into their care model, build trusting and supportive relationships with patients and specifically solicit information about the use of herbal therapy in combination with ARV. This knowledge will enable physicians, nurses and other care providers to explore possible side effects and cross reactions between ARV and herbal remedies.

Keywords: HIV, ARV, Herbal Medications, Nigeria

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CHAPTER 1

INTRODUCTION

Background of the Study

With infection rates at an alarming level, especially in developing countries, the HIV/AIDS epidemic is one of the greatest health challenges of our time (Short, 2006). Globally, the United Nations estimated that 35.3 million people are living with HIV (UNAIDS, 2013). Of this number, Sub-Saharan Africa has the highest level of HIV infections, accounting for 69% of global HIV infection in spite of having only 12% of the global population (UNAIDS, 2012). The global HIV epidemic has shown a decrease from the peak record of 3.4 million new infections in 1997 to an estimated 2.7 million new infections in 2010 (UNAIDS, 2011). This is a 21% decrease from the prevalent rate in 1997 (UNAIDS, 2011). Nigeria has a disproportionately high incidence of HIV infection compared to other Sub-Saharan African countries (NACA, 2012).

The HIV infection has been recognized as one of the biggest challenges facing humanity in this century (Durojaiye, 2009). The Nigerian census appears to be inaccurate and varies widely. Nigeria, with an estimated population of 177,072,561, is the most populated country in Sub-Saharan Africa (NACA, 2014). An estimated 3,229,757 people are currently living with HIV in Nigeria, ranking Nigeria second among the countries with the highest HIV/AIDS burden in the world, next only to South Africa (5.6 million) whose population is approximately one third of Nigeria's population (NACA, 2014). An estimated 220,394 new infections occurred in 2013 alone (NACA, 2014).

The lacks of political will as well as the inadequate resources are factors that continue to hamper the prevention of HIV infection in Sub-Saharan Africa (Uneke, Alo,

Ogbu, & Ngwu, 2007). HIV infections continue to spread among highly marginalized and stigmatized populations (Uneke et al., 2007). The first diagnosis of HIV in Nigeria was in 1986 with the diagnosis of a 13-year-old hawker (Alubo, Zwandor, Jolayemi & Omudu, 2002). HIV infections continue to decimate many communities in Nigeria (Durojaiye, 2009). From the first HIV diagnosis in 1986 to year 2011, 3,459,363 HIV infections have been recorded in Nigeria (NACA, 2012).

Nigerian women are disproportionately affected by the HIV epidemic. Over 55% of HIV infections occur among the female population. HIV is the leading cause of death and disease among women of reproductive age (15-49 years old) (NACA, 2012). HIV prevalence among Nigerian women aged between 15 and 24 years is estimated to be three times higher than among men of the same age (NACA, 2011a). In Nigeria, 58% of the population of HIV-positive patients are women, with 55% of AIDS-related deaths occurring among female patients (NACA, 2012).

The National HIV/AIDS and Reproductive Health Survey (NARHS) conducted in 2012 reported a national prevalence of 3.4% (NACA, 2014). There are an estimated 3.2 million HIV patients in Nigeria, which has a significant impact on the global HIV burden (NACA, 2014). 58% of HIV-positive people in Nigeria are women (NACA, 2012). This has resulted in a high population of pregnant HIV patients, showing a prevalence level of 4.1% infection rate among this population (pregnant women) (NACA, 2012). This has translated into a staggering figure of 210,000 pregnant HIV patients (Afe, Adewumi, Fagorala, Disu, Ganikale, & Audu, 2011; NACA, 2011). Annually, there are 56,000 births of HIV-positive babies in Nigeria (NACA, 2011). In 2011 the number of pregnant women living with HIV was estimated to be 221,129 with about 17.1% (37,868) of these

women receiving antiretroviral medications to prevent mother-to-child HIV transmission (NACA, 2012).

Globally, Nigeria has the second largest population of HIV infection (NACA, 2014). Nigerian women are disproportionately affected with HIV infection. Nigeria still lags behind in antiretroviral (ART) intervention and the country needs to scale up the uptake of prevention of mother-to-child transmission (PMTCT) in order to catch up with global trend.

Problem Statement

With its physical and psychosocial aspects, HIV has been recognized as one of the biggest challenges facing humanity in this century (Alubo, et al., 2002; Gilbert & Walker, 2010). The introduction of effective antiretroviral combination therapy (ART) in 1996 helped curtail the epidemic nature of HIV (CDC, 2013). ART is commonly known as highly active antiretroviral therapy (HAART) or combination antiretroviral therapy (cART) (Dieffenbach & Fauci, 2011). ART therapy, which involves the use of a combination of three or more antiretroviral medications, brings a renewed hope of effective management of HIV (Gulick et al., 1997). With the use of HAART/cART, HIV is now considered a chronic disease with improved life expectancy (Dieffenbach & Fauci, 2011; Palella et al., 1998). ART has revolutionized the management protocol of HIV, increasing the hope of curtailing transmission of HIV to uninfected people. Results from HIV Prevention Trial Network (HPTN) 052 study shows that early HIV treatment with ART is capable of reducing HIV transmission to uninfected persons by 96% (Cohen et al., 2011). In addition, ART is very helpful in preventing mother-to-child HIV transmission by as high as 90% (CDC, 2006).

In Africa, the use of herbal remedies in treating many disease conditions is astronomically high, with the World Health Organization (WHO, 2002) reporting the use of herbal remedies among 80% of the population. Herbal remedies such as a-Zam have shown significant promise in improving the CD4 and reducing viral load of HIV patients in Nigeria. Studies have shown that a-Zam is an effective remedy in the management of HIV symptoms such as fatigue, fever, oral thrush, weight loss, appetite, skin lesions, malaise and diarrhea (Onifade, Jewell, & Okesina, 2011a).

Outside the conventional ART management of HIV, multiple claims of non-orthodox and traditional treatment have been made in different parts of the world (Abalaka, 2004; Amzat & Abdullahi, 2008; Igoli, Ogaji, Tor-Anyiin & Igoli, 2005: Kisangau, Lyaruu, Hosea, & Joseph, 2007; Oreagba, Oshikoya, & Amachree, 2011; Zou, Liu, Wang, Li, & Liao, 2012). However, there is little evidence of the support of Nigerian doctors and politicians for the use of herbal treatments for HIV that are prescribed by traditional healers. If there is any alternative treatment that is effective in the treatment of HIV/AIDS, it is imperative that the scientific world investigate such treatment protocols.

Purpose

With the increasing popularity of herbal remedies in the treatment of HIV in Nigeria (Abalaka, 2004), nurse scientists must investigate the efficacy of herbal remedies and compare the efficacy of herbal remedies with conventional anti-retroviral treatments. It is important to continue to seek remedies to this deadly disease that is ravaging our world and to seek better understanding of the experience of HIV patients using herbal remedies in their treatment.

Onifade et al (2011a) studied the effectiveness of a-Zam in HIV treatment by measuring the changes in CD4 and viral load of patients during the course of a-Zam treatment. However, Onifade et al. (2011a) did not compare outcomes of herbal treatment with outcomes of antiretroviral medications. Additionally, the study did not seek deeper understanding of the experience of patients during the course of the herbal therapy. The present study is designed to bridge these identified gaps and to seek deeper understanding of the experiences of Nigerian patients during treatment with ARV only and a combined treatment of ARV and herbal medications.

The purpose of this study was to investigate the efficacy of ARV only therapy and a combined therapy of ARV and herbal medications and to also investigate the effect of these treatment modalities on HIV symptoms and patients' quality of life among HIV patients in Nigeria. This is a comparative analysis study designed to compare the effectiveness of conventional antiretroviral (ARV) medications with a combination therapy of ARV and herbal therapies as they are already used by Nigerian HIV patients. The study consisted of two parts namely the pilot study and the actual study. The pilot study was designed to test the reliability of the two instruments used in obtaining data from the subjects. The actual study measured and compared the symptom experience and quality of life of patients using ARV only and those using a combination of ARV and herbal medications. Data collection was done using the Sign and Symptom Check-List for persons with HIV disease (SSC-HIVrev) (Holzemer et al., 2001) and the brief version of the World Health Organization Quality of Life instruments Instrument for HIV (WHO, 2012).

Aims of Study

The aims of this study are:

1. To investigate the efficacy of antiretroviral (ARV) medications on the CD4 count among Nigerian HIV patients.
2. To investigate the efficacy of a combination therapy of ARV and herbal medications on the CD4 count among Nigerian HIV patients.
3. To investigate the difference in the CD4 counts of patients taking ARV only and patients that take a combination of ARV and herbal medications.
4. To investigate the effects of ARV on patients' quality of life.
5. To investigate the effects of ARV on HIV symptoms.
6. To investigate the effects of a combination of herbal therapies and ARV on patients' quality of life.
7. To investigate the effects of a combination of herbal therapies and ARV on HIV symptoms.

Research Questions

The research questions for this study are:

1. How do CD4 counts differ after treatment with antiretroviral medications only?"
2. How do CD4 counts differ after treatment with a combined therapy of herbal treatment and conventional antiretroviral medications?
3. What is the difference in CD4 counts of patient taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications?

4. What is the difference in the symptom experience of patients taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications?
5. What is the difference in the quality of life of patients taking only ARV, and those taking a combination of herbal therapies and conventional antiretroviral medications?

Significance of the Study

HIV/AIDS has reached an epidemic level, especially in developing countries (Short, 2006). Nigeria, with a median age of 17 years, is a youthful nation of approximately 177 million people. NACA (2012) estimates that the population of people living with HIV/AIDS is 3.2 million. Globally, Nigeria is reported to have the second highest incidence of new HIV infections (UNAIDS, 2012). Heterosexual relationships are known to contribute to approximately 80 percent of new infections in Nigeria (UNAIDS, 2012), while blood transfusion and mother-to-child transmission accounts for approximately 20% of infections. Multiple studies have shown that most pediatric HIV infection is associated with mother-to-child transmission (MTCT), which occur during childbearing, labor, delivery and breastfeeding (Buskens, Jaffe, & Mkhatshwa, 2007; Coetzee, Hilderbrand, Boulle, Draper, Abdullah, & Goemaere, 2005; Futterman, Shea, Besser, Stafford, Desmond, Comulada, & Greco, 2010; Hembah-Hilekaan, Swende, & Bito, 2012). In 2011, the number of pregnant women living with HIV was estimated to be 221,129 with about 37,868 (17.1%) of these women receiving antiretroviral medications to prevent mother-to-child HIV transmission (NACA, 2012). An estimated 26.5% of HIV-infected pregnancies resulted in child infection in 2011 (NACA, 2012). The fact that

HIV has no known cure at present and HAART is not readily available provides impetus for people to seek cures outside the conventional health care model (Onifade, Jewel, Okesina, Yong, Ojezele, Nwanze, Adejumo, Oladeinde, Osakue, & Uwaifo, 2011b).

UNAIDS (2012a) estimates that about 35.3 million people worldwide are living with HIV, with over 3.2 million people living with the disease in Nigeria (NACA, 2014). The prevalence of HIV in Nigeria has recorded a remarkable increase from the time of the first infection in 1986. The prevalence of HIV infection among adults aged 15-49 years was reported to have increased from 1.8% in 1991 to 5.8% in 2005 (UNAIDS, 2007; USAIDS/PEPFAR, 2008). Although the trend decreased to 3.9% in year 2005 (UNAIDS, 2007), an estimated 3.2 million Nigerians are still living with HIV (NACA, 2014).

HIV infection continues to decimate many communities in Nigeria (Durojaiye, 2009). The number of weekly cases of HIV in many secondary health facilities in Nigeria averages 20 per week, and AIDS-related disorders account for up to 40% of hospital admission (Soyinka, 1998). The transmission of HIV continues to increase at an alarming rate. According to Alubo et al (2002), up to 30% of the hospitalized patients in Otukpo General Hospital (OGH) in Benué State, Nigeria were admitted with AIDS-related conditions.

A similar trend was recorded in a Catholic-run diagnostic center, where 29 out of 250 voluntary blood donors tested positive for HIV in 1996, and AIDS-related deaths averaged 2 per week (Alubo et al., 2002). There is high discrimination and stigma attached to HIV infection in Nigeria. This is because the mode of transmission of HIV in Nigeria is predominantly through heterosexual means (UNAIDS, 2012) and there is a

general perception that people living with AIDS (PLWA) are people of low morals who have brought HIV/AIDS upon themselves (Alubo et al., 2002). These people are generally regarded as "loose" people who deserve neither sympathy nor empathy (Alubo et al., 2002).

HIV infections have a multitude of symptoms that can manifest in different ways, and in an extremely unpleasant manner. Symptoms associated with HIV include fatigue, pain, fever, and memory problems (Siegel, Lekas, Schrimshaw, & Brown-Bradley, 2011). Other commonly reported HIV-related symptoms are headaches, herpes zoster, throat pain, and arthralgia (Singer, Zorilla, Fahy-Chandon, Chi, Syndulko & Tourtellotte, 1993). A comprehensive HIV symptom list is adequately captured in the Sign and Symptom Check-List for persons with HIV disease (SSC-HIVrev) (Holzemer, Hudson, Kirksey, Hamilton & Bakken, 2001). The HIV symptoms cluster identified by Holzemer et al (2001) in the instrument are: fatigue, fear, fever, GI upset, shortness of breath, sore throat, numbness, headache, rectal itch, bruising/bleeding, body changes and gynecological-related problems for women. Posttraumatic and depressive symptoms are also known to be associated with diagnosis of HIV (Klis, Velding, Gidron, & Peterson, 2011).

The debilitating nature and multiplicity of HIV symptoms are known to impact significantly on patients' quality of health. According to Fatiregun, Mofolorunsho & Osagbemi (2009) quality of life is a function of the overall well-being of patients, which can foster happiness and contentment. The state of health could influence quality of health. The WHO's (2012) conceptualization of quality of life within the context of individual culture and value system provides a unique definition of quality of life. Quality

of life is individualistic in nature. Factors such as religion, financial need/status, culture, educational level, culture and health will influence an individual's perception of quality of health. Health is a major determinant of quality of life. Because of the centrality of health to quality of life, the quality of life of HIV patients could be used as a way to evaluate the effectiveness of HIV treatment and/or management.

According to the World Health Organization (WHO) herbal remedies have been used throughout the world to treat many ailments (WHO, 2002). An estimated 80% of Africans reportedly use herbal therapies in the treatment of many diseases (WHO, 2002). Herbal therapy is used either as a complementary treatment or as an alternative treatment to conventional or orthodox medicine in treating different disease conditions (Onifade et al., 2011a; Patel, Bessong & Liu, 2011). Herbal remedies have been found to inhibit some steps associated with HIV replication (De Clereq, 2000; Kong, Goh, Chia, & Chia, 2003). Herbal remedies have shown to be effective in reducing viral load and increasing CD4 counts (Onifade et al., 2011a). According to Matthee, Wright & Konig (1999) alkaloid-derived herbal remedies such as *Ancistrocladus korupensis,* which is extracted from the tropical liana plant, inhibit reverse transcriptase and HIV-induced cell fusion. Dhamaratne, Tan, Marasinghe & Pezzuto (2002) reported that Coumarin herbal remedy in the form of canolides extracted from a tropical forest tree, *Calophyllum lanigerum,* was classified as a potent non-nucleoside reverse transcriptase inhibitor. Coumarin from plant sources and their analogs (i.e. synthetic coumarins) have shown to be potent nonnucleoside RT-inhibitors, or inhibitors of HIV-integrase, or HIV-protease (Kostova, 2006).

Historically, herbal therapies have recorded groundbreaking successes, as in the clinical success of quinine and quinidine isolated from the *Cinchona* tree bark, and artemisinin from *Artemisia annua*, in the treatment of malaria (Igoli, Ogaji, Tor-Anyiin & Igoli, 2005). Ufo opioko (*Ageratum conyzoides Linn)* is an herbal therapy that is reportedly widely used in treating HIV in Nigeria (Igoli et al., 2005). The efficacy of Ufu opioko (*Ageratum conyzoides Linn*) in the treatment of HIV is yet to be scientifically established.

Onifade et al (2011a) studied the use of herbal therapy with *a-Zam* and showed that *a-Zam* is an effective anti-HIV agent as it resulted in significant increase in CD4 counts and significant decrease in viral load. This study showed no remarkable harmful drug interaction with Highly Active Anti-Retroviral Therapy (HAART). Onifade et al (2011a) study did not carry out comparative analysis of the efficacy of a-Zam with the efficacy of HAART. The study only investigated the efficacy of a-Zam on the physiologic (CD4 and viral load) aspect of HIV management. The effects of a-Zam on HIV symptoms were not investigated in detail. These obvious knowledge gaps necessitate the investigation of the impact of herbal therapies and HAART on HIV symptoms and patients' quality of life.

Operational Definitions of Concepts or Terms

The meaning of Nigeria and Nigerians as used in this review need to be operationally defined for proper understanding of these two concepts. Nigeria refers to the geographical location of the country in West Africa. This excludes all the foreign embassies and high commissions of the country that are located all over the world. Also, the term Nigerians refers to those individuals that were born in Nigeria by Nigerian

parents and are currently living permanently in Nigeria. For the purpose of this study, all diasporic Nigerians were not classified as Nigerians. This differentiation is necessary because residency abroad may introduce different dynamics that may not be prevalent in Nigeria's geographical space.

For the purpose of this study, WHO's (2000) definition of herbal medicines/therapies provided an operational definition. Herbal therapies are herbs, herbal materials, herbal preparations and finished herbal products whose active ingredients include plants parts or plant materials, or combination (WHO, 2000). For the purpose of this study, herbal homes are local traditional healer homes where herbs, herbal materials, herbal preparations and finished herbal products are used in treatment of different disease conditions.

Theoretical Framework

The theory of symptom management (TSM) (Dodd, Miaskowski, & Lee, 2004; Humphreys et al., 2008) provided the theoretical framework for this study. Symptom management is central to the management and treatment of HIV. The TSM helped to adequately conceptualize symptoms and helped to develop pragmatic means of eliminating or ameliorating these symptoms.

Concepts of TSM

The three major concepts of the TSM are symptom experience, symptom management strategies and symptom status outcomes. These concepts are embedded within the nursing dimensions of person, environment and health and illness (Humphreys et al., 2008).

Symptom Experience

This is described as “a simultaneous perception, evaluation and response to a change in one’s usual feeling” (Humphrey’s et al., 2008, p. 147). It is known that the response to symptom experience is a function of the severity of the symptom as well as the context (environment) of the experience (Humphreys et al., 2008).

Symptom Management Strategies

These are the pragmatic ways to reduce the frequency of the symptom experience or minimize the severity of symptom or ameliorate the distress associated with the symptom experience (Portenoy et al., 1994). Symptom management strategies require an aggregate information on the who (i.e. the individual patients), how (dose), where (whether home or health care setting), when (timing of intervention) and what (type of intervention) are involved in the interventional protocols employed in symptom management (Humphreys et al., 2008). The combination of these strategic management approaches is capable of having profound effects on the management outcomes (Humphreys et al., 2008).

Symptom Status Outcomes

These are objective, measurable outcomes resulting from symptom management strategies. Outcomes could be reduction in the intensity, or frequency or distress level of the symptom, resulting in improved physical and psychological well being. Other possible outcomes could be early return to optimum functional level, cost containment and/or early discharge from the healthcare setting (Humphreys et al., 2008).

Relationships Between the Concepts of TSM

The three concepts of the TSM are known to have simultaneous interactions with each other. The symptom experience is a function of the strategies employed in symptom management and the outcomes of such management strategies. According to the authors of the theory, "the symptom experience is conceptualized as influencing and being influenced by both symptom management strategies and symptoms status outcomes. As individuals become aware of symptoms, initiate strategies, and assess symptom outcomes, their symptom perception is affected" (Humphreys et al., 2008, p. 147).

The reciprocal interaction between these three concepts is a continuous process until the resolution or stabilization of symptoms. The effects of non-adherence to management strategies are shown by the broken arrows between symptom management strategies and symptom status outcomes components of the TSM (in Appendix 1). Non-adherence could adversely affect the symptom status outcome. Factors such as the complexity or difficulty of symptom management strategies and the factors embedded in the nursing dimension of person, environment and health and illness could impede adherence to symptom management protocol (Humphreys et al., 2008). The bi-directional arrows seen in Appendix 1 indicate a simultaneous interaction among the three concepts of the TSM. Non-adherence to management strategies could result when treatments or interventions are too challenging, are not followed, or are not followed consistently.

Adequacy of TSM for HIV Symptom Management

The TSM has shown great promise in explaining, conceptualizing and contextualizing symptom experiences among HIV patients. The symptom experience is conceptualized as affecting and being affected by both symptom management strategies

and symptoms status outcomes (Humphreys et al., 2008). The theory was used to explore the association between symptom experience and the use of behavioral response (prayer) in the management of HIV-related symptoms of fatigue, nausea, depression and anxiety among HIV-positive African American patients (Coleman et al., 2006). To investigate the applicability of study results from the United States to Taiwan, Tsai, Hsiung, & Holzemer (2002) used the TSM and concluded that symptom management strategies had not been fully explored. The theory of symptom management has played a useful role in explicating the experience of depressive symptoms among HIV-positive patients (Eller et al., 2005) and in testing the effectiveness of symptom management information manuals among Taiwanese patients (Tsai, Holzemer, & Leu, 2005). Voss, Dodd, Portillo, & Holzemer (2006) were able to provide extensive explication of the symptom of fatigue in HIV patients by clearly integrating the three components of the TSM: symptom impact, symptom management & symptom outcomes. The TSM has been hailed as one of the prominent theories for enhancing understanding in nursing research on fatigue associated with HIV (Voss et al., 2006).

The central constructs of the TSM provided a suitable framework for this study. Patients' perception of their quality of life is a function of the effective symptom management strategies employed. In the context of this study, symptom management strategies are related to whether the patients are taking herbal remedies, or HAART, or a combination of both. The symptom management strategies will also influence patients' experience of the symptoms. Conversely, the symptom status outcomes will be dependent on the combination of symptom management strategies used. Similarly, the experience of symptom and the perception of symptoms will be dependent on the outcome of the

management protocol. The three concepts of the TSM perfectly provide pragmatic explanation for this study.

Hypothesis

This study seeks to compare the efficacy of conventional antiretroviral medications with a combined therapy of ARV and herbal remedies in the treatment of HIV among Nigerian HIV patients. This study is predicated on certain hypotheses. The hypotheses for this study are as follows:

1. There is no significant difference in the quality of life of HIV patients using a combined therapy of ARV and herbal medications and those using conventional antiretroviral medications only,
2. There is no significant difference in the symptom improvement of HIV patients using a combined therapy of ARV and herbal medications and those using conventional antiretroviral medications only, and
3. There is no significant difference in the improvement in CD4 counts of HIV patients using a combined therapy of ARV and herbal medications and those using conventional antiretroviral medications only.

If these hypotheses are true, the use of a combined therapy of ARV and herbal medications would hold great promise in HIV treatment in Nigeria and in other resource constraint countries. It is known that accessibility to ARV medication is still grossly limited in Nigeria. Likewise, in spite of the wide availability of ARV medications in western countries, ARV is still not readily available in Nigeria and other Sub-Saharan African countries. Also high proportions of patients are using herbal medications as

complementary medication to ARV. A comparable treatment outcome between patients using a combined therapy of ARV and herbal medications and those using ARV medications only would mean that herbal remedies could be safely used concomitantly with ARV. This would greatly help many HIV patients in Nigeria who use herbal remedies. With this information, Nigerian authorities could concentrate efforts on improving herbal treatment of HIV through research and appropriate data gathering to continually evaluate herbal therapies.

CHAPTER 2

LITERATURE REVIEW

Introduction

The purpose of this literature review is to seek insight into HIV and the use of herbal remedies in the treatment of HIV in Nigeria. This review examines current trends in the treatment of HIV and reviews the epidemiology of HIV in Sub-Saharan Africa and Nigeria and the use of herbal therapies in the treatment of HIV. The review also synthesizes information about the vertical transmission of HIV in Sub-Saharan Africa, with special attention on the Nigerian situation. Stigmatization and discrimination of HIV patients will also be discussed.

The literature review of HIV treatment modalities is conducted with special emphasis on the use and safety of herbal remedies in HIV treatment. Many research works have been carried out on the use of herbal remedies in the treatment of HIV (Dhamaratne, Tan, Marasinghe & Pezzuto, 2002; Hodgson & Rachanis, 2002; Igoli, Ogaji, Tor-Anyiin & Igoli, 2005; Kisangau, Lyaruu, Hosea, & Joseph, 2007; Kostova, 2006; Langlois-Klassen, Kipp, Jhangari, & Bubaale, 2007; Matthee, Wright & Konig, 1999; Mills, Cooper, Seely & Kanfer, 2005; Onifade, Jewell, & Okesina, 2011a; Orisatoki & Oguntobeju, 2010; Patel, Bessong & Liu, 2011). Specifically, literature on the use of the herbal remedy a-Zam in HIV treatment were reviewed.

Epidemiology of HIV

The advent of HIV in 1981 heralded the era of serious global health challenges. The scourge of HIV was first noticed in a San -Francisco clinic when a group of homosexual men presented with symptoms of rare opportunistic infections, which

included Pneumocystic carinii pneumonia, extensive mucosal candidiasis and multiple viral infections (Gottlieb et al., 1981). The first presentations of HIV symptoms were noted mainly in homosexual men and drug abusers (Masur et al., 1981). Subsequent evaluations of these men revealed that they were suffering from severe immune deficiency, which led to the tagging of the disease as acquired immune deficiency syndrome (AIDS) (Costin, 2007), while the virus causing this syndrome was named human immunodeficiency virus (HIV) in 1983 (Levy, 1993). At present, the majority of people infected are between the ages of 15-40 and are the most productive, agile and sexually active group in a society (Amzat & Abdullahi, 2008).

HIV infection is usually characterized by three distinct clinical stages: acute viremia, a latency phase which could be of variable duration, and a classification of clinical AIDS (Costin, 2007). During the acute viremia stage the virus can be detected in the blood of patients (Daar, Moudgil, Meyer, & Ho, 1991; Zhu et al., 1993). Following the initial viremia peaks, the level of virus in the blood declines to a very low to non-detectable level, signifying the latency phase (Coffin, 1995; Perelson, Newmann, Markowitz, Leonard, & Ho, 1996; Wei et al., 1995). This stage is characterized by high turnover of $CD4^+$ T cells with accompanying HIV virion production (Ho et al., 1995; Piatak et al.., 1993). During this stage the $CD4^+$ T cells begin to decline (Costin, 2007; Esbjournsson et al., 2012). Clinical diagnosis of AIDS occurs when the $CD4^+$ T cell count falls below 200cells/mm3, and when a patient presents with at least one opportunistic infection such as Pneumocystic carinii (Costin, 2007). This is the final stage of immune compromise leading to high susceptibility to secondary infections. This may manifest as rare cancers such as Kaposi's sarcoma and/or neuropathy (Costin, 2007;

Esbjournsson et al., 2012). The progressive manifestation of opportunistic infection is a result of the dysfunctional immune system (Esbjournsson et al., 2012)

HIV is known to contain reverse transcriptase and belongs to a subgroup of retroviruses known as the lentiviridae (Arnaout et al.., 1999; Fahey et al.., 1998; Garry, 1989; Levy, 1993). The infection's latency stage could last for a considerably long time, sometimes more than 20 years (Costin, 2007). During the latency phase, HIV continues to have destructive effects on immunological and neurological systems of the body (Costin, 2007).

There are two types of retroviruses (lentiviruses) namely pandemic HIV type 1 (HIV-1) and HIV type 2 (HIV-2) (De Silva, Tienen, Rowland-Jones & Cotton, 2010; Esbjornsson et al.., 2012; Nyamweya et al.., 2013). These retroviruses are closely related. Both types are transmitted in similar ways, exhibit similar cellular targets and manifest similar AIDS-related opportunistic infections (Di Silva, et al., 2010; Esbjornsson et al.., 2012). HIV-2 is predominantly restricted to West Africa, but an increasing number of cases have been seen in the U.S, Europe and India (Campbell-Yesufu, & Gandhi, 2011; Thiébaut et al., 2012). In comparison to HIV-1, the main characteristics of HIV-2 are that it has lower transmission rates, a longer latency period, slower reduction in $CD4^+$ T cell count and lower mortality rates (De Silva et al., 2010; Esbjornsson et al., 2012). HIV-1 is reported to have been introduced to human through multiple interspecies transmission from simian immunodeficiency virus in chimpanzees, while HIV-2 is thought to have been introduced to human through sooty mangabeys (De Silva et al., 2010; Esbjornsson et al., 2012).

Globally, there are approximately 34 million people living with HIV, the virus which causes AIDS (UNAIDS, 2013). New cases of HIV infection continue to be recorded in all regions of the world. However, 95% of new infections happen in individuals that live in low-and middle-income countries, especially in Sub-Saharan Africa (UNAIDS, 2013). Globally, there were over 700,000 fewer new HIV infections in 2011 compared to in 2001 (UNAIDS, 2012). Nonetheless, large improvements have been recorded in different parts of the world, including Sub-Saharan Africa. Africa has reduced AIDS-related death by one third in recent years (UNAIDS, 2012). The global HIV epidemic appears to be in check, with a record 50% reduction in new HIV infection in low-and middle-income countries between 2001 and 2011. However, there still exists sharp disparities in the incidence of HIV infection in low-income countries as compared with the industrialized nations of the world.

HIV in Sub-Saharan Africa

The United Nations estimated that 34 million people were living with HIV at the end of 2011 (UNAIDS, 2012). Of this number, Sub-Saharan Africa has the highest level of HIV infection, accounting for a disproportionate 69% of global HIV infection despite having only 12% of the global population. On average, 1 in every 20 adults (amounting to 4.9% of the population) in Sub-Sahara Africa live with HIV (UNAIDS, 2012).

There is a disproportionate impact of HIV on women and children, who continue to experience high rates of new infection, with attendant HIV-related illness and death (WHO, 2011). Sub-Saharan Africa has been greatly hit by the HIV epidemic. Of the children who contracted HIV in 2011, 90% live in Sub-Saharan Africa. Also, 92% of the global HIV-positive pregnant women live in Sub Saharan Africa (UNAIDS, 2012). In

2011, 59% of women living with HIV in Sub-Saharan Africa received ART medication during pregnancy and delivery (UNAIDS, 2012).

HIV in Nigeria

Nigeria, with an estimated population of 177,072,561, is the most populated country in Sub-Saharan Africa (NACA, 2014). An estimated 3.4 million people are infected with HIV in Nigeria, ranking Nigeria third among the countries with the highest HIV/AIDS burden in the world, next only to India and South Africa (NACA, 2012). The lack of political will and inadequate resources are factors that continue to hamper the prevention of HIV infection in Sub-Saharan Africa (Uneke et al., 2007).

HIV was first noted in Nigeria in 1986 with the diagnosis of a 13-year-old hawker (Alubo et al., 2002), and continues to decimate many communities in Nigeria (Durojaiye, 2009). From the first HIV diagnosis in 1986 to year 2011, 3,459,363 HIV infections have been recorded in Nigeria (NACA, 2012), with 388,864 new infections recorded in 2011 alone (NACA, 2012). Despite declines in global HIV prevalence, incidence has increased in Nigeria between 2008 and2012. Table 1 below shows the epidemiology of HIV in Nigeria. Table 1 shows the overall HIV statistic while table 2 shows the HIV statistic for year 2010 and 2011 alone. Although table 1 shows an increase in total HIV population, there was actually a decrease in new infection rate in 2011 as shown in table 2. This decline is a result of increase awareness and proactive efforts on the part of all the stakeholders in the country.

HIV among Women in Nigeria

As shown in Table 2, Nigerian women are disproportionately affected by the HIV epidemic. Over 55% of HIV infection occurs in female population. HIV is the leading

cause of death and disease among women of reproductive age (15 and 49 years) (NACA, 2012). HIV prevalence among Nigerian women aged 15 and 24 is estimated to be three times higher than among men of the same age (NACA, 2011a). In Nigeria, 58% of the population of HIV-positive patients are women, with 55% of AIDS related deaths occurring among female patients (NACA, 2012).

In 2011 the number of pregnant women living with HIV was estimated to be 221,129 with about 17.1% (37,868) of these women receiving antiretroviral medications to prevent mother-to-child HIV transmission (NACA, 2012). This is a 45% increase in ARV treatment for pregnant women from the 2010 figure. An estimated 26.5% of HIV infected pregnancies resulted in child infection in 2011 (NACA, 2012). Only about 4.7% of antenatal care (ANC) facilities in Nigeria provide prevention of mother-to-child transmission (PMTCT) services (WHO, 2011). In 2011, less than 18% of pregnant HIV infected women received ARVs for PMTCT while 11% of babies born in 2010 to HIV infected mothers received ARVs for PMTCT (NACA, 2012). Only 4% of babies born to HIV patients were tested for HIV within 2 months of life (WHO, 2011). In Nigeria prophylactic maternal triple ARV is the treatment of choice for HIV-infected pregnant women (NACA, 2012).

Mother-to-Child Transmission in Sub Saharan Africa

Multiple studies have shown that most pediatric HIV infection is associated with mother-to-child transmission (MTCT), which occurs during childbearing, labor, delivery and/or breastfeeding (Buskens, Jaffe, & Mkhatshwa, 2007; Coetzee, et al., 2005; Futterman, et al.., 2010; Hembah-Hilekaan, Swende, & Bito, 2012). Pregnant women living with HIV have a high risk of passing the infection to their babies if no intervention

is initiated to prevent such transmission (De Cock et al., 2000). In the absence of any intervention, the risk of transmission could be as high as 15-30% (Anoje et al., 2012). However, a combination of approaches could help reduce the risk of MTCT of HIV to less than 2% (De Cock et al., 2000). Interventions that could reduce incident of MTCT of HIV include prophylactic administration of antiretroviral (ARV) during pregnancy and labor and to the infant in the first few weeks of life, through an obstetrical intervention which includes elective caesarean delivery of the baby before the onset of labor and rupture of membranes. Safe infant feeding practices could help in the prevention of mother-to-child infection (Hembah-Hilekaan et al., 2012).

Some of the interventions to prevent MTCT, such as the avoidance of breast-feeding, may have cultural implications that make its acceptance difficult in Sub Saharan Africa. Similarly, the use of elective caesarean may not be safe nor available in resource-constrained communities in Sub Saharan African (De Cock et al., 2000). Prevention methods tend to focus on administration of ARV regimen from the third trimester of pregnancy (Chabikuli et al., 2013), which is reported to reduce the risk of transmission during pregnancy and childbirth to between 2-4% (Chabikuli et al., 2013). In response to the need for effective prevention regimen, different countries in Sub Saharan Africa are adopting different protocols to prevent MTCT.

Mother-to-child transmission is responsible for the high prevalence of pediatric HIV in Sub-Saharan Africa (Coetzee et al., 2005; Koo, Makin, & Forsyth, 2013; Kouanda et al., 2010). Of the two million global pediatric HIV infections, Sub-Saharan Africa accounts for 90% of infections (Kouanda et al., 2010). A UNAIDS (2008) estimate shows that over 90% of pediatric infections occur during pregnancy, birth or

breastfeeding. As a result of effective medical intervention in most industrialized countries, the rate of perinatal HIV transmission has decreased to 2% or less (Ghanotakis et al., 2012; Kouanda et al., 2010). This level was achieved through a combination of novel antiretroviral therapy, obstetrical intervention and re-definition of infant feeding that emphasize the use of infant formula and exclusion of breastfeeding for HIV-positive mothers (Cooper et al., 2002). However, the prevalence of MTCT in Sub-Saharan Africa is still as high as 40% pediatric infection rate among HIV-positive women (Kouanda et al., 2010).

Unlike the prevailing situation in high-income countries where the incidence of mother-to-child transmission of HIV has been almost completely eliminated, there is still high incidence of mother-to-child transmissions of HIV in Sub-Saharan Africa (UNAIDS, 2006). The effective voluntary testing and counseling services, increased access to antiretroviral medications, safe delivery practices and widespread availability and safe use of breastfeeding substitute have reduced the incidence of MTCT of HIV in high-income countries (UNAIDS, 2011). In spite of the improvement in the western world in the prevention of mother-to-child transmission of HIV, Sub-Saharan African countries still record high rates of pediatric HIV infection (Stringer et al., 2008). The lack of medical infrastructure, shortage of PMTCT services and shortage of medical personnel result in ineffective coordination of PMTCT services in Sub-Saharan African countries (Stringer et al., 2008).

Contrary to what is obtainable in developed countries of the world, most Sub-Saharan African countries have limited access to ARV regimens. Similarly, there exists scarce access to elective Caesareans or safe alternatives to breastfeeding (Stringer, et al..,

2008). This situation is also compounded by a lack of evenly distributed basic antenatal services. The resultant effect of this situation is the disproportionately high incidence of mother-to-child transmission of HIV in Sub Saharan African.

The 2009 HIV estimate among pregnant women in eastern and southern Africa was 750,000 (Kasenga et al., 2007). Sub-Saharan Africa accounts for about 90% of the incidence of MTCT (UNAIDS, 2006). Figures 1 and 2 below show the number of adults and children receiving and eligible for ARV therapy and estimated coverage in low-and middle-income countries by region in December 2010.

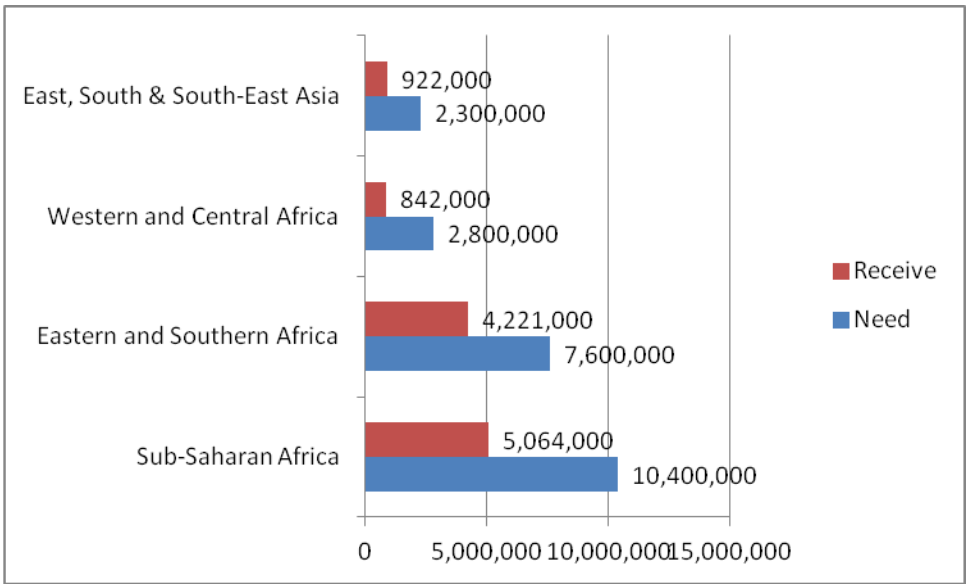

Figure 1: Number of Adults and Children Receiving and Eligible for ARV Therapy and Estimated Coverage in Low- and Middle-Income Countries by Region in December 2010.

Data Source: UNAIDS (2011). Retrived from www.unaids.org

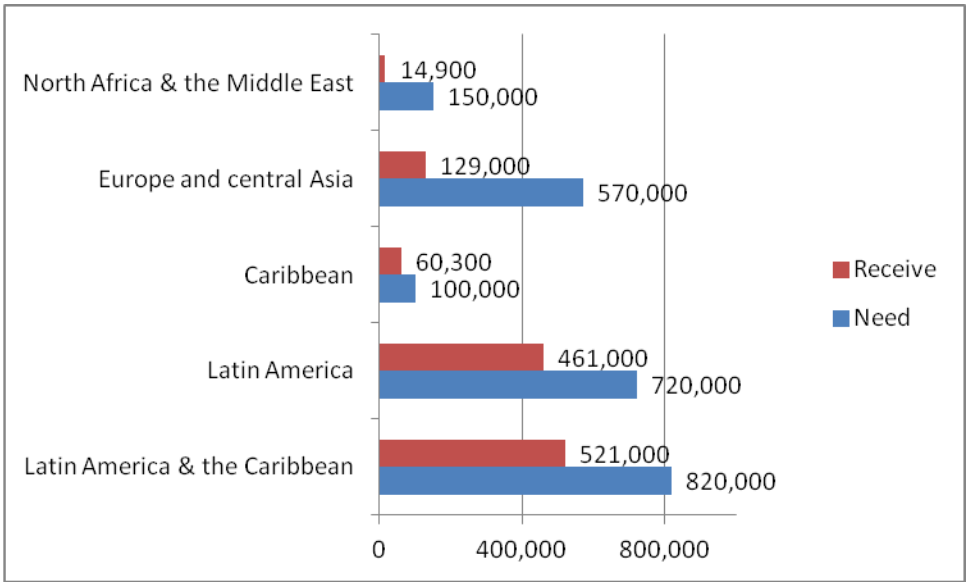

Figure 2: Number of Adults and Children Receiving and Eligible for ARV Therapy and Estimated Coverage in Low- and Middle-Income Countries by Region in December 2010.

Data Source: UNAIDS (2011). Retrived from www.unaids.org

For both figures 1 and 2

Receive = Number of people receiving ARV therapy

Need = Estimated number of people in need of ARV therapy

The trend in the availability of PMTCT in low-and middle-income countries, by geographical region in 2010 is depicted in figures 3 and 4.

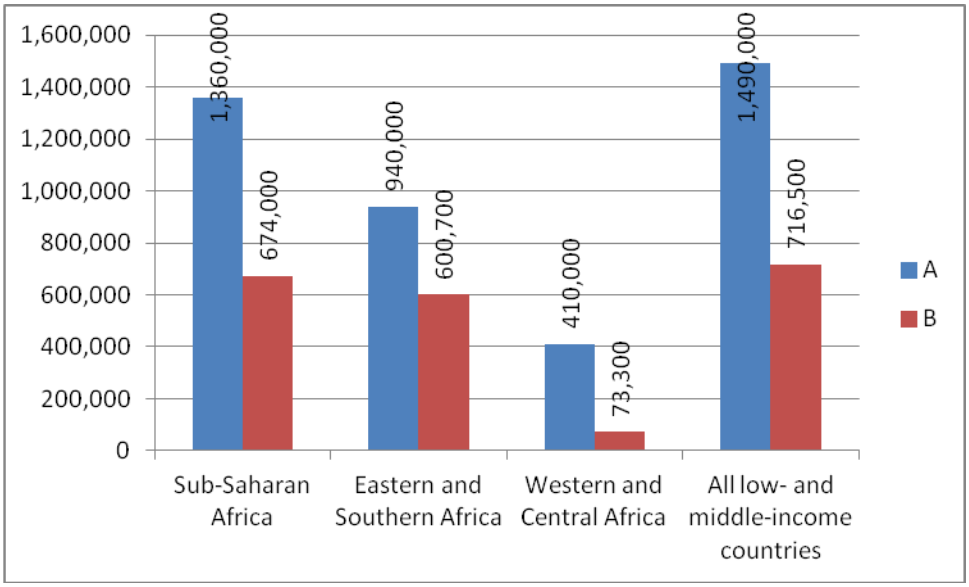

Figure 3: Estimated Number of Women Living with HIV Needing and Receiving ARV to Prevent New Infection Among Children, and Excluding Single-Dose Nevirapine in Low- and Middle-Income Countries, by Geographical Region in 2010.

Data Source: UNAIDS (2011). Retrived from www.unaids.org

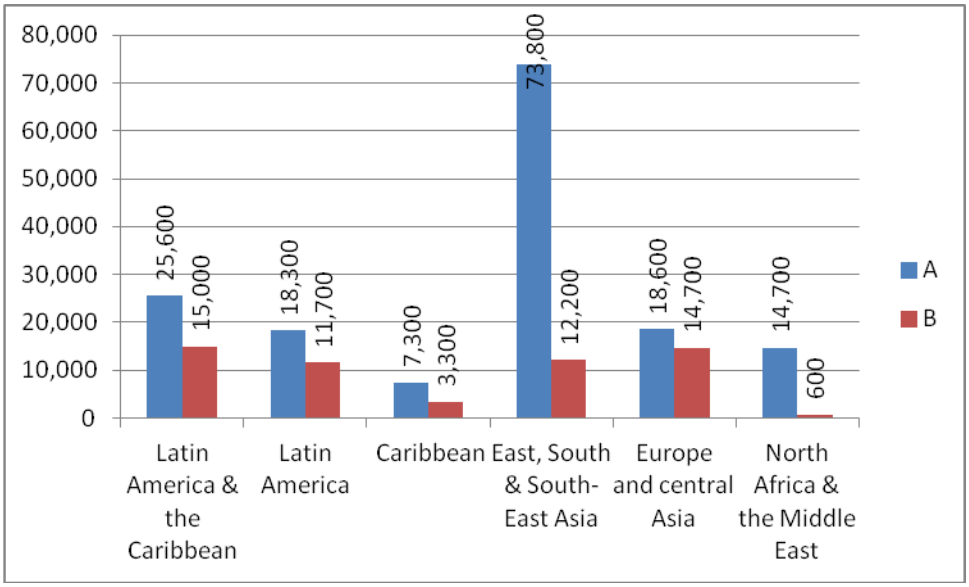

Figure 4: Estimated Number of Women Living With HIV Needing and Receiving ARV to Prevent New Infection Among Children, and Excluding Single-Dose Nevirapine in Low-and Middle-Income Countries, by Geographical Region in 2010.

Data Source: UNAIDS (2011). Retrived from www.unaids.org

For both figures 3 and 4

A = Estimated number of pregnant HIV women in need of ARV

B = Number of pregnant HIV women on ARV

Figure 5 and Table 3 show the estimated prevalence of HIV among women and the general population and PMTCT services in selected Sub-Saharan African countries. As shown in Figure 6, PMTCT services in Nigeria were as low as 3.6% in 2010 (UNAIDS, 2011). The figure compares the HIV prevalence in the general population and among pregnant women in 2009 with the percentage of PMTCT services in 2010. Nigeria was seen to underperform at 4.7% in PMTCT services when compared with South Africa (94%), Tanzania (90.4%), Kenya (92.5%), Mozambique (86%), Uganda (81%), and

Zimbabwe (74%) (UNAIDS, 2010). This poor performance requires positive action on the part of Nigerian authorities.

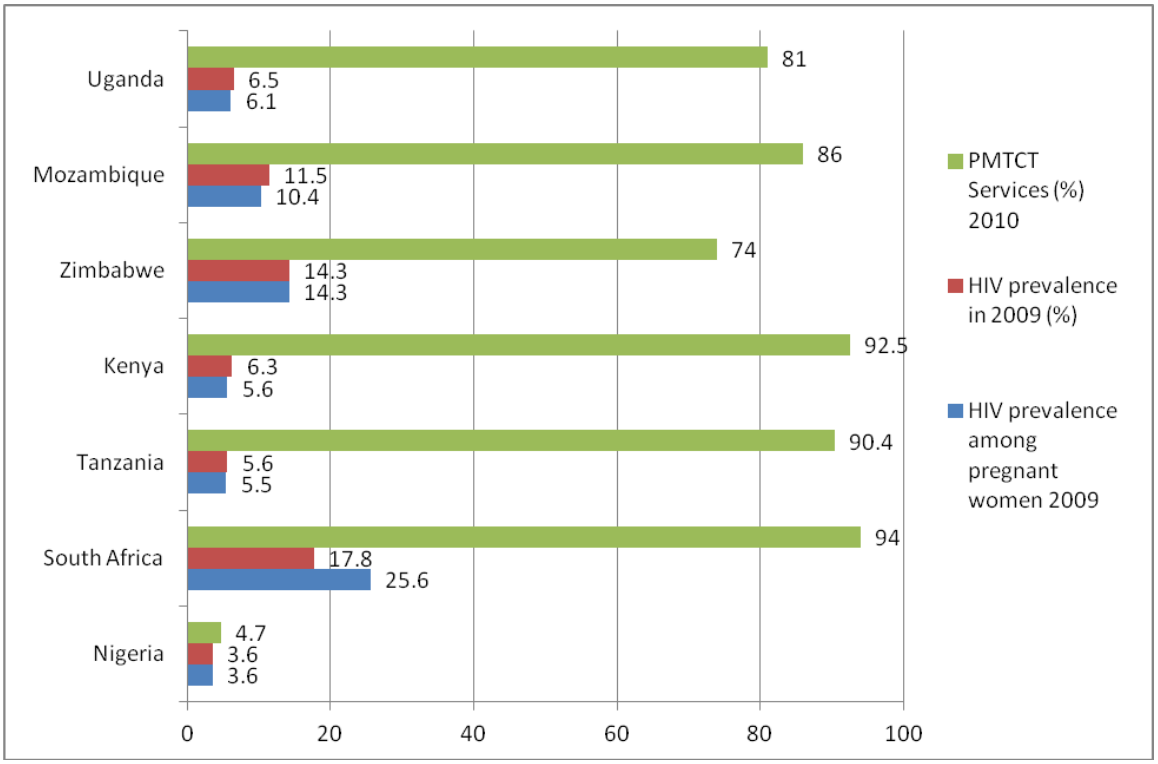

Figure 5: Estimated Prevalence of HIV Among Women and General Population and PMTCT Services in Selected Sub-Saharan African Countries

Sources: UNAIDS (2010)-UNAIDS Report on the Global AIDS Epidemic; UNICEF (2009). Prevention of Mother-to-Child Transmission (PMTCT) of HIV.

Figure 6 shows the percentage of women receiving ARV therapy to reduce HIV transmission during pregnancy, percentage of eligible children younger than 15 years old receiving ARV therapy in 2010 and the percentage of HIV testing among pregnant women in 2010. From this figure it could be seen that South Africa (95%) is outperforming other sub-Saharan African countries in the percentage of women receiving ARV therapy to reduce HIV transmission during pregnancy (UNAIDS, 2010). Similarly,

South Africa (95%), Zambia (94%), and Zimbabwe (90%) have a higher percentage of HIV testing among pregnant women in 2010 (UNAIDS, 2010). South Africa (58%) also has the highest number of eligible children younger than 15 years old receiving ARV therapy in 2010 as shown in table 4.

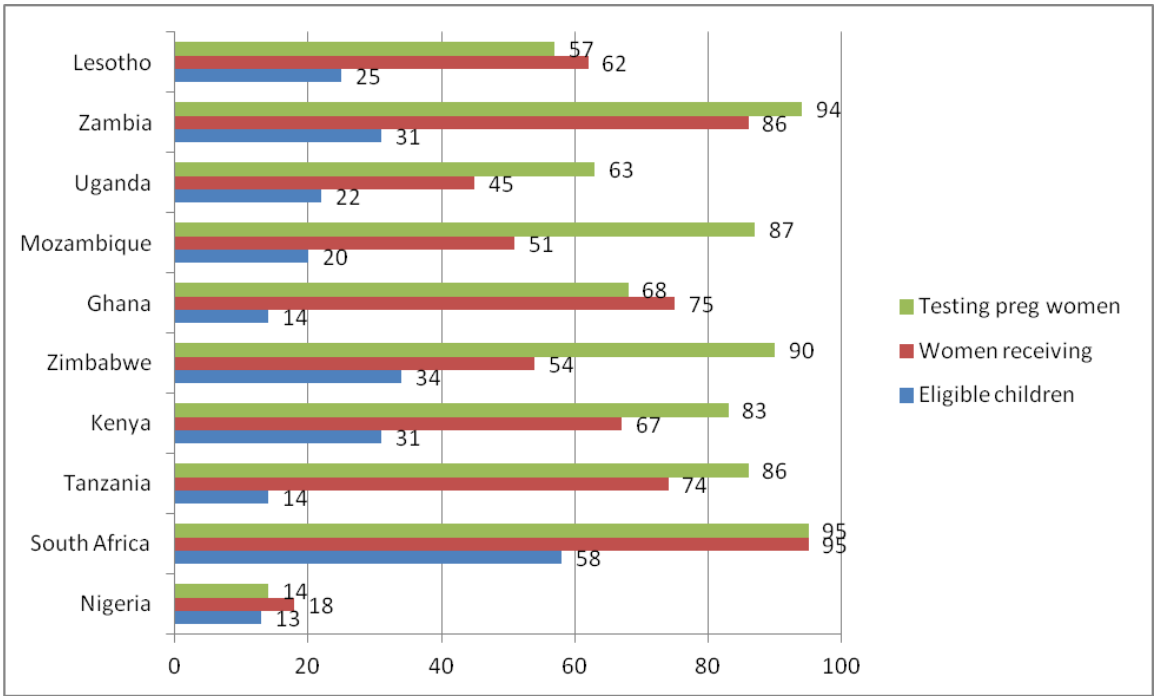

Figure 6: Percentage of Women and Children Receiving Antiretroviral Therapy in Selected Sub-Saharan African Countries for the Prevention of Mother-to-Child HIV Transmission

Blue=% of eligible children younger than 15 years old receiving ARV therapy in 2010.

Red=% of women receiving ARV therapy to reduce HIV transmission during pregnancy 2010.

Green=% of HIV testing among pregnant women in 2010.

MTCT in Nigeria

Data shows that among 388,864 new HIV infections which occurred in Nigeria in 2012, only about 56,000 new HIV clients were put on ARVs (NACA, 2013). Nigeria is lagging behind countries such as South Africa and Ghana in ARV coverage. South Africa, which has about 350,000 new HIV infections annually, puts about 277,000 HIV-positive persons on ARVs annually. In 2012 PMTCT coverage in Nigeria was about 18%, which was one of the lowest in Sub-Saharan Africa. In contrast, South Africa and Ghana achieved over 95% and over 75% PMTCT coverage respectively (NACA, 2013). About a quarter of all babies born with HIV in the world are Nigerians (NACA, 2013). Pediatric ARV coverage and treatment is about 13% in Nigeria. This is considerably low when compared with South Africa's coverage of 88% (NACA, 2013). To improve on its PMTCT coverage and ARV treatment, Nigeria is in the process of decentralizing its PMTCT and ARV treatments to primary care centers (NACA, 2013).

In 2011, an estimated 210,000 pregnant women (15+) were living with HIV in Nigeria. Only 13% of these women were tested for HIV. Only 22% of pregnant HIV patients received ARV treatment in 2009. The estimated number of children (0-14) living with HIV in 2009 was 360,000 and prophylactic ARV was given to only 8% of HIV-exposed infants (UNICEF, 2010). The Global HIV/AIDS initiative, Nigeria (GHAIN) is at the forefront in providing facilities for PMTCT services in Nigeria (Chabikuli et al., 2013). GHAIN is supporting PMTCT programs in 157 sites across the 36 states of the Federation. The primary focus of the government is to incorporate PMTCT treatment into primary health care system in Nigeria (NACA, 2011).

As a result of the emergence of the HIV epidemic in Nigeria, a national health sector-based response was established in 1986 with the Federal, State and Local Government Area structures driving the response (FMH, 2010). In 2000, a national multisectoral response was put in place to combat HIV in Nigeria. This includes the establishment of a Presidential Council on AIDS (PCA) and National Action Committee on AIDS (NACA) to drive the response. Also, state Action Committees on AIDS (SACA) and Local Government Action Committees on AIDS (LACA) were also established (FMH, 2010). Several PMTCT sites were established in all major federal health care facilities (Ugboaja, 2011). These interventions are guided by the appropriate policies namely the National HIV/AIDS Policy, HIV and AIDS Emergency Action Plan (HEAP) and National Strategic Framework (NSF).

Prophylactic treatment for HIV-positive women in Nigeria include:

- Co-trimoxazole 960mg once daily or every three days given to women with CD4 cell counts below 200cells/ul,
- Sulfadoxine-pyrimethamine for malaria and
- Iron, folate and multivitamin supplement are given to HIV-positive patients.

All infants born to HIV-positive mothers are given post-exposure prophylaxis. This includes a single dose of Nevirapine (NVP) of 2mg/kg within 72 hours and Zidovudine (ZDV) 2mg/kg twice daily for one week. A single dose of NVP 2mg/kg stat within 72 hours is given to infants where ZDV is not available (FMH, 2010).

In summary, Nigeria is reported to have 3.6% HIV prevalence. In Nigeria there is an estimated 3.5 million HIV patients, which has a significant impact on the global HIV burden (UNAIDS, 2010). 58% of HIV-positive people in Nigeria are women. This has

resulted in a high population of pregnant HIV patients, showing a prevalence level of 4.1% infection among pregnant women. This has translated into a staggering figure of 210,000 pregnant HIV patients (Afe et al., 2011; NACA, 2011). Annually, there are 56,000 births of HIV-positive babies in Nigeria (Oliver, et al., 2012). The uptake of interventions for preventing mother-to-child HIV transmission is low in Nigeria in spite of the staggering prevalence of pediatric HIV infection (Olugbenga-Bello et al., 2012). The national target in Nigeria is to achieve a 90% reduction in the mother-to-child HIV transmission by 2015 (NACA, 2011).

PMTCT Services in Nigeria

Skilled personnel deliver only 39% of births in Nigeria. Traditional birth attendants (TBAs) or relatives deliver 41% of births while the remaining 20% are unassisted deliveries (FMOH, 2010). Nigerian health care system is organized under a three-tier arrangement composed of primary, secondary and tertiary health facilities. In 2003 provision of PMTCT services were initially restricted to 11 tertiary health facilities in the country (FMOH, 2010). The gradual scale-up of PMTCT services has brought the availability of PMTCT services to 640 facilities. In all, the formal health sector has about 22,726 health care facilities. Grossly limited number of PMTCT or HCT (HIV counseling and testing) services is available in these facilities. Of the 22,726 health care facilities, only 63 tertiary, 482 secondary and 473 primary health facilities are providing PMTCT or HCT services (FMOH, 2010). PMTCT services are available in tertiary, secondary, primary, private and faith-based health facilities across the country while the government is striving to achieve a target of at least 90% PMTCT uptake by 2015 (NACA, 2011a). The policy thrust of the government is to decentralize PMTCT services from tertiary and

secondary facilities to primary care facilities to ensure accelerated scale-up towards elimination of mother-to-child transmission of HIV (FMOH, 2010).

In 2010 the Nigerian government set the following goals for PMTCT program;

- At least 90% of all HIV-positive pregnant women and breastfeeding infant-mother pairs receive ARV prophylaxis by 2015.
- At least 90% of all HIV exposed infants have access to early infant diagnosis services by 2015.
- At least 90% of pregnant women requiring ART for their own health receive life long ART.
- At least 90% of all pregnant women have access to quality HIV counseling and testing by 2015.
- At least 90% reduction in unmet need for family planning among women with HIV by 2015.
- At least 50% reduction in HIV incidence among 15-49 years old women by 2015.

(FMOH, 2010 P. 17)

Due to poor implementation, the ministry of health has unequivocally admitted that Nigeria will not be able to achieve the above goals by 2015 (FMOH, 2012).

Stigmatization and Discrimination of HIV Patients

HIV infection has physical as well as psychosocial aspects. There is still a heavy stigma associated with the diagnosis of HIV in Africa (Alubo, Zwandor, Jolayemi & Omudu, 2002), with many consequences for HIV patients' psychosocial well-being. There is high discrimination and stigma attached to HIV infection in Nigeria. This is

because the mode of transmission of HIV in Nigeria is predominantly through heterosexual means and there is general perception that people living with AIDS (PLWA) are people of low morals who have brought HIV/AIDS upon themselves (Alubo et al., 2002). These people are generally regarded as "loose" people that deserve neither sympathy nor empathy.

Research has shown that stigmatization and discrimination constitute major challenges to HIV treatment and prevention efforts (Reis et al., 2005). Discrimination and stigmatization associated with HIV constitute major barriers to HIV testing, counseling and status disclosure (Rankin et al., 2005). In spite of gains recorded in curtailing new infections and the treatment of HIV, the full benefit of national and the US Presidential Emergency Plan For Aids Relief (PEPFAR) programs are hampered by discrimination and stigmatization (Monjok, Smesny & Essien, 2010). Discrimination and stigmatization associated with HIV are believed to emanate from a culture of fear, ignorance and a lack of adequate information about HIV (Valdiserri, 2000).

A study by Uwakwe (2000) on the effectiveness of HIV/AIDS educational program among BSc nursing students at the University of Ibadan revealed that 79% of nurses expressed reservations about caring for HIV/AIDS patients at the beginning of the study. After three months of intense instruction on HIV/AIDS, AIDS patient care and compliance with universal precaution, 53% of the nurses still expressed reservations about caring for HIV/AIDS patients. Similarly, Oyelese's study on stigma, discrimination and ostracization of HIV patients in Nigeria (2004) revealed that a significant stigmatization and discrimination is still directed at HIV patients, albeit in subtle and suppressed manners.

Using a combination of semi-structured interview and focus group methodologies, Alubo et al (2002) investigated the acceptance and stigmatization of people living with HIV/AIDS (PLWA) in Benue state, Nigeria. A total of 40 PLWA and 10 family members were interviewed for the study while focus group discussions were held with male and female members of the community to assess their general perceptions of, acceptance of, and reactions to PLWA. Findings from this study showed that the level of stigmatization is high and the rate of acceptance is low. Fear of contracting this deadly disease and lack of knowledge about mode of transmission of the disease were found to be responsible for this trend, with some participants suggesting that PLWA be eliminated before they infect the entire community.

Healthcare workers have also been found to discriminate against HIV patients (Reis et al., 2005: Sadob et al., 2006). Such discrimination results in poor quality care, breaches of confidentiality (Ehiri et al., 2005), and complete refusal to provide treatment (Sadob et al., 2006). Multiple studies in Nigeria have shown that healthcare professionals, including physicians, nurses and laboratory scientists in many cases have refused to treat or been unwilling to care for HIV patients (Reis et al., 2005: Sadob et al., 2006). Refusal to care for HIV patients is usually attributed to a lack of adequate knowledge about HIV. However, studies have shown that significant acceptance of HIV patients is achievable with adequate and continuous education (Ezedinachi et al., 2002; Fawole, Asuzu, Oduntan, & Brieger, 1999).

The impact of stigmatization and discrimination on HIV patients may result in social isolation, may foster low self-esteem (Valdiserri, 2000), and discourage adherence to preventive practice (Nyblade, Stangle, Weiss, & Ashburn, 2009). Similarly,

individuals are discouraged from checking their HIV status and subsequently prevent sero-positive individuals from seeking treatment (Rankin et al., 2005). Vertical transmission of HIV is also adversely affected by stigmatization and discrimination, as many pregnant women may refuse or avoid voluntary counseling and testing which would enable them to know their status and subsequently commence treatment to prevent mother-to-child transmission of the infection (Odimegwu, Adedini, & Ononokpono, 2013). Also, stigmatization may prevent HIV patients from disclosing their status to sexual partners and families. This could adversely affect the efforts to prevent the spread of the disease (Ehiri et al., 2005). Breastfeeding is a common practice in Sub-Saharan Africa, including Nigeria. Stigmatization and discrimination may prevent HIV-positive nursing mothers from practicing alternative feeding techniques, thereby exposing their babies to HIV infection, for fear of rejection or chastisement from the public (Okonkwo et al., 2007) In a nutshell, stigmatization is known to promote fatalism, social isolation and self-hate (Rankin et al., 2005).

Herbal Treatment of HIV

Herbal therapy includes the use of herbs, herbal materials, herbal preparations and finished products in the treatment of different disease conditions (WHO, 2002). Herbal therapy is used either as a complementary treatment or as an alternative treatment to conventional or orthodox medicines in treating different disease conditions (Onifade et al., 2011a; Patel, Bessong & Liu, 2011). Historically, herbal therapies have recorded groundbreaking successe,s as in the clinical success of quinine and quinidine isolated from the *Cinchona* tree bark and artemisinin from *Artemisia annua* used in the treatment of malaria (Igoli, Ogaji, Tor-Anyiin & Igoli, 2005). Ufo opioko (*Ageratum conyzoides*

Linn) is a herbal therapy that is reportedly widely used in treating HIV in Nigeria (Igoli et al., 2005). The efficacy of Ufu opioko (*Ageratum conyzoides Linn*) in the treatment of HIV is yet to be scientifically established.

It is estimated that about 80% of Africans reportedly use herbal therapies in the treatment of many diseases (WHO, 2002). The inaccessibility and unavailability of orthodox medical treatment, especially in rural communities in developing countries, provides the impetus for the increased patronage of herbal therapies (Orisatoki & Oguntobeju, 2010). However, the increasing acceptability and popularity of herbal remedies is eliciting concern from orthodox health care professionals because of safety issues (WHO, 2002). The use of herbal remedies is not restricted to developing countries. Even in the United States, 35% of the American population is reported to use complementary and alternative medicine (CAM) (Lee, Andrade, & Flexner, 2006). Herbal medicine is reported to be the most commonly used CAM. 18.6% of adults in the U.S. reported using herbal therapy in 2002 (Tindle et al., 2005).

The search for an HIV cure is currently assuming different dimensions. Apart from the use of conventional antiretroviral medications, the use of herbal remedies is growing in different parts of the world (Mills, Cooper, Seely & Kanfer, 2005; Orisatoki & Oguntibeju, 2010; WHO, 2002). Herbal therapy is reported to be higher among HIV patients even with the availability of ARV (Lee et al., 2006). The use of natural health products (NHP) is reported to be as high as 67% among HIV patients receiving conventional ARV (Gore-Felton et al., 2003). Among the NHP users, 63% reported the use of vitamin C, 54% multivitamin, 53% vitamin E, 53% garlic and 20-50% of patients reported using vitamin B12, vitamin B6, vitamin A, aloe, zinc, beta-carotene,

acidophilus, ginseng, selenium, *Echinacea* species, folate, Chinese herbs, marijuana, goldenseal and coenzyme Q10 (Standish et al., 2001).

Herbal remedies are largely used to treat fungal and bacterial opportunistic infections that are associated with HIV infection (Kisangau, Lyaruu, Hosea, & Joseph, 2007). Similarly, herbal remedies have been used as primary treatment modalities for HIV/AIDS and associated problems such as dermatological disorders, insomnia, weakness, nausea and depression (Hodgson & Rachanis, 2002). Herbal remedies are reported to have been used by individuals in different stages of HIV infection (Langlois-Klassen, et al., 2007).

Studies have shown that herbal remedies are effective or helpful in HIV treatment (De Clereq, 2000; Dharmaratne, Tan, Marasinghe & Pezzuto, 2002; Kong, Goh, Chia, & Chia, 2003; Kostova, 2006; Matthee, Wright & Konig, 1999; Onifade et al., 2011a). Different herbal remedies are currently used in the treatment of HIV in different parts of the world. In Sub-Saharan Africa, two herbal remedies used for HIV treatment are *Hypoxis hemerocallidea* (African potato – an immunostimulant) and Sutherlandia (Mills, Cooper, Seely & Kanfer, 2005; Orisatoki & Oguntibeju, 2010).

The South African government has incorporated *hypoxis* into the primary health care system and used it as an immunostimulant in the treatment of HIV/AIDS (Mills et al., 2005). *Hypoxis* reportedly contains sterols and sterolins. These constituents of *Hypoxis* are believed to act as immune boosters but concrete evidence of this is lacking (Bouic et al., 2001). The corms of *H. hemerocallidea* are widely used in the treatment of immunity-related illnesses such as cancer, HIV/AIDS and the common cold. Herbal

remedies have gained governmental acceptance in South Africa despite a lack of empirical evidence of efficacy and safety (Mills et al., 2005).

Amzat and Abdullahi (2008) reported that a study in Senegal showed that a herbal formulation known as METRAFAIDS was able to decrease viral load by more than 66% in 54% of HIV patient population. This remarkable efficacy was achieved without any adverse reaction during the course of this study. METRAFAIDS is now trademarked and has been patented by the association for the promotion of traditional medicine (PROMETRA) (Amzat & Abdullahi, 2008).

Another study by Tumbare et al. (2012) on the safety and efficacy of a combination of three herbal drug preparations showed that 80% of the subjects achieved viral load reduction below detection level and the remaining 20% recorded a reduction in viral load. Included in this 80% was a patient with co-diagnosis of tuberculosis who was receiving anti-tuberculosis medications in conjunction with his herbal treatment. Tumbare et al. (2012) recorded no side effects in patients who were using both ARV and herbal therapies together.

The Chinese government provided a dynamic response to combat HIV epidemic with the formation of a National Free Antiretroviral Treatment Programme (NFATP), which is also known as a comprehensive acquired immuno-deficiency syndrome (AIDS) response program. A tripartite approach is used in Chinese communities in the treatment of HIV. These approaches are:

(a). Conventional antiretroviral medications (HAART),

(b). Buyao which include tea, soups, tablets, herbal preparations and tonics, sold over-the-counter, and

(c). Traditional Chinese medicine (TCM) (Zou et al., 2012).

Traditional Chinese herbal medicine (TCHM) is widely used in China to treat HIV. TCHM is used to enhance immunity, treat HIV symptoms, reduce medication side effects and improve quality of life (Liu, 2007). Many studies have shown that TCHM is effective in decreasing HIV RNA levels (Sangkitporn, 2005; Shi, & Peng, 2003), provide significant increase in CD4 counts (Shao, 2008; Wang et al., 2006), provide significant improvement of symptoms of oral candidiasis with no side effects (Jiang et al., 2009) and improve the symptom of diarrhea (Wang et al., 2008; Xu et al., 2011). TCHM has proven to significantly increase peripheral leukocytes with no serious adverse effects (Jiang et al., 2011), resulting in improvement of symptoms of anepithymia (loss of natural appetite) and nausea (Wang et al.., 2008) and improvement in overall life satisfaction (Burack, Cohen, Hahn, & Abrams, 1996). However, some TCHM show no significant difference in CD4 count and symptom severity (Burack, Cohen, Hahn, & Abrams, 1996) and no significant difference in viral load (Wang et al., 2008; Wang et al., 2006) between treatment groups and placebo groups. TCHM is known to have undesirable effects such as gastroenterological adverse effects (Shi & Peng, 2003) and other adverse effects (Weber et al., 1999).

An herbal formulation, known as SH, is reported to be effective in HIV treatment. SH, which is widely used in China, is a formulation containing five herbs (Sangkitporn et al., 2005). Each constituent of SH is reported to be an individually effective anti-HIV agent, and the combined herbs are also reported to possess anti-retroviral activity (Sangkitporn et al., 2005). A randomized, double blind placebo controlled clinical trial was conducted to investigate the effectiveness of co-administration of SH with

antiretroviral medications. Two groups of subjects were used. A group of 40 subjects were given a combination of Zidovudine (ZDV) 200mg, Zalcitabine (ddC) 0.75mg and SH herbs 2.5grams three times daily. A control group consisting of 20 subjects was administered a combination of ZDV 20mg, ddC 0.75mg and placebo 2.5grams three times daily for a period of 24 weeks. Findings from Sangkitporn et al. (2005) showed that HIV RNA from week 4 and beyond significantly decreased from the baseline value in both the experimental and control groups. But the SH group recorded a significantly lower HIV RNA compared to the control group. Similarly, the CD4 counts after 12 weeks and beyond showed a significant increase in SH group from baseline value. Finding from this study showed that a combination of SH herbs with two nucleoside reverse transcriptase inhibitor has a greater antiviral ability than conventional antiretroviral medications (Sangkitporn et al., 2005). The combination of SH with conventional antiretroviral medications resulted in no serious adverse effects.

In a chemical study conducted by Onifade, Jewel & Okesina (2010) on the efficacy of herbal remedies used to treat HIV in Zaria (Kaduna state, Nigeria) and Osogbo (Osun state, Nigeria), it was found that about 20% of herbal homes have potentially effective herbal remedies for HIV infection. Sixty percent of these herbal homes were able to provide symptomatic treatment, but potentially toxic products were noted in 20% of the herbal homes (Onifade et al., 2010).

Herbal remedies have been found to inhibit some steps associated with HIV replication (De Clereq, 2000; Kong, Goh, Chia, & Chia, 2003). Herbal remedies have shown to be effective in reducing viral load and increasing CD4 counts (Onifade et al., 2011a). According to Matthee, Wright & Konig (1999) alkaloid-derived herbal remedies

such as *Ancistrocladus korupensis* obtained from tropical liana plant inhibit reverse transcriptase and HIV-induced cell fusion. Dharmaratne, Tan, Marasinghe & Pezzuto (2002) reported that Coumarin herbal remedy in the form of canolides obtained from a tropical forest tree, *Calophyllum lanigerum,* was classified as a potent non nucleoside reverse transcriptase inhibitor. Coumarin from plant sources and their analogs (i.e. synthetic coumarins) have shown to be potent nonnucleoside RT-inhibitors, or inhibitors of HIV-integrase, or HIV-protease (Kostova, 2006).

Herbal Treatment of HIV in Nigeria

Nigeria has embraced ARV therapy in the treatment of HIV. However, herbal remedies have also been used in HIV treatment in Nigeria since its discovery (Awodele et al., 2012). A descriptive cross-sectional survey conducted in Lagos, Nigeria showed that 8.2% of respondents used herbal therapy as a complementary medicine with conventional ARV therapy (Awodele et al., 2012). Herbal therapies reportedly used include jobelyn (Sorghum bicolor plant leaves), garlic (Allicin, Y-glutamyl(s)-ally-L-Cysteine), ginger (Essential oil) and aloe vera (Hydroxyanthracene derivatives expressed as Barbaloin) (Awodele et al., 2012). Findings from Awodele et al. (2012) study showed marginal, but not significant, improvement in CD4 counts and viral load of HIV patients using these herbal therapies compared to those who do not use herbal therapies.

In Nigeria, many herbal remedies have proven to be effective in the treatment of HIV (Elujoba, 2005). Mostly, herbal remedies have been effective in treating the opportunistic infections associated with HIV (Abere & Agoreyo, 2006; Elujoba, 2005). Findings from Mbah et al. (2007) showed that a widely used herbal medicine, *neem* leaves, is effective in HIV management as it is found to bring about significant increase

in CD4 and improvement in general well-being of HIV patients. Similarly, *Baissea axillaries Hua* is found to be effective in treating HIV opportunistic infections of bacteria origin (Abere & Agoreyo, 2006).

Similarly, herbal remedies, such as a-Zam, which contain alkaloid have shown to be effective in the treatment of HIV (Bringmann et al., 1999). A-Zam is a herbal remedy used in HIV treatment in Nigeria. The exact components of a-Zam are not known. However, disclosure by the herbal therapist revealed that the major constituents of a-Zam are black seed (*nigella sativa*), honey and water (Onifade et al., 2011a). Phytochemical analysis of a-Zam revealed further constituents such as alkaloids, saponins, tannins, cardenolides and anthraquinones (Onifade et al.., 2011a).

Previous use of a-Zam in the treatment of disease conditions is not found in the literature. However, the constituents of a-Zam are known to be used in treating different disease conditions. For instance, alkaloids such as physostigmine that are isolated from natural sources has gained acceptance as acetyl-and butyrylcholinesterase (BChE) inhibitors and is being used in the treatment of Alzheimer's disease (Konrath, Passos, Klein-Junior & Henriques, 2013). Saponins are known to have direct beneficial effects on the heart and are useful in the treatment of heart and circulatory-related ailments. Saponin helps in reducing blood coagulation, cholesterol and sugar levels in blood while helping to promote systemic immunity and enzymic functions (Purmova & Opletal, 1995). Plant tannins are known to be useful in decreasing inflammation of ulcerative colitis (Clinton, 2009). Cardenolide is a class of cardiac glycosides. Cardiac glycosides have a long history of use in the treatment of congestive heart failure (Schoner & Scheiner-Bobis, 2007). Cardenolides are known to bind to the sodium pump producing a resultant effect

on multiple signaling pathways leading to remarkable anti-tumor effects (Mijatovic et al., 2006). Anthraquinone is reported to have diverse pharmacologic potentials. It is known to possess antiviral activities against HIV-1, human cytomegalovirus (HCMV), vesicular stomatitis virus, herpe simplex virus type 1 and 2, parainfluenza virus and vaccinia virus (Dave & Ledwani, 2012).

A clinical study conducted by Onifade et al. (2011a) on the effectiveness of a-Zam in HIV treatment show that a-Zam is effective in increasing the CD4 count and in reducing the viral load of HIV patients. Findings from Onifade et al. (2011) show that there was a statistical significance difference ($p<0.05$) between pre-treatment CD4 count and post-treatment CD4 count. Also, a significant reduction in viral load was obtained after treatment with a-Zam. Onifade et al. (2011a) study show no negative drug interaction in patients that used both ARV and a-Zam.

Nigerian Government Policy on Herbal Medications

In spite of the astronomical usage of herbal remedies in the treatment of diseases in Nigeria, the Nigerian government appears not to have a clearly defined policy on the use of herbal remedies. The Nigerian government, through the National Agency for Food and Drug Administration (NAFDAC) and Nigeria Institute of Pharmaceutical Research and Development (NIPRID), was in the process of conducting limited clinical trial on selected herbal medications used for HIV treatment (Obinna, 2013). One of the core mandates of NAFDAC is to ensure that only high quality, safe, and effective herbal medicines are released into the Nigerian market. Stemming from the proliferation of claims of herbal cure, the NAFDAC had set up a National Expert Committee to work in conjunction with NIPRID to verify claims of potency of herbal HIV medications. The

expect committee was scheduled to commence evaluation of herbal medicine in the first quarter of 2014 (Obinna, 2013). But as it is typical of Nigerian agencies, no information is found on the activity of this committee, and it is not clear if the committee has commenced work as scheduled.

Safety of Herbal Remedies Used in HIV Treatment

There is an erroneous belief that herbal remedies are harmless because they are obtained from natural sources. However, health care professionals have always been concerned about the risks associated with the use of herbal therapy (Corns, 2003). Despite this, increasingly large numbers of patients continue to use herbal remedies to treat minor and major infections (Gardiner, 2007; WHO, 2002) because of their accessibility, availability, affordability and acceptability in many communities in developing countries (Amzat & Abdullahi, 2008; Tamuno, 2011).

Possible interactions between herbal medicine and ARV could lead to therapeutic failure (Awodele et al., 2012). Studies have shown that herbal therapies such as St. John's wort, herbally derived vitamins and garlic are capable of causing negative drug interaction with antiretroviral medications (Dhalla et al., 2006; Nyika, 2007). Similarly, Awodele et al. (2012) showed that concurrent use of herbal remedies with ARV could result in potential adverse effects. Studies have shown that garlic has the potential to reduce pharmacokinetic concentration of Saquinavir in plasma and cause a reduction in the effectiveness of ARV (Borrelli, Capasso, & Izzo, 2007; Piscitelli, Burstein, Welden, Gallicano, & Falloon, 2002).

Investigation of the toxicological profile of herbal remedies has largely been carried out using animal populations. Onifade et al. (2011b) conducted a toxicological

study of a-Zam using 20 rats that were subdivided into four different groups. Different dosages of a-Zam (400mg/kg, 800mg/kg, 1600mg/kg and 3200mg/kg) were administered daily to each group over a period of 84 days to test for chronic toxicity after the initial acute toxicity test. A control group was administered rat chow and water only. Physical examination and hematological studies were performed. Histological studies were done at 85th day of drug administration. Onifade et al. (2011b) found no physical or physiological alteration in any group. Similarly, blood test and histological studies only showed mild to moderate derangement. Renal function test (electrolytes, urea & creatinine) and liver function test (high density lipoprotein, HDL, triglyceride, low density lipoprotein and total cholesterol) were done. It was found that, even at a higher daily dose of 3200mg/kg, a-Zam was safe, as it resulted in no severe injury in any of the groups.

The use of herbal remedies in conjuction with ARV is likely to produce beneficial or detrimental effects. When St. John's Wort, which is generally used by HIV patients, is taken with protease inhibitor (PI) and non-nucleoside reverse transcriptase inhibitor (NRTI) can cause a reduction in PI and NRTI concentration leading to possible therapeutic failure (Mannel, 2004). As a result of the possible safety issues associated with herbal remedies when taken alone or with ARV, it is important that health care professionals should always review herbal remedies that patients may be taking during the course of treatment.

Conclusion

A-Zam is found to be beneficial in increasing the CD4 counts and in reducing the viral load in Nigerian HIV patients (Onifade et al., 2011a). However, Onifade et al. (2011a) study did not investigate in detail the experience of patients who used a-Zam.

Also, the study did not compare the symptom and treatment outcome of patients using the herbal remedy a-Zam with those patients using conventional antiretroviral medications. As a result of these identified knowledge gaps, it is imperative to conduct study to further our knowledge of the experience of HIV patients in Nigeria in the course of using herbal remedies. Therefore, the goals of this study are to investigate the effectiveness of the herbal remedy a-Zam and to investigate the impact of herbal remedies and HAART on HIV symptoms and patients' quality of life.

Table 1: Epidemiology of HIV in Nigeria: Key Facts

	2008	2012
National Median HIV Prevalence	4.6%	4.1%
Estimated Number of PLWHIV	2,980,000	3,459,363
Annual AIDS Deaths	192,000	217,148
Number requiring Antiretroviral Therapy	857,455	1,449,166
New HIV infections	336,379	388,864
Total number of AIDS orphans	2,175,760	2,193,745

Source: National Agency for the control of AIDS (NACA, 2012). Federal Republic of Nigeria Global AIDS Response Country progress report in 2012. Retrieved from http://www.unaids.org/en/dataanalysis/knowyourresponse/countryprogressreports/2012countries/Nigeria%202012%20GARPR%20Report%20Revised.pdf

Table 2: Trends in HIV incidence in Nigeria 2010 and 2011

	2010	2011
Total population	319,322	310,322
Adult > 15 years	247,718	243,430
Children < 15 years	71,604	67,190
Male	144,258	140,169
Female	175,064	170,431

Source: National Agency for the control of AIDS (NACA, 2012). Federal Republic of Nigeria Global AIDS Response Country progress report in 2012. Retrieved from http://www.unaids.org/en/dataanalysis/knowyourresponse/countryprogressreports/2012countries/Nigeria%202012%20GARPR%20Report%20Revised.pdf

Table 3: Estimated Prevalence of HIV among Women, Children and General Population in Selected Sub-Saharan African Country and the Percentage of PMTCT Services.

Sub-Saharan African Countries	HIV prevalence in 2009 (%)	HIV prevalence among pregnant women 2009	PMTCT Services (%) 2010	Number of Pediatric (0-14) HIV 2009	Number of pregnant women living with HIV 2009
Nigeria	3.6	3.6	4.7	360,000	230,000
South Africa	17.8	25.6	94	330,000	330000
Tanzania	5.6	5.5	90.4	160,000	73,000
Kenya	6.3	5.6	92.5	180,000	87,000
Zimbabwe	14.3	14.3	74	150,000	62,000
Mozambique	11.5	10.4	86	130,000	98,300
Uganda	6.5	6.1	81	150,000	96,700

Sources:UNAIDS (2010)-UNAIDS Report on the Global AIDS Epidemic; UNICEF (2009). Prevention of mother-to-child Transmission (PMTCT) of HIV.

Table 4: Percentage of Women and Children receiving Antiretroviral Therapy in Selected Sub-Saharan African Countries for the Prevention of Mother-to-Child HIV Transmission

Sub-Saharan African Countries	% of women receiving ARV therapy to reduce HIV transmission during pregnancy 2011	% of eligible children younger than 15 years old receiving ARV therapy 2010	HIV Testing among pregnant women 2010 (%)
Nigeria	18	13	14
South Africa	95	58	95
Tanzania	74	14	86
Kenya	67	31	83
Zimbabwe	54	34	90
Ghana	75	14	68
Mozambique	51	20	87
Uganda	45	22	63
Zambia	86	31	94
Lesotho	62	25	57

Sources:UNAIDS (2010)-UNAIDS Report on the Global AIDS Epidemic; UNICEF (2009). Prevention of mother-to-child Transmission (PMTCT) of HIV.

CHAPTER 3

RESEARCH METHOD AND DESIGN

Introduction

This chapter discusses the research design and methodological approaches used in this study. In this chapter, the aspects of the study that will be discussed are research design, research setting, gaining access, instrument/questionnaire, sample and sampling plan, recruitment problems, inclusion and exclusion criteria, control of threats, protection of human subjects, data collection, methods and procedures, data analysis and management, methods used to analyze research questions, trustworthiness of research data, eliminating confounding variables and summary statement.

This is a comparative analysis study designed to compare the effectiveness of conventional antiretroviral (ART) medications with a combination therapy of ART and herbal therapies as they are already used by Nigerian HIV patients. The study would consist of two parts namely the pilot study and the actual study.

The Pilot Study

The pilot study was designed to test the reliability of the two instruments used in obtaining data from the subjects. The two instruments used for data collection are the brief version of the World Health Organization Quality of Life Instrument for HIV (WHOQOL-HIV BREF) (WHO, 2012) and the Sign and Symptom Check-List for persons with HIV disease (SSC-HIVrev) (Holzemer et al., 2001). Although these two questionnaires have been widely tested among different populations, the instruments have not been tested extensively among Nigerian HIV population. The integrity of the data obtained from this study is a function of the reliability of the instruments used in data

collection. The researcher considered it imperative to ascertain the reliability of the study instruments before they are used in the main study. The pilot study also enables the researcher to socialize into the research environment in Nigeria, to assess and identify possible problems that could arise during questionnaire administration and strategize to resolve any problem before the actual study.

Questionnaire Administration for Pilot Study

Before the actual study, a pilot study was carried out. This is a reliability pilot test of the two instruments (SSC-HIVrev and WHOQOL-HIV BREF) used in this study. Both questionnaires were administered to 20 randomly selected HIV patients receiving treatment at the State Specialist Hospital Osun-State, Nigeria. Randomization was done by flipping a coin. A coin was flipped for each subject that agrees to participate in the study. If the coin comes up "heads", the subject was included in the pilot study. If the coin comes up "tails", the subject was excluded from the pilot study. This method provided equal opportunity for all participants to be included in the actual study, irrespective of characteristics such as sex, age, tribe, or educational levels (Polit & Beck, 2012). The research assistant helped situate the patients for questionnaire administration. Questionnaires were administered by the principal investigator via phone and/or Skype. Each participant was required to put completed questionnaire in an envelope provided for that purpose and sealed. The sealed envelope was given to the research assistant. All sealed envelopes were sent to the researcher in the U.S. for reliability test.

Analysis of Pilot Study

Data obtained from the pilot study was analyzed using IBM SPSS Statistics 22 software. The Cronbach alpha reliability tests were carried out for both the SSC-HIVrev and WHOQOOL-HIV Bref. Similarly, descriptive analyses were done to analyze the demographic information of the pilot study participants. The pilot study helped the researcher to determine if the two instruments are suitable for use in the actual study.

The Actual Study

The actual study is divided into two parts namely;

1. Collection and analysis of physiological data (CD4 counts) and

2. Collection of data about patients' symptom experience and quality of life during treatment with ARV only and combination of ARV and herbal remedies.

Collection and Analysis of Physiological Data (CD4 Counts)

The first component of this study was the collection and analysis of the physiological data. The CD4 was used as a biomarker of HIV treatment outcome. The initial intention of this researcher was to obtain and analyze the CD4 counts and the viral load of HIV patients during the course of treatment. But data regarding viral load was not available in the Specialist Hospital and in many clinics in Nigeria. The CD4 counts were obtained from patients' medical records. The purpose of the quantitative comparative analysis was to examine the impact of ARV only and combination of ARV and herbal therapy on CD4 counts of HIV patients during treatment. This component involved the analysis of the improvement in the CD4 counts of patients taking ARV only and those using combination of ARV and herbal remedies during the course of treatment.

Each participant's CD4 counts were obtained from patients' medical records by the record staff. To ensure credibility of study results, only CD4 counts results obtained from patients' medical records were used. The CD4 counts that were measured before the commencement of treatment were used as baseline CD4 counts. CD4 counts obtained at 6 months post treatment were used as post treatment CD4 counts. Six month duration was used because CD4 count is typically expected to increase rapidly in the first few months of ARV treatment, followed by a more gradual increase until an optimum count is achieved (Gengis & Deeks, 2009).

Collection of Patients' Symptom Experience and Quality of Life Data During Treatment

The second part of the actual study included the administration of dual questionnaires to Nigerian HIV patients who were taking conventional antiretroviral medications only (ARV group) and those who were taking a combination of conventional antiretroviral medications and herbal remedies (combined group). The focus of the questionnaire was to compare the experience of these two groups in the course of their respective therapies. The goal was to investigate the impact of treatment on relief of HIV associated symptoms and the patients' quality of life in the course of treatment. This was done by administering questionnaires to obtain information about treatment experience and patients' quality of life during the course of their treatment with herbal remedies and/or conventional antiretroviral medications.

Questionnaire administration for the actual study was done in a fashion similar to that of the pilot study. Each participant enrolled in the actual study was given the two questionnaires. The research assistant helped situate the patients for questionnaire administration. Questionnaires were administered by the principal investigator via phone

and/or Skype. After the completion of the questionnaires, participants were required to put completed questionnaires in an envelope provided for that purpose. The envelopes were sealed by each participant before handing it over to the research assistant. All sealed envelopes were sent to the researcher in the U.S. for analyses.

Analysis of Actual Study

Data generated from the actual study was analyzed using IBM SPSS Statistics 22 software. Descriptive statistics was used to analyze the demographic data (age, gender, and ethnicity) while inferential statistics was used to draw conclusion from study data. Pair sample t-test was used to compare the difference between pre-treatment CD4 counts and post treatment CD4 counts within each group. Independent t-test was used to compare the difference between pre-treatment CD4 counts and post treatment CD4 counts across both groups (i.e. between the ARV group and the combined group). Analysis of covariance (ANCOVA) was used to statistically control the effect of baseline CD4 counts and to examine the difference between the baseline and post treatment CD4 counts.

Research Questions

This study was designed to answer the following questions:

1. How do CD4 counts differ after treatment with antiretroviral medications only?"
2. How do CD4 counts differ after treatment with a combined therapy of herbal treatment and conventional antiretroviral medications?
3. What is the difference in CD4 counts of patient taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications?

4. What is the difference in the symptom experience of patients taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications?
5. What is the difference in the quality of life of patients taking only ARV, and those taking a combination of herbal therapies and conventional antiretroviral medications?

Research Design

This study is designed to start with a pilot test. This is a reliability test of the two instruments (SSC-HIVrev and WHOQOL-HIV BREF) used in data collection. Both questionnaires were administered to twenty randomly selected HIV patients receiving treatment at the State Specialist Hospital Osun-State, Nigeria. The research assistant helped situate the patients for questionnaire administration. The questionnaires were administered via phone and/or Skype. Each participant was required to put completed questionnaire in an envelope provided for that purpose and sealed. The sealed envelope was given to the research assistant. All sealed envelopes were sent to the researcher in the U.S. for reliability test.

After the reliability test, the actual study commenced. The actual study compared the effectiveness of ARV only with combined therapy of ARV and herbal remedies among Nigerian HIV patients. Using power calculation (Cohen, 1988), 110 participants were drawn from Nigerian HIV patients using conventional antiretroviral medications only and those using a combination of herbal remedies and conventional antiretroviral medications. Two groups of matched randomly selected HIV participants were utilized. Each group was composed of 55 participants. Group A participants were drawn from

patients who were using conventional antiretroviral medications only. Group B participants were drawn from patients who were using a combination of herbal therapies and conventional antiretroviral medications for their treatment. Subjects were placed in a group on the basis of the treatment protocol (medications) used in the management of their HIV prior to contact for this study. No participants were required to change the kind of medication he/she was taking prior to contact for this study.

Participants in each group were selected randomly from matched subjects that are similar in terms of important extraneous variables. For each group, subjects with similar treatment protocol, same treatment duration and same duration of HIV diagnosis were included in the study. Subjects in each group have started their treatment about the same time and taking the same antiretroviral medications. All participants were diagnosed within the last two years and also commenced treatment in the last two years. All patients receiving ARV treatment at Osun State Specialist hospital received first and second line HAART. Specifically, a combination of AZT+3TC+NVP (300mg +150mg +200mg) bd or AZT+3TC(FTC)+ EVF (300mg+150mg+600mg) or TDF+3TC+EVF (300mg +150mg +600mg) and 2nd line, 3TC+TDF+LPV/r or with ATV/r are the treatment of choice at State Specialist Hospital, Osun. The herbal medications used by participants in this group include a-zam, ufo-opioko and numerous herbal concoctions popularly known as “agbo” in western part of Nigeria. The herbal medications were prescribed by non-orthodox traditional medical practitioners.

The methods described above helped to eliminate extraneous variables that could affect study results. From the matched samples, participants in each group were selected by flipping a coin. For each group, a coin was flipped for each subject who agreed to

participate in the study. If the coin came up “heads”, the subject was included in the actual study. If the coin came up “tails”, the subject was excluded from the study. This method provided equal opportunity for all participants to be included in the actual study, irrespective of characteristics such as sex, age, tribe, or educational levels (Polit & Beck, 2012).

Symptoms assessment was done using the Sign and Symptom Check-List for persons with HIV disease (SSC-HIVrev) (Holzemer et al., 2001). The quality of life assessment was done using the brief version of the World Health Organization Quality of Life instrument for international assessment of HIV/AIDS (WHOQOL-HIV BREF) (WHO, 2012). The physiologic assessment was done by collecting and analyzing CD4 counts obtained from patients’ medical records. To protect the integrity of the study, questionnaire administration was conducted in the clinic during clinic hours. Arrangements were made to provide transport assistance to all subjects that have difficulty with transportation.

Research Setting

A designated area was provided for the purpose of data collection and administration of questionnaires to patients. This space was used throughout the duration of the study. To promote the integrity of data collection process and prevent the data from being compromised, all questionnaires and interviews were carried out in this location. It is necessary to dedicate a specific space for the administration of the questionnaire, as this would ensure that questionnaires were administered under a controlled environment. Trained research assistant was present at the time of the questionnaire administration. The principal investigator administered the questionnaire over the phone.

Gaining Access

In order to gain access to the subjects for this study, there was collaboration with HIV specialist hospital in Osun State, Nigeria, as well as with physicians, scientists and researchers in this center. Collaboration with these professionals helped to facilitate necessary access to study subjects. The stigma and discrimination attached to HIV infection initially made the recruitment of subjects extremely difficult. Many scientists and researchers were contacted but many of them were unwilling to provide access to their HIV patients. After extensive contacts, a seasoned HIV scientist and researcher committed to helping provide access to potential subjects. Similarly, two medical doctors agreed to help in the recruitment efforts. A lot of resistance was encountered from subjects but the strong assurance of confidentiality eventually persuaded some of the patients contacted to agree to participate in the study. Contact was established with the patients with the help of the care providers who coordinated their treatment. Recruitment fliers were distributed to patients receiving treatment at the hospital. The process of establishing contact with the patients was done with strict adherence to confidentiality. Only patients who consented to participating in the study were included in this study.

Instruments/Questionnaires

Data collection was done using two well-tested instruments. This study seeks to gain insight into the changes that occur in symptoms and quality of life of HIV patients during treatment with antiretroviral medications only and with a combination of herbal therapies and conventional antiretroviral medications. Two instruments that incorporate/embed these two constructs were used in data collection. The quality of life of subjects was measured using the brief version of the World Health Organization

Quality of Life Instrument for HIV (WHOQOL-HIV BREF) (WHO, 2012). The symptom outcome was measured using the Sign and Symptom Check-List for persons with HIV disease (SSC-HIVrev) (Holzemer et al., 2001).

WHOQOL-HIV BREF Instrument

Investigation of the quality of life of HIV patients was done using the brief version of the World Health Organization Quality of Life Instrument for International Assessment of HIV/AIDS (WHOQOL-HIV BREF). This instrument provides insight into the quality of life of participants in the course of their treatment with herbal remedies and/or conventional antiretroviral medications. This instrument also provided an opportunity for patients to provide information on their experiences in the course of their treatment. According to the World Health Organization, quality of health (QOL) is defined as "an individual's perception of their position in life in the context of the culture and value system in which they live, and in relation to their goals, expectations, standards and concerns" (WHO, 2012 p. 3). Looking beyond the mechanistic focus of medicine on the treatment of the signs and symptoms of diseases, the WHO quality of life assessment instrument provides a tool that extends beyond the traditionally used indicators of disease morbidity and mortality (Sharpe, 1994).

The WHOQOL-HIV was developed from an extensive test of 115 questions that incorporate the WHOQOL-100 in 10 centers around the world (WHO, 2012). The quality of life assessment tool is a valuable instrument in understanding the impact of HIV infection on individual lives (O'Connell, Skevington, Saxena, WHOQOL HIV Group, 2004). The WHOQOL instrument is individualized, as it measures the satisfaction of individuals vis-a-vis the impact of disease condition on vital aspects of their lives and

their interpretation of such experience (Skevington, Lotfy, O'Connell, 2004). The WHOQOL-HIV BREF, used in this study, is an abridged version of the original WHOQOL-HIV assessment instrument. The brief version became necessary because of the cumbersome and time-consuming nature of the original version (WHOQOL-HIV), which made it difficult to be used in large studies or in resource constraint regions like sub-Saharan Africa.

The WHOQOL-100 assessment version is a cross-culturally valid assessment instrument of wellness and well-being (Skevington, Lotfy, O'Connell, 2004). WHOQOL-100 is operationalized through 100 items that denote 25 facets organized into six domains (WHOQOL Group, 1998). The conceptualization of WHOQOL instrument is based on the realization that the determinants of health status could not be completely understood through the measure of disease alone. Progressively, health status measures have come to be conceived as incorporating both the objective measures of final health status and subjective measures of health and well-being (Muldoon, Barger, Flory, & Manuck, 1998; Wood-Dauphine, 1999).

Although many instruments have been previously developed for measuring the quality of life of HIV patients, the WHOQOL-HIV instrument provides a unique opportunity for cross-cultural measurement of the quality of life of people living with HIV/AIDS. Some of the previously developed quality of life assessment instruments for HIV include the HIV overview of problems-evaluation system (HOPES) (O'Leary et al., 1998) and the medical outcomes study-HIV (Smith et al., 1996). The WHOQOL-HIV has shown a high level of adaptability, as its use has extended beyond HIV patients. The instrument is suitable for assessing the quality of life outcomes resulting from multiple

opportunistic infections associated with HIV infection such as tuberculosis (Deribew et al., 2009), depression (Pereira, Martins, Alves, & Canavarro, 2014) and Hepatitis C (Preau et al., 2008). The instrument can be used by a broad spectrum of HIV patients at different stages of infection (O'Connell, Saxena, Skevington, for the WHOQOL-HIV Group, 2004) and by specific subgroups such as sex workers, injecting drug users, and homosexual males (O'Connell & Skevington, 2012).

The WHOQOL-HIV instruments have gained wide acceptance internationally, and different versions have been used across nations to measure quality of life of HIV/AIDS patients in Iran (Razavi et al., 2012), in Taiwan (Fang et al., 2002; Hsiung et al., 2011), in India (Chandra et al., 2006) in Burkina Faso (Bakiono et al. 2014), in Italy (Starace et al., 2002), in Rwanda (Mutimura, Stewart & Crowther, 2007), in Brazil (Berlim, Pavanello, Caldieraro, & Fleck. 2005) and in Nigeria (Agu et al., 2012; Fatiregun et al., 2009; Mofolorunsho et al., 2013; Odili et al., 2011).

The WHOQOL-HIV BREF instrument consists of 31 items using a five point Likert-type scale. The items are distributed into the following six domains: physical health domain, psychological health domain, level of independence domain, social relationship domain, environmental domain and spirituality/religion/personal beliefs domain. The physical health domain measures pain and discomfort, energy level, fatigue, sleep and rest. The psychological health domain measures positive and negative feelings, thinking, learning, memory and concentration, self-esteem, body image, and appearance. The level of independence domain measures mobility, daily life activities, level of dependence on medication or treatment and work capacity. The social relationship domain measures personal relationship, social support and sexual activity. Environmental

domain measures physical safety and security, home environment, financial resources, health and social care, accessibility and quality, opportunities for acquiring new information and skills, participation in and opportunities for recreation and leisure activities and physical environment. Spirituality/religion/personal beliefs domain measures forgiveness and blame, as well as concerns about future and death and dying (Odili, Ikhurionan, Usifoh, & Oparah, 2011).

Validity and Reliability of WHOQOL-HIV Instrument

The WHOQOL-HIV has been widely evaluated for reliability and validity in different parts of the world. In Iran, Razavi et al. (2012) assessed the reliability of the instrument using Cronbach's α (alpha) for internal consistency and found the Cronbach's alpha for the six domain to be 0.8 (for spiritual/religion/personal beliefs domain), 0.78 (level of independence domain), 0.72 (psychological domain), 0.65 (environmental domain), 0.63 (social relationships domain), and 0.61 (physical domain) showing that the instrument has good reliability. The French version of WHOQOL-HIV is reported to have high reliability with Cronbach's alpha of 0.944 (for spiritual/religion/personal beliefs domain), 0.94 (level of independence domain), 0.937 (psychological domain), 0.938 (environmental domain), 0.94 (social relationships domain), and 0.942 (physical domain) (Reychler, Caty, Vincent, Billo, & Yombi, 2013). Similarly, the Malay version was found to have internal consistency ranging from 0.60 to 0.87 across all the domains indicating that the Malay version of WHOQOL-HIV is a valid and reliable instrument for measuring the quality of life of HIV patients (Saddki et al., 2009). The Nigerian version of WHOQOL-HIV BREF has good internal consistency and reliability with Cronbach's alpha ranging between 0.81 and 0.85 (Akinboro et al.,

2014). Akinboro et al. (2014) reported the Cronbach's alpha for the six domains to be 0.81 (physical domain), 0.81 (psychological domain), 0.82 (level of independence domain), 0.83 (social relationships domain), 0.83 (environmental domain), and 0.85 (for spiritual/religion/personal beliefs domain).

SSC-HIVrev Instrument

The other information collected in this study was the participants' symptom experience in the course of their treatment with herbal remedies and conventional antiretroviral medications. The Sign and Symptom Check-List for persons with HIV disease (SSC-HIVrev) (Holzemer et al., 2001) was used to evaluate symptom experience and/or improvement. This instrument consists of six symptom clusters, namely: malaise/weakness/fatigue (consisting 6 items), confusion/distress (4 items), fever/chills (4 items), gastrointestinal discomfort (4 items), shortness of breath (3 items) and nausea/vomiting (3 items). Specifically, the symptoms cluster to be evaluated are fatigue (muscle aches, weakness, painful joint, fatigue), fear (difficulty concentrating, depression, memory loss, fear/worries), fever (fever, chills, day sweats, night sweats), GI upset (loose stool, diarrhea, gas/bloating, abdominal pain, nausea and vomiting), shortness of breath (shortness of breath at rest, wheezing and shortness of breath with activities), sore throat (sore throat, painful swallowing, mouth ulcers, and white spots in mouth/thrush), numbness (numbness/tingling of arms, hands/fingers, legs, feet/toes), headache (dizziness, headaches, heart racing, chest pain), rectal itch (rectal itching, bleeding and discharge), and bruising/bleeding (sore/bleeding gums, nose bleeds, easy bruising, blood in spit/sputum). Body changes (weight gain, concern over weight gain,

hump on back of neck/shoulders) was omitted from this questionnaire because it was culturally not considered to be an important factor for the population in this study.

Validity and Reliability of SSC-HIVrev Instrument

To control the threat to internal validity, extensively used and well-tested instruments was used for data collection. The Sign and Symptom Check-List for persons with HIV disease (SSC-HIVrev) (Holzemer et al., 2001) is a reliable and highly valid instrument. This instrument is reported to have high internal validity. The six symptom clusters, the number of items in the factor and the Cronbach's alpha reliability estimates for this instrument were Malaise/Weakness/Fatigue (six items with Cronbach alpha of 0.90), Confusion/Distress (four items with Cronbach alpha of 0.90), Fever/Chills (four items with Cronbach alpha of 0.85), Gastrointestinal Discomfort (four items with Cronbach alpha of 0.81), Shortness of Breath (three items with Cronbach alpha of 0.79) and Nausea/Vomiting (three items with Cronbach alpha of 0.77 (Holzemer et al., 2001, p. 1041). The reliability estimate of the instrument ranges between 0.76 to 0.94, showing strong reliability and validity for this instrument.

Sample and Sampling Plan

Using power analysis (Cohen, 1988), 110 subjects (each group was composed of 55 subjects) were drawn among HIV patients receiving treatment at the Specialist Hospital, Osun- State, Nigeria. This hospital was chosen because of the cosmopolitan nature and large population of Osogbo, the location of the hospital. Osogbo is the capital city of Osun state. The city has a population of approximately 250,951. This site provided access to different ethnic groups in Nigeria, which could provide a broad generalization for the study findings. The sample size was based on .05 significance level with an effect

size of 0.4 and power of 0.8. To account for attrition from the study, an additional 15 percent increase in sample size was factored in.

Recruitment Problems

Selection criteria were based on the diagnosis of HIV. For the purpose of this study, patients who have used or were using only herbal remedies for their HIV treatment were contacted for participation in this study. However, it was very difficult to recruit into this group. It appears that patients using only herbal therapy were trying to hide their HIV status from their families, friends, and orthodox health care providers. Several attempts were made to enlist patients into this group. The identified patients in the herbal group only stalled this study for several months, as they kept requesting for time to think about their participation in the study. After prolonged wait, this group fell out of this study because of insufficient enrollment.

Only two groups were used in this study. The two groups are;

- Group A which included patients who were using conventional antiretroviral medications only (ARV group).

- Group B which included patients who were using a combination of herbal therapies and conventional antiretroviral medications for their treatment (combined group).

Patients that meet the inclusion criteria were randomly selected from matched participants as previously described. Informed consent was obtained before the inclusion of subjects in the study. Participants were given full disclosure about the nature of the study, the extent of their participation and voluntary nature of their participation in the study. Subjects were able to voluntarily discontinue participation in the study at any time.

Disclosure was made to subjects that the study may involve minimal risks, and these risks were fully disclosed to subjects. All subjects who agreed to participate in the study were required to sign the informed consent form.

Inclusion Criteria

Inclusion criteria for this study are as follows;

- Age between 18 and 65
- Diagnosis of HIV
- Nigerian citizenship and
- Residency in Nigeria
- Ability to read, write, speak and understand English
- Subjects must be receiving either antiretroviral medications only or herbal medications only or a combination of antiretroviral medications and herbal medications.

Exclusion Criteria

For the purpose of this study, patients with full-blown AIDS were excluded from the study, as the aim of this study was to investigate and compare the efficacy of different treatment protocols on HIV infection. Determination of full blown AIDS status was based on the physical health of the patients. Non-ambulatory and bed-ridden patients were considered to be a function of disease progression to full blown AIDS status. Such patients were excluded from this study. Similarly, non-English speaking subjects were excluded from the study. Subjects included men and women and selection was done

based on inclusion and exclusion criteria. Full disclosure was given to research subjects and written informed consent was obtained from each participant.

Control of Threats

To control the threats to the internal validity of the study result, subjects were randomly selected from matched samples. Matching is a useful method in eliminating confounding variables, as it will eliminate the sources of bias in the treatment. Also randomization is a useful method in assigning treatment or intervention to study participants, as it eliminates the sources of bias in the treatment (Polit & Beck, 2012; Vickers, 2003 and Wendler, 2009). Randomization will also enhance the external validity of the study finding, as it will ensure representative sampling, thereby enhancing the generalizability of study findings to bigger population. The use of matching and randomization will enhance the internal validity of the study results. An important extraneous variable is the differences noted in the baseline CD4 counts among patients. Analysis of covariance (ANCOVA) was used to statistically control the effect of baseline CD4 counts.

Protection of Human Subjects

In the process of carrying out this study, appropriate attention was given to ethical issues in research. Research subjects' confidentiality was protected. Detailed information about the study was explained to subjects and full disclosure of risks associated with the study was made. The subjects were informed of their right to discontinue participation in the study at any point during its course. Each subject was required to sign an informed consent paper. Because of the initial apprehension of participants and the dynamic nature of this study, process consent was used in combination with informed consent (Munhall,

2007). Process consent is a way to continuously renegotiate informed consent to meet the changing situation in the process of a study (Munhall, 2007; Usher & Arthur, 1998). Process consent enables the participants to opt out of the study at any point if he/she becomes uncomfortable or unable to go on with the study for whatever reason. Throughout the process of this study, participants received continuous explanations of and information about the study, and their permissions were sought on a continual basis. This approach guaranteed necessary ethical issues needed in this study.

Patient confidentiality was maintained and a commitment to this effect was provided to subjects in writing. Trained research assistant was strictly requested to not disclose subjects' information to anyone outside the research group. The research assistant was required to sign a written commitment to maintain subjects' privacy and confidentiality at all time. Patient information was electronically stored in a password-protected computer system. All paper copies were stored under lock and key in a fireproof cabinet. The paper copies were shredded after information was stored electronically.

These measures also mitigate the risks involved in this study. This study involves minimal risks. The risks associated with this study include potential breaches of confidentiality and deep emotional and psychological trauma that could be precipitated by discussion of health issues. To prevent psychological trauma to participants during this study, informed consent was continuously renegotiated at different time during the study. Participants were free to withdraw from the study at any point during the study. Before the commencement of this study, ethical approvals were obtained from

appropriate and relevant authorities in Nigeria and the U.S. Ethical approvals for this study were obtained from the following authorities;

- Osun State Ministry of Health, Health Planning, Research and Statistics Departments.
- Osun State Specialist Hospital, Osogbo Health Research Ethics Committee (SHOSREC) and
- University of Massachusetts, Amherst Institutional Review Board (UMASS IRB).

Data Collection Methods and Procedures

Data collection was done for a period of five months and a week from November 16, 2015 to March 23, 2016. The study started on November 16, 2015 with the identification of subjects using conventional anti-retroviral medications and those using a combination of ARV and herbal medications. Subjects that meet the inclusion criteria were randomly chosen from each group. The study was comprised of two groups (Group A comprised of subjects using antiretroviral medications only {ARV group}; Group B comprised of subjects using both herbal therapies and conventional antiretroviral medications {Combined group}). General demographic information about the research subjects was collected. Both SSC-HIVrev and WHOQOL-HIV BREF questionnaires were administered to both groups.

HIV symptom management outcome was measured using the revised edition of the Sign and Symptom Check-List for persons with HIV disease (SSC-HIVrev) (Holzemer, Hudson, Kirksey, Hamilton & Bakken, 1999). For this instrument, subjects in each group were asked to rate each sign or symptom on a three-point Likert scale as mild,

moderate or severe. Subjects were asked to rate the symptoms as they experience them on a daily basis. If a subject is not experiencing a symptom on the day of the assessment, he/she was instructed to record "not applicable". With this, each item was scored as no symptom= 0; mild= 1; moderate= 2; and severe= 3. The items within a factor will be summed for a scale score. The symptoms cluster to be evaluated are; fatigue, fear, fever, GI upset, shortness of breath, numbness, headache, rectal itch, bruising/bleeding, body changes and gynecological-related problems for women. Appendices A and B shows the SSC-HIVrev instrument and demographic questionnaire respectively. The quality of life of HIV subjects was measured using the brief version of the World Health Organization Quality of Life for HIV (WHOQOL-HIV BREF) instrument. Appendix C shows WHOQOL-HIV BREF instrument/questionnaire. The questionnaires were administered to patients in Groups A and B.

Data Analysis and Management

Data generated from the pilot study was analyzed using IBM SPSS Statistics 22 software. The reliability of both the SSC-HIVrev and WHOQOOL-HIV BREF were analyzed using IBM SPSS Statistics 22 software. Both descriptive and inferential data analyses were used to analyze study results. Descriptive statistics was used to analyze the demographic data (age, gender, and ethnicity) while inferential statistics was used to draw conclusion from study data. Paired sample t-test was used to determine the difference between baseline CD4 counts and post treatment CD4 counts in both groups. Analysis of covariance (ANCOVA) was used to statistically control the effect of baseline CD4 counts in both groups and to examine the difference between both groups. Also, independent t-test was used to compare the differences between symptom cluster and

quality of life between both groups. With this, it was possible to determine if there was significant difference in treatment outcomes between the groups using conventional antiretroviral only (i.e. ARV group) and those using a combination of conventional antiretroviral medications and herbal therapy (i.e. the combined group).

The focus of data analyses was on the following areas:

(1) The difference between pre-treatment (baseline) CD4 counts and post treatment CD4 in group A (i.e. the difference in pre- and post-treatment CD4 counts in ARV group).

(2) The difference between pre-treatment (baseline) CD4 counts and post treatment CD4 in group B (i.e. the difference in pre- and post-treatment CD4 counts in combined group).

(3) The difference in CD4 counts of patient taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications (i.e. differences in CD4 counts between ARV group and combined group).

(4) The difference in the symptom experience of patient taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications (i.e. differences in symptom experience between ARV groups and combined group).

(5) The difference in the quality of life of patient taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications (i.e. differences in quality of life between groups A and B).

Methods Used to Analyze Research Questions

This study is carried out to answer five research questions. Appropriate statistical analytical methods were employed to investigate each of these research questions.

Research Question #1: How do CD4 counts differ after treatment with antiretroviral medications only?

To answer this question a pair sample t-test was ran on IBM SPSS Statistics 22 software.

Research Question #2: How do CD4 counts differ after treatment with a combined therapy of herbal treatment and conventional antiretroviral medications?

To answer this question pair sample t-test was ran on IBM SPSS Statistics 22 software.

Research Question #3: What is the difference in CD4 counts of patient taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications?

To answer this question ANCOVA was run on IBM SPSS Statistics 22 software.

Research Question #4: What is the difference in the symptom experience of patient taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications?

To answer this question independent t-test was ran on IBM SPSS Statistics 22 software.

Research Question #5: What is the difference in the quality of life of patient taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications?

To answer this question independent t-test was ran on IBM SPSS Statistics 22 software.

Trustworthiness of Research Data

To control the threats to external validity of the study result, randomization was used in sample selection. All patients that consented to participate in the study were screened for meeting the inclusion criteria. Among the patients that meet the inclusion criteria, sample selection was done randomly from matched subjects that are similar in terms of important extraneous variables. Randomization was done by flipping a coin for each of the patient that met the inclusion criteria and agreed to participate in the study. If the coin came up "heads" the subject was included in the actual study. If the coin came up "tails" the subject was excluded from the study. This method provided equal opportunity for all participants to be included in the actual study, irrespective of characteristics such as sex, age, tribe, or educational levels (Polit & Beck, 2012). Randomization is a useful method of assigning treatment or intervention to subjects or in sample selection, as it eliminates the sources of bias in the treatment (Burns & Grove, 2009; Polit & Beck, 2012; Vickers, 2006; Wendler, 2009). Randomization enhanced the external validity of the study finding, as it ensured a representative sample, thereby enhancing the generalizability of study findings to overall Nigerian population. Matching of samples for important extraneous variables helped eliminate confounding variables that could affect study results.

To further control for extraneous variables, the pretreatment (baseline) CD4 counts were statistically adjusted and controlled using analysis of covariance (ANCOVA). ANCOVA is an appropriate tool to evaluate whether population means of a

dependent variable are equal across treatment, while statistically controlling for the effects of other continuous variables that are not of primary interest or for nuisance variables. The use of ANCOVA helped to ensure that the differences in the baseline CD4 counts between the two groups were controlled for before comparison of the baseline CD4 counts with post treatment CD4.

To control the threat to internal validity, extensively used and well-tested instruments were used for data collection. The Sign and Symptom Check-List for persons with HIV disease (SSC-HIVrev) (Holzemer et al., 2001) was used to evaluate symptom improvement. This instrument is reported to have high internal validity. "The six symptom clusters, the number of items in the factor and the Cronbach's alpha reliability estimates for this instrument were Malaise/Weakness/Fatigue (six items with Cronbach alpha of 0.90), Confusion/Distress (four items with Cronbach alpha of 0.90), Fever/Chills (four items with Cronbach alpha of 0.85), Gastrointestinal Discomfort (four items with Cronbach alpha of 0.81), Shortness of Breath (three items with Cronbach alpha of 0.79) and Nausea/Vomiting (three items with Cronbach alpha of 0.77) (Holzemer et al., 2001, p. 1041).

The World Health Organization Quality of Life (WHOQOL) instrument was developed by a group of reputable experts from World Health Organization (WHO). Using confirmatory factor analysis, Skevington et al. (2004) analyzed the internal consistency, item-total correlations, discriminant validity and construct validity and found that the instrument has good to excellent psychometric properties of reliability and good validity. The WHOQOL-HIV instrument was found to be an excellent cross-

cultural valid assessment tool for quality of life within the physical, psychological, social and environmental domains (Skevington et al., 2004).

To further ensure the validity of this study, research assistant was given adequate training about his role in situating patients for questionnaire administration and maintaining confidentiality and patients' rights. A scientist was recruited to serve as research assistants for this study. Only physiological tests (CD4 counts) that were carried out in conformity with Osun State Specialist Hospital standard were used for this study. Although some of the subjects have information about their CD4 counts, only CD4 counts obtained from patients' medical records by the hospital staff were used in this study.

Eliminating Confounding Variables

To eliminate confounding variables meticulous approach was used in data selection and treatment. Research subjects must have been on treatment for similar length of time. It is necessary to only compare treatment outcome in subjects with similar length of therapy because outcome may have direct correlation with treatment duration. Also, subjects using similar ARV regime were used so as to be able to eliminate potential side effects that could impact on quality of life of subjects. Variables such as time of commencement of treatment, type of treatment and duration of treatment were similar for all the study subjects. Another potential source of confounder is the source of physiologic (CD4) data. CD4 counts were obtained from subjects' medical records. The differences noted in the baseline CD4 were statistically controlled and adjusted for using analysis of covariance (ANCOVA) before the between group comparative analysis was done.

Summary

The aim of this study was to seek better understanding of the impact of different therapies on the management of HIV. To gain deep insight into the efficacy of different HIV treatment modalities, two distinct, but interrelated measures were used to evaluate the treatment outcomes. The symptom outcome and perception of quality of life (QOL) were considered to be important in measuring the efficacy of different treatments. Since ARV is the gold standard for HIV treatment, it becomes imperative to compare the symptom outcomes and QOL in patients using combined treatment with patients using only conventional antiretroviral medications.

The use of matching was useful in eliminating confounding variables and randomization ensured sample representativeness by eliminating bias in sample selection. Random sampling ensured that all subjects that met inclusion criteria have the same chance of participating in the study irrespective of characteristics such as sex, educational level, age, tribe or sexual orientations. Extraneous variables in the pre-treatment data were also statistically controlled and adjusted for using analysis of covariance (ANCOVA). Baseline CD4 data varies across patients and between the two groups. To compare the baseline CD4 with the post-treatment CD4 counts, the baseline CD4 were controlled and adjusted for using ANCOVA. This method helped to control for extraneous variables in the baseline CD4 counts.

This study strictly adhered to ethical issues in research. The findings from this study have the potential to revolutionize HIV treatment protocol and could help in developing pragmatic treatment modalities for HIV, especially in resource-constrained

regions such as Sub-Saharan Africa while opening further opportunities for future studies.

CHAPTER 4

RESULTS

The aim of this study was to compare the efficacy of ARV therapy only with that of a combination therapy of ARV and herbal medications among Nigerian HIV patients. The study compared the symptom outcome, quality of life and CD4 of patients taking ARV with those patients taking a combination of ARV and herbal medications. This study was divided into two parts. The first part was a pilot study designed to test the reliability of the study instruments. The second part was the actual study. This study involved the following two groups;

- Group A- Comprised of subjects drawn from patients who are using only ARV for their treatment (ARV Group).
- Group B- Comprised of subjects drawn from patients who are using a combination of herbal therapies and conventional antiretroviral medications for their treatment (Combine Group).

Subjects were placed in a group on the basis of the treatment protocol (medications) used in the management of their HIV prior to contact for this study. No participants were required to change their treatment regimen.

The Statistical Package for Social Sciences Version 23 was used to determine the reliability of the study instruments, to calculate the frequencies, and determine differences between groups using independent t-tests. ANCOVA was used to control for confounding variables. In this chapter, the aspects of the study that will be discussed are the process of obtaining approval for the study, the pilot study, process of subject recruitment, recruitment for reliability pilot study, process of questionnaire

administration, and results of the pilot study. Also, the actual study, process of subject recruitment and recruitment for the actual study, process of questionnaire administration for the actual study, problems encountered during recruitment and results of the actual study are discussed in this chapter.

Presentation of Findings

The results obtained from the pilot and actual studies are methodologically presented for clarity. The results of the pilot study are presented under two sub-headings;

- The results of demographic data and
- Result of Cronbach's alpha

For the actual study, the results of demographic information were presented first, followed by the results of the five research questions. Demographic results from the actual study are presented under three sub-headings as follows:

- Results of demographic information of all the participants in the actual study (both groups A and B).
- Results of demographic information of participants in group A (ARV group).
- Results of demographic information of participants in group B (Combine group).

This chapter concludes with a summary of the findings of the pilot and actual study.

Process of Obtaining Approval for the Study

Because of the nature of this study, approval was obtained from three different authorities in Nigeria and in the United States. Ethical approval was obtained from Osun State Ministry of health, department of health planning, research and statistics. Application for approval was submitted to the state authority in December 2014 and approval was given on January 23, 2015. Because this study was carried out at the State

Specialist Hospital, Asubiaro, Osogbo, Osun-State, another institutional approval was obtained from the research and ethics committee of the Specialist Hospital. The State Specialist Hospital's approval was granted on September 18, 2015.

Following the approval of Osun State Ministry of Health and State Specialist Hospital authorities, Institutional Review Board approval was obtained from the University of Massachusetts, Amherst. It was after the necessary approvals were obtained that the pilot study was started.

Pilot Study

The main purpose of the pilot study was to determine the validity and reliabilities of the two instruments used in this study; the brief version of the World Health Organization Quality of Life Instrument for HIV (WHOQOL-HIV BREF) and the Sign and Symptom Check-List for persons with HIV disease (SSC-HIVrev). These are highly reliable and valid instruments. However, there is no record of their use in Nigeria or among Nigerian population. Determination of the study instruments' reliability is very important because the reliability of these instruments will have a strong impact on the results of the final study. The pilot study also helped this researcher to test the process of conducting the final study, to test study design and navigate possible logistic issues that could come up during the actual study.

To test the validity and reliability of these instruments, face validity and internal consistency of both instruments were evaluated. The face validity was done by the researcher. This researcher is an expert in Nigerian culture being originally from Nigeria and fluent in one of the Nigerian major languages. The researcher meticulously reviewed both questionnaires to determine if each item in both instruments is relevant to the

Nigerian population. Only the weight factor (in the SSC-HIVrev) was considered to be unimportant to the Nigerian population. Cronbach's alpha was used to determine the internal consistency of both questionnaires.

Process of Subject Recruitment

A Nigerian scientist served as the research assistant for this study. The research assistant helped situate the subjects for the researcher to be able to communicate with them via telephone or Skype. The research assistant gave the informed consent form to each patient that meet the inclusion criteria and volunteered to participate in this study. Over the phone or via Skype, the researcher provided information about the study to the subjects. Subjects were given the opportunity to ask questions and the researcher clarified subjects' questions and concerns. Subjects were expressly told over the phone or Skype that they can opt out of the study at any time during the study. A few days after the initial information session, another telephone conversation was had with the subjects for a second time to identify those who still wanted to participate in the study. Only those patients that met the inclusion criteria and signified their willingness by signing the consent form were included in the reliability pilot study.

Recruitment for Reliability Pilot Study

Before the commencement of the actual study, the two instruments used for data collection were subjected to reliability testing. Twenty subjects were randomly selected from patients that meet the inclusion criteria for this study. Inclusion criteria for this study were as follows:

1. Subjects must be between 18 years and 65 years.
2. Subject must have diagnosis of HIV
3. Subject must be a Nigerian citizen
4. Subject must reside in Nigeria
5. Subject must be able to read, write, speak and understand English.
6. Subjects must be receiving either antiretroviral medications only, or herbal medications only, or a combination of antiretroviral and herbal medications.

For the pilot study, twenty subjects were randomly selected among HIV patients receiving treatment at the State Specialist Hospital, Asubiaro, Osun-State, Nigeria. Randomization was done by flipping of coins. This method helped to eliminate extraneous variables that could affect study results. A coin was flipped for each subject who agreed to participate in the study. If the coin came up "heads", the subject was included in the pilot study. If the coin came up "tails", the subject was excluded from the study. This method provided equal opportunity for all participants to be included in the actual study, irrespective of characteristics such as sex, age, tribe, or educational levels (Polit & Beck, 2012).

The two questionnaires were administered to the 20 randomly selected subjects. The two questionnaires administered were;

(a). The brief version of the World Health Organization Quality of Life Instrument for HIV (WHOQOL-HIV BREF) and

(b). The Sign and Symptom Check-List for persons with HIV disease (SSC-HIVrev). The reliability pilot study was carried out between October 12, 2015 and October 28, 2015. Study recruitment was done via a flyer.

Process of Questionnaire Administration

Identification of subjects was done with the help of the Nigerian medical doctors and the research assistant. The Nigerian doctors and research assistant provided access to the patients but did not participate in the study, review the study nor were they involved in providing explanation to the subjects. Also, they did not play any role in obtaining informed consent from the subjects. Instead the Nigerian doctors were taking care of the patients and assisted in the distribution of recruitment flyer to potential subjects. The Nigerian doctors and scientist also helped situate the subjects for questionnaire administration. Informed consent and questionnaire administration were done via Skype and/or telephone after the researcher had provided information to study participants and clarified patients concerns and questions. After completion of the questionnaire, subjects were instructed to put their completed questionnaires in an envelope, sealed the envelope and asked to give the sealed envelope to the research assistant. All sealed envelope were sent to the researcher in the U.S. via courier service for reliability test.

Results of Pilot Study

The pilot study was conducted for many reasons. The primary reason was to determine the reliability of the two instruments used in this study. The other reasons were to use the pilot study to test-run the actual study, to become familiar with the Nigerian terrain, to identify possible problems that might occur during the actual study and to navigate a way toward resolving such problems. During the pilot study, questionnaires were administered to 30 participants. Out of this number, 6 (20%) did not complete the questionnaires in full and 4 (13%) participants changed their mind about participation and

dropped out of the study. Only fully completed questionnaires were included in the reliability analysis. Descriptive data obtained from the pilot study is presented in Table 5 below.

The results of the demographic data obtained from the Pilot study are presented in the Tables 5 to 13 below. 90% of the participants in the pilot study were women and 80% of the participants were below 49 years old. As shown in Table 8, less than 40% of the participants in the pilot study had secondary education, while 20% had university degrees and 10% had a post graduate education. 30% of the participants reported having more than elementary education but less than secondary education. 55% of the participants were married. The participants were predominantly from Yoruba tribe (85%). This is because the site of the study is located in Yoruba territory. The other Nigerian major tribes, Igbo and Hausa, constituted 5% each while the remaining 5% cut across other Nigerian tribes. Christians and Muslims constituted 55% and 45% of the participants respectively. 60% of the participants in the pilot study reported working full-time while 20% work on a part-time basis. 15% of the participants were unemployed. Most of the participants were low-income earners with 85% of the participants having an annual income of less than N100,000 Nigerian Naira (approximately US$312 yearly income).

Cronbach's Alpha

From the pilot data, the two instruments were analyzed for reliability. In the SSC-HIVrev questionnaire one factor (the body changes) was omitted because it was not considered to be an important factor among the population of study. Five items are embedded in the omitted factor (body changes). The omitted items under the body changes are;

- weight gain in stomach area
- concern over weight gain
- hump on back of neck/shoulders
- skinny arms and legs and
- prominent leg veins

With the omitted factor, the Cronbach's alpha for the SSC-HIVrev instrument was .915. Cronbach's alpha for each factor of the SSC-HIVrev instrument is presented in Table 14. The Cronbach's alpha for the World Health Organization Quality of Life instrument (WHOQOL-HIV BREF) was found to be .840. Overall, both the SSC-HIVrev and WHOQOL-HIV BREF were found to be highly reliable instruments among Nigerian population.

Actual Study

The purpose of the actual study was to compare the efficacy of HIV treatment in patients using only ARV with those patients who are using a combined therapy of ARV and herbal medications. In doing this, this study was designed to compare symptom experience and quality of life of patients taking ARV with those patients using combination of ARV and herbal remedies. Physiological data (specifically CD4 counts) obtained from these two groups was also compared.

Process of Subject Recruitment

A process similar to the approach used in the recruitment of subjects for the pilot study was used to recruit subjects for the final study. After the pilot study had been carried out and the reliability of the two study instruments determined, recruitment process for the actual study began. Recruitment poster and fliers were distributed to HIV patients receiving treatment at the State Specialist Hospital, Osun-State, Nigeria. Consent was properly obtained from all patients that signify interest in participating in the study. Detailed explanation of the study and potential risks associated with the study were disclosed to potential subjects. Subjects were given the opportunity to ask questions and the researcher clarified subjects' concerns. All potential subjects were told of the voluntary nature of the study and were told that they could discontinue their participation in the study at any time without any repercussion. Two days after the initial discussion with each subject, another conversation was held with each subject to ask if they were still willing to participate in the study. Only those patients that met the inclusion criteria and signified willingness by signing the consent form were enrolled in the actual study. The actual study commenced only after each subject had given consent for the study. During administration of the informed consent, the research assistant helped situate the subjects for the researcher to be able to communicate with them via telephone or Skype.

Recruitment for Actual Study

After data from the pilot study had been analyzed and the reliability of the two instruments had been determined, recruitment for the final study commenced. Fliers were distributed to patients receiving treatment at State Specialist Hospital, Osun-State,

Nigeria. 150 patients initially consented to participate in this study; however, 22 patients withdrew midway into the study. Questionnaires from 18 subjects were discarded because of incomplete filing. Inclusion criteria for this study were as follows:

1. Subjects must be between 18 years and 65 years old.
2. Subject must have diagnosis of HIV
3. Subject must be a Nigerian citizen
4. Subject must reside in Nigeria
5. Subject must be able to read, write, speak and understand English.
6. Subjects must be receiving either antiretroviral medications only, or herbal medications only or a combination of antiretroviral and herbal medications.

Participants were put in a group on the basis of the medications they were taking at the time of contact for this study. For each group, participants were selected randomly from matched subjects that have similarity in terms of important extraneous variables. Subjects with similar treatment protocol, same treatment duration, and same duration of HIV diagnosis were included in the study. Subjects in each group had started their treatment at about the same time and were taking the same antiretroviral medications. From the matched samples, participants in each group were selected by flipping a coin. For each group, a coin was flipped for each subject who agreed to participate in the study. If the coin came up "heads", the subject was included in the actual study. If the coin came up "tails", the subject was excluded from the study. This method provided equal opportunity for all participants to be included in the actual study, irrespective of characteristics such as sex, age, tribe, or educational levels (Polit & Beck, 2012).

Process of Questionnaire Administration

The process of administering study questionnaires was similar to the method used in the pilot study. Identification of subjects was done with the help of the Nigerian medical doctors and a research assistant. The Nigerian doctors and the research assistant provided access to the subjects but did not participate in the study (they did not review the study, were not involved in providing explanation to subjects, and did not play any role in obtaining informed consent from the subjects). These Nigerian doctors were currently taking care of HIV patients and assisted in the distribution of recruitment flyers to potential subjects. The research assistant helped situate the subjects for questionnaire administration. Informed consent and questionnaire administration were done via Skype and/or telephone after the researcher had provided information to study participants and clarified patients concerns and questions. The two questionnaires administered were;

- The brief version of the World Health Organization Quality of Life Instrument for HIV (WHOQOL-HIV BREF) and
- The Sign and Symptom Check-List for persons with HIV disease (SSC-HIVrev).

The actual study was carried out between November 16, 2015 and March 23, 2016. After completion of the questionnaire, each subject put their completed questionnaire in an envelope, sealed the envelope and gave the sealed envelope to the research assistant. All sealed envelopes were sent to the researcher in the U.S. via courier service for evaluation.

Problems Encountered During Recruitment

The process of recruiting subjects into this study was very tedious. Although the physicians that were primarily taking care of HIV patients in the Specialist Hospital,

Osun-State provided access to the patients, they played no role in explaining the study to the patients, nor did they help in the recruitment process. At the initial stage of the recruitment exercise, most of the patients contacted were very concerned about the breach of confidentiality. Many of the patients expressed fears that their video could secretly be taken and published in Nigeria and outside Nigeria. Discussions were held about the ethics of conducting research and the grave consequences of any breach of confidentiality or research ethics. It took concrete assurances from the principal investigator for the patients to feel comfortable. Strong assurance was given to subjects about maintaining confidentiality.

This study was initially designed to include three groups namely:

- Group A: Subjects drawn from patients using herbal therapies only.
- Group B: Subjects drawn from patients using conventional antiretroviral medications (ARV) only and
- Group C: Subjects drawn from patients using a combination of herbal therapies and conventional antiretroviral medications.

However, in the course of this study, the herbal-only group fell out because the study could not recruit enough subjects from this group. At a point it became apparent that patients using herbal therapy only were basically trying to go under the radar and avoid their status from becoming known to anybody. Several attempts were made to enlist patients in this group. The identified patients in the herbal group only stalled this study for several months, as they kept requesting for time to think about their participation in the study. Contacts were made to this group through their care providers.

During the course of questionnaire administration it was discovered that the combined group was covertly using herbal therapy in conjunction with the conventional ARV. In fact the patients using combined therapy were making concerted effort to avoid disclosure of their dual therapies to their care providers. These patients disclosed the use of dual therapy under strict assurance of confidentiality. However, the patients were encouraged to disclose all their co-concomitant medications to their care providers so that they could be better cared for. The reluctance of the patients to disclose dual therapy to physicians was attributed to the patients' conviction that the physicians would stop them from continued use of the herbal medications. All the patients in this group believe that the improvement noted in their symptoms and quality of life was a result of the herbal remedies they were taking.

Results of Actual Study

The demographic information for all the participants in the actual study is presented below, followed by the demographic data for the ARV group and the combined group respectively. The results of the five research questions are presented after the demographic data. The results of the demographic data obtained from the actual study are presented in Tables 15-27.

Results of Demographic Information for all Participants in the Actual Study

The actual study was conducted to determine the effect of both treatment modalities on HIV symptoms and on the quality of life of HIV patients and to determine if there is any difference in treatment outcomes among the two groups. During the actual study, questionnaires were administered to 150 participants. Out of this number, 25 (17%) did not complete the questionnaires in full and 15 (10%) participants changed their

minds about their participation and dropped out of the study. Only 110 participants that fully completed the questionnaires were considered in the final analysis. To obtain descriptive data for the actual study the frequency, mean and standard deviation were calculated (Table 15).

The results of the demographic data obtained from the actual study are presented in Tables 15 to 23. 76.4% of the participants in the actual study were women and 23.6% were male. 63.6% of the participants were 45 years old or younger. As shown in Table 18, 53.6% of the participants in the actual study had secondary education, 18.2% had university degrees, and 1.8% had a post graduate education. 72.7% of the participants were married while 4.5% were single. The participants were predominantly from Yoruba tribe (71.8%). This is because the site of the study is located in Yoruba territory. The other Nigerian two major tribes, namely Igbo and Hausa, constituted 10% and 10.9% respectively while the remaining 7.2% cut across other Nigerian tribes. Christians and Muslims constituted 43.6% and 56.4% of the participants respectively. 86.4% of the participants in the actual study reported working full time, while 3.6% reported working on a part-time basis. 7.3% of the participants were unemployed. Most of the participants were low income earners, with 84.6% of the participants having annual income of less than N200,000 Nigerian Naira (approximately US$624 yearly income).

Results of Demographic Data for Participants in ARV Group and Combined Group

The results of the demographic data obtained from the ARV group are presented in Table 24 and Tables 25-27. 80 percent of the participants in the ARV group were women and 20 percent were male. 61.8% of the participants were 45 years old or younger. As shown in Table 26, 61.8% of the participants in the ARV group had a

secondary education while 14.5% had university degrees. 78.2% of the participants were married while 1.8% of the participants were single. The participants were predominantly from Yoruba tribe (70.9%). This is because the site of the study is located in the western part of the country (Yoruba territory). The other two Nigerian major tribes, namely Igbo and Hausa, constituted 10.9% each while the remaining 7.2% cut across other Nigerian tribes. Christians and Muslims constituted 45.5% and 54.5% of the participants respectively in the ARV group. 85.5% of the participants in the ARV group reported working full-time, while 3.6% reported working on a part-time basis. 9.1% of the participants were unemployed. Most of the participants were low income earners with 83.7% of the participants reporting an annual income less than N200,000 Nigerian Naira (approximately US$624 yearly income). The results of the demographic data obtained from the ARV group are presented in Table 24 and tables 25-27.

The results of the demographic data obtained from the combine group are presented in Table 24 and tables 25-27. 72.7% of the participants in the combined group were women and 27.3% were male. 65.5% of the participants were 45 years old or younger. As shown in Table 26 below, 45.5% of the participants in the combine group had a secondary education while 21.8% had university degrees and 3.6 percent had postgraduate degrees. 67.3% of the participants were married while 7.3% of the participants were single. The participants were predominantly from Yoruba tribe (72.7%). This is because the site of the study is located in the western part of the country (Yoruba territory). The other two Nigerian major tribes, namely Igbo and Hausa, constituted 9.1% and 10.9% respectively. The remaining 7.3% cut across other Nigerian tribes. Christians and Muslims constituted 41.8% and 58.2% of the participants

respectively in the combine group. 87.3% of the participants in the combine group reported working full time, while 3.6% reported working on a part-time basis. 5.5% of the participants were unemployed. Most of the participants were low-income earners with 85.5% of the participants reporting an annual income of less than N200,000 Nigerian Naira (approximately US$624 yearly income). The results of the demographic data obtained from the combine group are presented in Table 24 and tables 25-27.

Results for Research Question 1

Research Question #1: How do CD4 counts differ after treatment with antiretroviral medications only?

To evaluate the difference between pre-treatment (baseline) and post-treatment CD4 counts among patient taking only ARV (ARV group), a pair sample t-test was run on IBM SPSS Statistics 22 software. Results show that there is a significant difference between the pre- and post-treatment CD4 counts among subjects taking ARV medications only with t-value=-6.713, sig. (2-tailed)=.000 and df=39 as shown in Table 29. The paired sample statistics for ARV group is shown in Table 28.

Results for Research Question 2

Research Question #2: How do CD4 counts differ after treatment with combined therapy of herbal treatment and conventional antiretroviral medications?

To evaluate the difference between pre-treatment (baseline) and post-treatment CD4 counts among patient taking a combination of ARV medications and herbal medications (combined group), a pair sample t-test was run on IBM SPSS Statistics 22 software. Results show that there is a significant difference between the pre- and post-

treatment CD4 counts among subjects taking a combination of ARV and herbal medications (t-value=-6.080, sig. (2-tailed)=.000 and df=39 as shown in Table 31. The paired sample statistics for combined group is shown in Table 30.

Results for Research Question 3

Research Question #3: What is the difference in CD4 counts of patient taking ARV only and those taking combination of herbal therapies and conventional antiretroviral medications?

To determine if there is a difference in pre- and post-treatment CD4 counts between patient taking ARV only (ARV group) and patients taking combination of ARV medications and herbal medications (combined group), independent t-test was run on IBM SPSS Statistics 22 software. Results show that there is a significant difference in baseline CD4 counts between the two groups (p-value=.002). After statistically controlling the baseline CD4 counts with analysis of covariance (ANCOVA), results show that there is no significant difference between the two groups post-treatment CD4 (p-value=.832) as shown in Table 32.

Results for Research Question 4

Research Question #4: What is the difference in the symptom experience of patient taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications?

To determine if there is a difference in symptom experience between patients taking ARV only (ARV group) and patients taking a combination of ARV medications and herbal medications (combined group), an independent t-test was run on IBM SPSS

Statistics 22 software. Results show that there is no significant difference between the two groups in many of the factors; fatigue factor (p=.229), fear factor (p=.471), GI upset factor (p=.891), SOB factor (p=.651), numbness factor (p=.597), headache factor (p=.314), rectal itch factor (p=.538), bruising factor (p=.497) as shown in Table 33. However, a significant difference was noted in fever (p=.003) and sore throat (p=.013) factors between the ARV group and combined groups. The fever factor mean scores for ARV group and combined group were .3045 and .6045 respectively. This signifies that the patients in ARV group recorded a significantly better outcome in fever factor compared to patients in the combined group. The intensity of fever episodes in the ARV group was significantly lower than the fever intensity among patients in combined group.

Similarly, a significant difference was noted in sore throat factor (p=.013) among the ARV group and combined groups. The sore throat factor mean scores for ARV group and combined groups are .0273 and .1636 respectively. This signifies that the patients in ARV group recorded significantly better outcome in sore throat factor compared to patients in combined group. The intensity of sore throat in ARV group is significantly lower than the sore throat intensity among patients in the combined group.

Results for Research Question 5

Research Question #5: What is the difference in the quality of life of patient taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications?

To determine if there is a difference in the quality of life between patient taking ARV only (ARV group) and patients taking a combination of ARV and herbal medications (combined group), an independent t-test was run on IBM SPSS Statistics 22

software. Findings show that there is no significant difference in many domains such as physical domain (p=.183), psychological domain (p=.486), independence domain (p=.689), environment domain (p=.119), personal belief domain (p=.703), QOL (p=.670). Similarly, results show that there is no significant difference in overall quality of life between the two groups (p=.211) as shown in Table 34. However, a significant difference was noted in two domains-social relationship (p=.028) and health satisfy domains (p=.049) between the ARV group and combined groups. The health satisfaction mean scores for ARV group and combined groups were 4.1273 and 3.6545 respectively. This signifies that patients in ARV group reported significantly better satisfaction in their health compared to the combined group. A similar trend was noted in social relationship domain. The social relationship domain mean scores for ARV group and combined group are 16.2364 and 14.6364 respectively. This signifies that patients using ARV alone recorded significantly higher improvement in their social relationship as compared with patients using combination of ARV and herbal medications.

Table 5: Descriptive Statistics for Pilot Study Participants (n=20)

	Number	Minimum	Maximum	Mean	Standard Deviation
Gender	20	1	2	1.90	.308
Age	20	30	63	43.40	9.773
Education	20	2	5	3.10	.968
Marital Status	20	1	6	3.15	1.694
Ethnicity	20	1.00	6.00	1.4000	1.18766
Religion	20	1.00	2.00	1.4500	.51042
Employment	20	.00	3.00	1.1500	.74516
Income	20	1.00	13.00	10.900	4.01182

Table 6: Gender of Pilot Study Participants (n=20)

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	2	10.0	10.0	10.0
Female	18	90.0	90.0	100.0
Total	20	100.0	100.0	

Table 7: Age of Pilot Study Participants (n=20)

Age	Frequency	Percent	Valid Percent	Cumulative Percent
30	1	5.0	5.0	5.0
32	3	15.0	15.0	20.0
36	1	5.0	5.0	25.0
37	1	5.0	5.0	30.0
40	2	10.0	10.0	40.0
41	2	10.0	10.0	50.0
42	2	10.0	10.0	60.0
44	1	5.0	5.0	65.0
45	1	5.0	5.0	70.0
48	1	5.0	5.0	75.0
49	1	5.0	5.0	80.0
54	1	5.0	5.0	85.0
58	1	5.0	5.0	90.0
62	1	5.0	5.0	95.0
63	1	5.0	5.0	100.0
Total	20	100.0	100.0	

Table 8: Level of Education of Pilot Study Participants (n=20)

	Frequency	Percent	Valid Percent	Cumulative Percent
Primary	6	30.0	30.0	30.0
Secondary	8	40.0	40.0	70.0
University	4	20.0	20.0	90.0
Postgraduate	2	10.0	10.0	100.0
Total	20	100.0	100.0	

Table 9: Marital Status of Pilot Study Participants (n=20)

	Frequency	Percent	Valid Percent	Cumulative Percent
Single	1	5.0	5.0	5.0
Married	11	55.0	55.0	60.0
Living as Married	1	5.0	5.0	65.0
Separated	1	5.0	5.0	70.0
Divorced	3	15.0	15.0	85.0
Widowed	3	15.0	15.0	100.0
Total	20	100.0	100.0	

Table 10: Ethnicity of Pilot Study Participants (n=20)

	Frequency	Percent	Valid Percent	Cumulative Percent
Yoruba	17	85.0	85.0	85.0
Hausa	1	5.0	5.0	90.0
Igbo	1	5.0	5.0	95.0
Other	1	5.0	5.0	100.0
Total	20	100.0	100.0	

Table 11: Religion of Pilot Study Participants (n=20)

	Frequency	Percent	Valid Percent	Cumulative Percent
Christian	11	55.0	55.0	55.0
Muslim	9	45.0	45.0	100.0
Total	20	100.0	100.0	

Table 12: Employment Status of Pilot Study Participants (n=20)

	Frequency	Percent	Valid Percent	Cumulative Percent
Not Working	3	15.0	15.0	15.0
Full time Employment	12	60.0	60.0	75.0
Part Time Employment	4	20.0	20.0	95.0
Retired	1	5.0	5.0	100.0
Total	20	100.0	100.0	

Table 13: Income of Pilot Study Participants (n=20)

	Frequency	Percent	Valid Percent	Cumulative Percent
>N1.2M	1	5.0	5.0	5.0
N1m to less than N1.2m	2	10.0	10.0	15.0
N37K to less than N100K	8	40.0	40.0	55.0
0 to less than N37K	9	45.0	45.0	100.0
Total	20	100.0	100.0	

Table 14: Cronbach Alpha for Each Factor in SSC-HIVrev

FACTORS	CRONBACH'S ALPHA
Fatigue Factor	.83
Fear Factor	.716
Fever Factor	.698
GI Factor	.536
Shortness of breath Factor	0
Sore-throat Factor	.647
Numbness Factor	.844
Headache Factor	.570
Rectal Itch Factor	.977
Bruising Factor	-.202

Table 15: Descriptive Statistics for Actual Study Participants (n=110)

	N	Minimum	Maximum	Mean	Std. Deviation
Gender	110	1.00	2.00	1.7636	.42679
Age	110	22.0	65.0	42.9636	10.40371
Education	110	2.00	5.00	2.9545	.72170
Marital Status	110	1.00	6.00	2.6636	1.44804
Ethnicity	110	1.00	6.00	1.6273	1.25515
Religion	110	1.00	2.00	1.5636	.49820
Employment	110	.00	3.00	1.0182	.46888
Income	110	1.00	13.00	11.4545	2.59370

Table 16: Gender of Actual Study Participants (n=110)

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	26	23.6	23.6	23.6
Female	84	76.4	76.4	100.0
Total	110	100.0	100.0	

Table 17: Age of Actual Study Participants (n=110)

Age (Year)	Frequency	Percent	Valid Percent	Cumulative Percent
20-25	1	.9	.9	.9
26-30	12	10.9	10.9	11.8
31-35	23	20.9	20.9	32.7
36-40	13	11.7	11.7	44.4
41-45	21	19.1	19.1	63.5
46-50	13	11.7	11.7	75.2
51-55	12	10.8	10.8	86.0
56-60	10	9.0	9.0	95.0
61-65	5	4.5	4.5	100.0
Total	110	100	100	

Table 18: Education of Actual Study Participants (n=110)

	Frequency	Percent	Valid Percent	Cumulative Percent
Primary Education	26	26.4	26.4	26.4
Secondary Education	59	53.6	53.6	80.0
University Education	20	18.2	18.2	98.2
Postgraduate Education	2	1.8	1.8	100.0
Total	100	100.0	100.0	

Table 19: Marital Status of Actual Study Participants (n=110)

	Frequency	Percent	Valid Percent	Cumulative Percent
Single	5	4.5	4.5	4.5
Married	80	72.7	72.7	77.3
Living as Married	2	1.8	1.8	79.1
Separated	7	6.4	6.4	85.5
Divorced	2	1.8	1.8	87.3
Widowed	14	12.7	12.7	100.0
Total	100	100.0	100.0	

Table 20: Ethnicity of Actual Study Participants (n=110)

	Frequency	Percent	Valid Percent	Cumulative Percent
Yoruba	79	71.8	71.8	71.8
Hausa	12	10.9	10.9	82.7
Igbo	11	10.0	10.0	92.7
TIV/Idoma	2	1.8	1.8	94.5
Ijaw	1	.9	.9	95.5
Other	5	4.5	4.5	100.0
Total	100	100.0	100.0	

Table 21: Religion of Actual Study Participants (n=110)

	Frequency	Percent	Valid Percent	Cumulative Percent
Christian	48	43.6	43.6	43.6
Muslim	62	56.4	56.4	100.0
Total	110	100.0	100.0	

Table 22: Employment of Actual Study Participants (n=110)

	Frequency	Percent	Valid Percent	Cumulative Percent
Not Working	8	7.3	7.3	7.3
Full time Employment	95	86.4	86.4	93.6
Part Time Employment	4	3.6	3.6	97.3
Retired	3	2.7	2.7	100.0
Total	110	100.0	100.0	

Table 23: Income of Actual Study Participants (n=110)

	Frequency	Percent	Valid Percent	Cumulative Percent
>N1.2m	2	1.8	1.8	1.8
N1m to less than N1.2m	3	2.7	2.7	4.5
N900K to less than N1m	1	.9	.9	5.5
N400K to less than N500K	3	2.7	2.7	8.2
N300K to less than N400K	2	1.8	1.8	10.0
N200K to less than N300K	6	5.5	5.5	15.5

N100K to less than N200K	11	10.0	10.0	25.5
N37K to less than N100K	40	36.4	36.4	61.8
0 to less than N37K	42	38.2	38.2	100.0
Total	110	100.0	100.0	

Table 24: Age of Participants in ARV and Combined Groups in Actual Study

Age (Year)	ARV				COMBINED			
	Frequency	Percent	Valid Percent	Cumulative Percent	Frequency	Percent	Valid Percent	Cumulative Percent
20-25	1	1.8	1.8	1.8	0	0	0	0
26-30	5	9.1	9.1	10.9	7	12.7	12.7	12.7
31-35	10	18.2	18.2	29.1	13	23.7	23.7	36.4
36-40	7	12.7	12.7	41.8	6	10.8	10.8	47.2
41-45	11	20	20	61.8	10	18.2	18.2	65.4
46-50	8	14.5	14.5	76.3	5	9.1	9.1	74.5
51-55	8	14.5	14.5	90.8	4	7.2	7.2	81.7
56-60	3	5.5	5.5	96.3	7	12.7	12.7	94.4
61-65	2	3.6	3.6	100.0	3	5.4	5.4	100.0
Total	55	100.0	100.0		55	100.0	100.0	

Table 25: Descriptive Statistics for Participants in ARV and Combined Groups

	ARV					Combined				
	N	Minimum	Maximum	Mean	Std. Deviation	N	Minimum	Maximum	Mean	Std. Deviation
Gender	55	1.00	2.00	1.8000	.40369	55	1.00	2.00	1.7273	.44947
Age	55	22.00	65.00	43.0364	10.09210	55	27.00	65.00	42.8909	10.79896
Education	55	2.0000	4.0000	2.909091	.6168236	55	2.0000	5.0000	3.00000	.8164966
Marital Status	55	1.00	6.00	2.6000	1.38245	55	1.00	6.00	2.7273	1.52090
Ethnicity	55	1.00	6.00	1.6364	1.23773	55	1.00	6.00	1.6182	1.28367
Religion	55	1.00	2.00	1.5455	.50252	55	1.00	2.00	1.5818	.49781
Employment	55	.00	3.00	.9818	.45096	55	.00	3.00	1.0545	.48756
Income	55	1.00	13.00	11.1636	3.09578	55	1.00	13.00	11.7455	1.95522

Table 26: Demographics of Participants in ARV and Combined Groups

		ARV				Combined			
		Frequency	Percent	Valid Percent	Cumulative Percent	Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	11	20.0	20.0	20.0	15	27.3	27.3	27.3
	Female	44	80.0	80.0	100.0	40	72.7	72.7	100.0
	total	55	100.0	100.0		55	100.0	100.0	
Education	Primary	13	23.64	23.64	23.64	16	29.1	29.1	29.1
	Secondary	34	61.81	61.81	85.45	25	45.5	45.5	74.5
	Univer	8	14.5	14.5	100	12	21.8	21.8	96.4

	sity		5	5	.0				
	Postgraduate	0	0	0	100.0	2	3.6	3.6	100.0
	Total	55	100.0	100.0		55	100.0	100.0	
Marital status	Single	1	1.8	1.8	1.8	4	7.3	7.3	7.3
	Married	43	78.2	78.2	80.0	37	67.3	67.3	74.5
	Living as married	2	3.6	3.6	83.6	5	9.1	9.1	83.6
	Separated	2	3.6	3.6	87.3	2	3.6	3.6	87.3
	Widowed	7	12.7	12.7	100.0	7	12.7	12.7	100.0
	Total	55	100.0	100.0		55	100.0	100.0	
Ethnicity	Yoruba	39	70.9	70.9	70.9	40	72.7	72.7	72.7
	Hausa	6	10.9	10.9	81.8	6	10.9	10.9	83.6
	Igbo	6	10.9	10.9	92.7	5	9.1	9.1	92.7
	TIV/Idoma	1	1.8	1.8	94.5	1	1.8	1.8	94.5
	Ijaw	1	1.8	1.8	96.4	0	0	0	94.5
	Others	2	3.6	3.6	100.0	3	5.5	5.5	100.0
	Total	55	100.0	100.0		55	100.0	100.0	
Religion	Christian	25	45.5	45.5	45.5	23	41.8	41.8	41.8
	Muslim	30	54.5	54.5	100.0	32	58.2	58.2	100.0
	Total	55	100.0	100.0		55	100	100.0	

Employment	Unemployed	5	9.1	9.1	9.1	3	5.5	5.5	5.5
	Full-Time	47	85.5	85.5	94.5	48	87.3	87.3	92.7
	Part-Time	2	3.6	3.6	98.2	2	3.6	3.6	96.4
	Retired	1	1.8	1.8	100.0	2	3.6	3.6	100.0
	Total	55	100.0	100.0		55	100.0	100.0	

Table 27: Income of Participants in ARV and Combined Groups

	ARV				Combined			
	Frequency	Percent	Valid Percent	Cumulative Percent	Frequency	Percent	Valid Percent	Cumulative Percent
>N1,200,000	1	1.8	1.8	1.8	1	1.8	1.8	1.8
N1,000,000 to less than N1,200,000	3	5.5	5.5	7.3	0	0	0	1.8
N900,000 to less than N1,000,000	1	1.8	1.8	9.1	0	0	0	1.8
N400,000 to less than N500,000	1	1.8	1.8	10.9	2	3.6	3.6	5.5
N300,000 to less than N400,000	0	0	0	10.9	2	3.6	3.6	9.1
N200,000 to less than N300,000	3	5.5	5.5	16.4	3	5.5	5.5	14.5
N100,000 to less than N200,000	6	10.9	10.9	27.3	5	9.1	9.1	23.6
N37,000 to less than N100,000	20	36.4	36.4	63.6	20	36.4	36.4	60.0
0 to less than N37,000	20	36.4	36.4	100	22	40.0	40.0	100.0
Total	55	100	100		55	100.0	100.0	

Table 28: Paired Sample Statistics for ARV Group (n=40)

	Mean	N	Std. Deviation
Pair 1 BaselineCD4	298.6750	40	139.06987
PostTXCD4	567.4500	40	272.07276

Table 29: Paired Sample t-test for ARV Group (n=40)

	Paired Differences				
	Mean	Std. Deviation	t	df	Sig (2-tailed)
Pair 1 BaselineCD4-PostTXCD4	268.77500	253.22661	-6.713	39	.000

Table 30: Paired Sample Statistics for Combined Group (n=39)

	Mean	N	Std. Deviation
Pair 1 BaselineCD4	378.3333	39	177.97018
PostTXCD4	598.5641	39	210.81568

Table 31: Paired Sample t-test for Combined Group (n=39)

	Paired Differences				
	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Pair 1 BaselineCD4 - PostTXCD4	220.23077	226.19803	-6.080	38	.000

Table 32: ANCOVA table for CD4 Count

	Group 1 ARV(n=)		Group 2 COMBINED GROUP(n=)			
	Mean	SD	Mean	SD	*F*	*p*
Baseline CD4					10.533	.002
Post CD4	567.4500	272.07276	598.5641	210.81568	.045	.832

Table 33: Independent t-test for SSC-HIVrev

Variable	Group 1 ARV (n=55)		Group 2 COMBINED (n=55)			
	Mean	(SD)	Mean	(SD)	t	p
Fatigue Factor	.5273	.68663	.7318	1.04622	-1.212	.229
Fear Factor	.5773	.5773	.4909	.52916	.723	.471
Fever Factor	.3045	.40737	.6045	.59840	-3.073	.003
GI Upset Factor	.2455	.35840	.2545	.33771	-.137	.891
SOB Factor	.0545	.24649	.0364	.16571	.454	.651
Sore Throat Factor	.0273	.09220	.1636	.38556	-2.551	.013
Numbness Factor	.6091	.82332	.6909	.79635	-.530	.597
Headache Factor	.3909	.43238	.4727	.41576	-1.012	.314
Rectal Itch Factor	.1333	.44721	.1879	.47904	-.617	.538
Bruising Factor	.0636	.15380	.0864	.19376	-.681	.497

Table 34: Independent t-test for WHOQOL-HIV BREF

Variable (Domain)	Group 1 ARV (n=55)		Group 2 COMBINED (n=55)			
	Mean	(SD)	Mean	(SD)	t	p
Physical Domain	16.2545	2.56918	15.5818	2.69218	1.341	.183
Psychological Domain	16.9455	2.45416	16.3491	5.82564	.700	.486
Independence Domain	14.3091	2.11584	14.8182	9.16938	-.401	.689
Social relationship Domain	16.2364	3.27145	14.6364	4.18712	2.233	.028
Environment Domain	16.0182	2.40170	15.2182	2.91033	1.572	.119
Personal belief Domain	13.3638	3.77302	13.0909	3.70322	.383	.703
QOL	4.4364	.71398	4.3818	.62334	.427	.670
Health satisfy	4.1273	1.10645	3.6545	1.36379	.1.996	.049
Sum WHOQOL	93.1273	10.31684	89.6945	17.38157	1.259	.211

CHAPTER 5

DISCUSSION

The purpose of this study was to investigate HIV treatment outcomes among patients using only antiretroviral medications (ARV) and among those using a combined therapy of ARV and herbal medications. This study also compares treatment outcomes in these two groups. Two instruments, namely the SSC-HIVrev and the WHOQOL-HIV BREF, were used to evaluate and compare treatment outcomes in these two groups. Novel findings were obtained from this study. Many of the findings of this study are consistent with findings from previous studies. In this section, findings of this study will be discussed, as well as its strengths, limitations, and implications. This chapter concludes with recommendations and a summary statement.

Discussions of the findings focus on the validity and reliability of the study instruments, discussion of demographic information, discussion of the findings of each research question, and discussion of treatment outcomes in the patients taking only ARV and patients taking a combination of ARV and herbal remedies.

Reliability of Instruments

To ascertain the suitability of the study instruments, a reliability test was done with a pilot sample. The two study instruments were administered to twenty subjects. The subjects were selected randomly among HIV patients receiving treatment at the State Specialist Hospital, Osun-State, Nigeria.

WHOQOL-HIV BREF

The Cronbach's alpha for the WHOQOL-HIV BREF among Nigerian patients was found to be .84. This indicated that this instrument has good reliability among

Nigerian patients. This finding is consistent with findings from previous studies among different populations (Akinboro et al., 2014; Razavi et al., 2012; Reychler, Caty, Vincent, Billo, & Yombi, 2013; Saddki et al., 2009). Akinboro et al. (2014) reported Cronbach's alpha ranging between .81 and .85. A similar trend was reported by Saddki et al. (2009) with Malay's version of WHOQOL-HIV having Cronbach's alpha values ranging from 0.60 to 0.87 across all domains. Also, in consistency with this study, the French version of WHOQOL-HIV was reported to have high reliability with Cronbach's alpha of 0.944 (for spiritual/religion/personal beliefs domain), 0.94 (level of independence domain), 0.937 (psychological domain), 0.938 (environmental domain), 0.94 (social relationships domain), and 0.942 (physical domain) (Reychler, Caty, Vincent, Billo, & Yombi, 2013). Razavi et al. (2012) reported that the reliability alpha among Iranian populations ranges between 0.61 and 0.8. Based on the reliability findings for this instrument in the pilot study, it is evident that the WHOQOL-HIV BREF is a suitable and highly reliable instrument for this study.

SSC-HIVrev

Similarly, a very high reliability was obtained for the SSC-HIVrev among Nigerian patients. This instrument is composed of six factors. However, a factor (i.e. the body changes) was omitted in the SSC-HIVrev questionnaire because it was not considered to be an important factor among the population of study. With the omitted factor, the Cronbach's Alpha for the SSC-HIVrev instrument was .915. A factor (i.e. shortness of breath factor) was found to be negative. This indicates that there was no variation among the participants' responses to the question. The negative and low alpha scores seen in some factors may indicate mixed understanding of the way the participants

understood the item and items' response options. The low alpha scores mean that items are not highly correlated. There may be a need to refine the wording of this questionnaire to be consistent with Nigerian cultural interpretation.

Fundamental assumptions of this instrument might need to be refined as well. Records of reliability of this instrument among Nigerian population were not found in the literature. However, the high reliability found in this study is consistent with findings from Holzemer et al. (2001). The reliability Cronbach's alpha obtained by Holzemer et al. (2001) ranges between 0.76 to 0.94. "The six symptom clusters, the number of items in the factor and the Cronbach's alpha reliability estimates for this instrument were Malaise/Weakness/Fatigue (six items with Cronbach alpha of 0.90), Confusion/Distress (four items with Cronbach alpha of 0.90), Fever/Chills (four items with Cronbach alpha of 0.85), Gastrointestinal Discomfort (four items with Cronbach alpha of 0.81), Shortness of Breath (three items with Cronbach alpha of 0.79) and Nausea/Vomiting (three items with Cronbach alpha of 0.77" (Holzemer et al., 2001, p. 1041). This shows strong reliability and validity for this instrument.

Face validity of both instruments was also evaluated by the researcher. Face validity was done to see if the items are culturally relevant to Nigerian population. Being originally from Nigeria and fluent in one of the dominant Nigerian languages, the researcher is an expert in Nigerian culture. Evaluating both the face validity and internal consistency of both questionnaires showed that the instruments were highly valid and culturally relevant to Nigerian population. Only the weight factor in the SSC-HIVrev was considered to be unimportant to the Nigerian population.

Trends from Demographic Data

Findings from this study show that there is a disparity in the population of male patients seeking and receiving treatment for HIV. Over three quarter (76.4%) of participants in this study were females with only 23.6% male participants. Even in both the ARV group (80% females and 20% males) and the combined group (72.7% females and 27.3% males) more females were receiving treatments. The high population of female participants is a reflection of the large population of female patients receiving treatment in the clinic. Significantly lower numbers of male patients were receiving treatment at the clinic. The disproportionally large female population noted in this study is consistent with findings from Bello and Bello (2013). In Bello and Bello's (2013) evaluation of the quality of life of HIV/AIDS patients in a secondary health care facility in the Nigerian city of Ilorin. 70% of the participants were female. Similarly, participants in Onyebuchi-Iwudibia & Brown (2014) and Ahmed et al. (2013) were 72.4% and 62.4% females respectively. Ahmed et al. (2013) reported the HIV testing rate among females (62.4%) to be significantly higher than that of male (37.6%) at facilities in Nigeria. Takarinda et al. (2016) also found that females in Zimbabwe tend to make themselves available for HIV testing. In determining the HIV testing rates among Zimbabwean males and females, Takarinda et al. (2016) reported testing rates of 61% among Zimbabwean females as compared to 39% males. The implication of this is that there is a high population of HIV-positive men that are not diagnosed. This translates into fewer males eventually entering into treatment, as noted in Egbe, Omoregie & Alex-Ighodalo (2015).

The lower testing rates noted in males could have large negative public health consequences. It is likely that the male sense of invincibility is partially responsible for

the low testing and low treatment rates. Studies have shown that there is a high population of male HIV patients in Nigeria. According to the National HIV/AIDS and Reproductive Health Survey (NARHS) conducted in 2012, there is a national HIV prevalence of 3.4% (NACA, 2014). 58% of HIV-positive people in Nigeria are women, and 42% of HIV patients are men (NACA, 2012). This translates into over 1.4 million HIV positive males. This is an astonishingly high HIV population among Nigerian men. In the light of Smith's (2007) assertion that sexual and economic disparities and contradictory moralities could contribute to an HIV epidemic in Nigeria, the Nigerian male population need to be encouraged to seek testing and treatment for HIV. If most of these male patients are not entering into treatment, this may portend grave public health issues particularly in society where polygamy is a generally acceptable and widely practiced cultural norm (Lawan, Envuladu & Abubakar, 2016). This becomes all the more serious, considering prevailing gender inequality and the inability of females to negotiate sexual relationships in many Nigerian cultures. It is necessary for coordinated efforts to pull male HIV patients into treatment in conventional HIV clinics.

This study revealed that a majority of study participants (80%) had secondary education or lower. Only 1.8% were found to have a postgraduate education and 18.2% were found to have a bachelor's degree. This shows that highly educated Nigerians are not participating in treatment. A consistent finding by Suleiman & Momo (2015) found that 65.3% of HIV patients receiving antiretroviral therapy in two hospitals in Bayelsa state, Nigeria had secondary (high school) education or below. Similarly, Lubinga, Kintu, Atuhaire, & Asiimwe (2012) also found that 96.1% of patients in a western Uganda study had a secondary education or below. According to the United Nations Human

Development Report, Nigeria has a 62.6% poverty rate in 2016 (http://www.ng.undp.org/content/nigeria/en/home/library/poverty/national-human-development-report-2016.html). With the poverty index of Nigeria at all time high, highly educated HIV positive individuals have the financial advantage to attract individuals with less education into unprotected sex. This could lead to a higher incidence of HIV among Nigerians. Strategic approaches need to be adopted to encourage highly educated Nigerian professionals to seek treatment from orthodox HIV clinics and/or hospitals. It appears that a higher number of poor and economically disadvantaged people tend to seek treatment for HIV.

The majority of patients (72.7%) who were receiving treatment in both groups were married, with an additional 1.8% living as married. 78.2% of subjects in the ARV group and 67.3% of subjects in the combined group were in a legal relationship. However, a majority of the married participants disclosed to the researcher that their spouses were not aware of their HIV status. Reasons given for non-disclosure include the stigma attached to HIV and the fear of being rejected by their spouses and family members. Although tremendous improvements have been made to reduce the stigmatization of HIV patients, a substantial stigma is still attached to the infection in Nigeria. Onyebuchi-Iwudibia & Brown (2014) reported a high level of HIV-related stigma among HIV patients in the eastern part of Nigeria, noting a strong association between stigma and depression. A similarly high level of stigmatization against HIV patients was reported by Downshen, Binns & Garofolo (2009) and Simbayi et al. (2007). Stigmatization is known to have a significant impact on the physical health and the overall quality of health of HIV patients. As a result, more efforts have to be channeled

into education and increasing acceptance and support for HIV patients. Non-disclosure of HIV status to spouses is very dangerous, as this could put spouses of HIV patients at risk of contracting the disease. It is necessary that concerted efforts should be directed at encouraging disclosure of HIV status to spouse and family members.

Findings from this study show that although over 86% of participants are engaged in full time employment, a significantly high number of this population (90.1%) are low income earners with an annual income of less than N300,000 (three hundred thousand Nigerian Naira). This translates into an annual income of US$700 (seven hundred American dollars). This trend is indicative of poor financial status of most of the participants receiving treatment. Since HIV prevalence cuts across different income strata of the Nigerian population, it could be assumed that high income earners are not entering conventional treatment in comparable numbers to low-income earners. Also, it is possible that high-income earners could be avoiding treatment in conventional HIV clinics or going "under the radar" to source for alternative treatments which may include herbal remedies. During the initial but failed recruitment efforts into the herbal-only group, all the patients contacted for enrollment into the herbal group were in highbrow locations and working in top private and government establishments. Although their identities were essentially concealed, their care provider disclosed that they were not willing to be identified because of their prominent status in the society.

Research Questions

This study was carried out to seek answers to five research questions. These research questions could provide great insight into treatment outcomes in patients taking only ARV and in patients taking a combined therapy of ARV and herbal medications.

Research Question 1

The first research question for this study was, "How do CD4 counts differ after treatment with antiretroviral medications only?". Findings from this study show that there is a significant difference between pre- (baseline) and post-treatment CD4 counts among subjects taking ARV medications only (t=-6.713, sig (2-tailed)=.00 and df=39). CD4 count is a good biomarker of HIV treatment outcome. This study shows that ARV resulted in significant improvements in CD4 counts after less than six months of ARV therapy. The difference noted in the post CD4 counts is consistent with findings from previous studies (Coetzee et al.,2004; Fairall et al., 2008; Idigbe et al., 2005). Fairall et al. (2008) also reported an increase of 15.1cells/μL in CD4 cell counts with each month of highly active anti-retroviral therapy (HAART) administration among South African patients, while Coetzee et al. (2004) reported good clinical outcomes among patients receiving ARV in Khayelitsha, South Africa. Among Nigerian patients, Idigbe et al. (2005) found that ARV led to an increase in CD4 counts and improvement in the overall physical wellness of Nigerian patients receiving a combination of Nevirapine, Stavudine and Lamivudine. The finding of this study supports the fact that ARV is currently the gold standard in the management of HIV infection. This could be noted in the significant increase in baseline CD4 counts from 298.6750 to 567.4500 post-ARV treatment across a six-month treatment period.

Research Question 2

The second research question for his study was, **"**How do CD4 counts differ after treatment with a combined therapy of herbal treatment and conventional antiretroviral medications?" Findings from this study show that there is a significant difference between the pre- and post-treatment CD4 counts among subjects taking a combination of ARV and herbal medications (t=-6.080, sig. (2-tailed)=.00 and df=38. CD4 count is a good biomarker of HIV treatment outcomes. CD4 counts increased from 378.3333 baseline to 598.5641 post-treatment with a combined therapy of ARV and herbal medications.

The significant difference noted in CD4 counts in this group is consistent with findings from Ayuba et al. (2014). Ayuba et al. (2014) investigated the efficacy of a West African bicolor-based traditional herbal preparation (Jobelyn) used in combination with ARV among Nigerian patients. Consistent with findings of this study, Ayuba et al. (2014) reported improvement in CD4 counts of patients receiving ARV only and those patients taking a combination of Jobelyn and ARV. However, Ayuba et al. (2014) found that patients that received a combination of ARV and Jobelyn recorded faster improvement in CD4 counts with a higher level of statistical significance at 6 weeks and 12 weeks when compared with patients that received only ARV. Awodele et al. (2012) reported a marginal improvement in the CD4 counts and viral load of HIV patients using herbal medications when compared with those patients who are not in herbal therapy. However, the improvement noted between the herbal group and non-herbal group was found not to be statistically significant (Awodele et al., 2012**).** No side effects or cross

reactions were reported by patients taking combined therapy. Reasons given for taking herbal therapy include to improve general health and immune systems, to reduce pain, and to ameliorate symptoms of opportunistic infection.

Research Question 3

The third research question for this study was "What is the difference in CD4 counts of patient taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications?" This study compared the efficacy of ARV only therapy with a combined therapy of ARV and herbal remedies. Results show that there is no significant difference in the post treatment CD4 counts between the ARV group and the combined group. This result shows that when CD4 counts are used as biomarkers to evaluate treatment outcome between these two groups, there was no difference in treatment outcome. This finding is in contrast to findings by Ayuba et al. (2014) which found a significantly higher statistical difference in the treatment outcomes between patients receiving ARV only and patients that received a combination of ARV and herbal remedy with Jobelyn. Although Ayuba et al. (2014) found improvements in both the ARV only group and the combined group, the study found that the combined group achieved faster improvement in CD4 counts with a higher level of statistical significance at 6 weeks and 12 weeks when compared with the ARV only group. It could be assumed that herbal remedies produced no significant effect in treatment outcomes when used in combination with ARV. If herbal remedies contributed in any significant way, it is expected that the use of herbal remedies concomitantly with ARV should produce treatment outcome that will significant improve the post-treatment CD4 counts in the combined group when compared with ARV only group. If herbal medications produced

an additive therapeutic role to ARV when they were used concomitantly with ARV, the combined therapy is expected to result in better treatment outcomes and significant improvement in physiological factors such as CD4 counts. Although the mean CD4 count in combined group (598.5641) is higher than the CD4 counts in the ARV-only group (567.4500), the slight increase noted in the combined group is not statistically significant to confer superiority of treatment outcome on the combined group.

Unlike the findings from Ayuba et al. (2014), the "no difference" noted between these groups may be because of the ineffective therapeutic nature of the specific herbal medications taken by the combined group. The therapeutic, pharmacodynamics and pharmacokinetics of the herbal medications used in this study were not known. Hence, the lack of difference seen in this study may show that the types of herbal medications used by participants of this study did not produce any therapeutic effects. While some herbal medications have shown superior efficacy (Ayuba et al., 2014; Onifade et al., 2011a; Sangkitporn et al., 2005; Sugimoto et al., 2005) it could be assumed that not all herbal medications are resulting in similar treatment outcomes. The herbal medications used in this current study probably helped to reduce some side effects and reduced the incident of opportunistic infections.

A very important finding of this study was that the use of herbal medications did not produce any undesirable outcome in CD4 counts. Since herbal remedies are widely used, widely available and easily accessible in Nigeria, it is important to note that the use of herbal medications with ARV did not result in any undesirable outcome. In the ARV group, mean baseline CD4 counts increased from 298.6750 to 567.4500 after treatment. Similarly, in the combined group, the baseline CD4 counts increased from 378.3333 to

598.5641 post-treatment. The initial statistical difference noted between the baseline CD4 of the ARV group and combined group was statistically adjusted for using analysis of covariance (ANCOVA).

A striking finding was obtained from this study. This study showed that 100% of patients taking herbal medications concomitantly with ARV reported that their care providers were not aware of their use of herbal remedies. Reasons given for non-disclosure include the fear of possible treatment denial and reproach from their physicians and care providers. Similar finding were recorded by Lubinga, Kintu, Atuhaire, & Asiimwe (2012) among HIV patients in Western Uganda where 92.3% of patients reported that their physicians were not aware of their concomitant use of herbal medications with ARV. Similarly, Peltzer, Preez, Ramlagan, & Fomundam (2008) also reported that 90% of HIV patients in KwaZulu-Natal, South Africa did not disclose concomitant use of herbal medications with ARV to their physicians. In addition, in a study among patients in Kumasi metropolis in Ghana, Gyasi, Tagoe-Darko, & Mensah (2013) found that 70% of patients used herbal medications. However, Gyasi, Tagoe-Darko, & Mensah (2013) found that 93.9% of HIV patients did not disclose their use of herbal medications to their physicians. This pattern of non-disclosure was also reported by Shedlin et al. (2013) among Mexican-origin patients in a U.S.-Mexico border HIV clinic. Many reasons were given for the use of herbal medications. As also noted by Shedlin et al. (2013) patients using herbal medications reported using it to help their general health, improve their immune systems, and ameliorate symptoms of opportunistic infection and side-effects related to ARV use. This is consistent with the reported use of herbal medications in pain management (Gyasi, Tagoe-Darko, & Mensah, 2013; Peltzer,

Preez, Ramlagan, Fomundam, 2008), stress relief, appetite stimulation and to promote general physical well-being (Gyasi, Tagoe-Darko, & Mensah, 2013).

Research Question 4

The fourth research question for this study was, "What is the difference in the symptom experience of patient taking ARV only and those taking a combination of herbal therapies and conventional antiretroviral medications?". The difference in symptom experience between the two groups was measured using the SSC-HIVrev instrument. A comparative analysis of overall symptom experience of patients in the ARV-only group and combined group shows that there is no significant difference between the two groups. Although no significant difference was noted in overall symptom experience in both groups, significant difference was noted in some factors of the symptom cluster. Specifically, significant differences were noted in fever (p=.003) and sore throat factors (p=.013). The fever factor mean scores for ARV group and combined group were .3045 and .6045 respectively. This signifies that the patients in the ARV group recorded significantly better outcomes in fever factor compared to patients in the combined group. The intensity of fever episode in ARV group was significantly lower than the fever intensity among patients in combined group.

Similarly, a significant difference was noted in sore throat factors (p=.013) between the ARV group and combined groups. The sore throat factor mean scores for ARV group and combined group were .0273 and .1636 respectively. This signifies that the patients in ARV group recorded significantly better outcome in sore throat factor compared with patients in the combined group. The intensity or seriousness of sore throat in ARV group is significantly lower than the sore throat intensity among patients in the

combined group. This shows a consistently better treatment outcome in ARV group when compared with the combined group.

Research Question 5

The fifth research question for this study was, "What is the difference in the quality of life of patients taking only ARV, and those taking a combination of herbal therapies and conventional antiretroviral medications? This study compared the quality of life between patients taking ARV only (ARV only group) and patients taking combination of ARV and herbal medications (combined group). This comparison was done using the WHOQOL-HIV BREF instrument. Results show that there is no significant difference in the overall quality of life of both groups. This finding is consistent with findings from Bepe et al. (2011) among Zimbabwean HIV patients. Similar to this study, Bepe et al.'s (2011) study among Zimbabwean HIV patients showed that the use of herbal medications concomitantly with ARV did not produce significant improvement in the quality of life index when compared to patients using only ARV. Although in this study no significant difference was noted between both groups, a significant difference was noted in two domains (social relationship and health satisfaction domains) between the ARV group and combined groups. The health satisfaction mean scores for ARV group and combined group were 4.1273 and 3.6545 respectively. This signifies that patients in ARV-only group reported significantly better satisfaction in their health compared to the combined group.

A similar trend was noted in social relationship domain. The social relationship domain mean scores for ARV group and combined group were 16.2364 and 14.6364 respectively. This signifies that patients using ARV only recorded significantly higher

improvement in their social relationship compared to patients using a combination of ARV and herbal medications. It is evident that there is a direct relationship between the social relationship and health satisfaction domains. It appears that patients with a good social relationship tend to enjoy better health satisfaction. It could be that the support from family members, friends, and significant others plays an important role in patients' perception of wellness, and helps patients to navigate and better cope with diagnosis and treatment for HIV.

As seen in the findings from research questions 4 and 5, some factors and domains in the SSC-HIVrev and WHOQOL-HIV BREF revealed that there are consistently better treatment outcomes in ARV group when compared with the combined group. The significantly better treatment outcomes noted in the ARV group in the two domains and factors explained above may translate into better quality of life for patients in the ARV group. It is doubtful if herbal medications play any significant additive role to justify impact in the overall quality of life of patients. It appears that the use of herbal medications play little role in the quality of life of patients when used concomitantly with ARV. It is important to know if the used of only herbal medications would produce significant treatment outcomes that is comparable or superior to ARV-only therapy group or to combined group.

Several studies have shown that the use of herbal remedies only can be effective in the treatment of HIV (Onifade et al., 2011a; Sangkitporn et al., 2005; Sugimoto et al., 2005). Among people living with HIV/AIDS in northeastern Thailand, Sugimoto et al. (2005) reported significantly better mental health scores in patients using herbal medications than non-users of herbal medications. Onifade et al. (2011a) found that

herbal therapy with a-Zam was an effective anti-HIV agent resulting in significant increase in CD4 counts and significant decrease in viral load after treatment with a-Zam from four months after initiation of herbal therapy. Onifade et al. (2016) reported no remarkable harmful drug interaction between a-Zam and Highly Active Anti-Retroviral Therapy (HAART). Another widely used herbal formulation in China, SH, was reported to be effective in HIV treatment. Each of the five constituents of SH was reported to be an individually effective anti-HIV agent, and the combined herbs are also reported to possess anti-retroviral activity (Sangkitporn et al., 2005). Findings from Sangkitporn et al. (2005) showed that HIV RNA decreased significantly from the baseline value in both the experimental and control groups from week 4 of treatment. SH group was found to have a significantly lower HIV RNA compared to the control group. The CD4 counts after 12 weeks and beyond showed a significant increase in SH group from baseline value. Sangkitporn et al. (2005) found that a combination of SH herbs with two nucleoside reverse transcriptase inhibitor has a greater antiviral ability than conventional antiretroviral medications. It will be interesting to compare treatment outcomes in herbal only group, ARV only group, and with combined therapy. Like in this study no serious adverse effect was reported with concomitant use of SH with conventional antiretroviral medications.

Implications of this Study

This study has provided expanded insight into the treatment outcomes in patients using different treatment modalities in the management of HIV infection. Although the use of antiretroviral medications are generally and widely accepted as gold standard for HIV management, it was seen from this study that a large proportion of HIV patients also

use herbal medications concomitantly with ARV. While some used herbal medications as complimentary medications, many reportedly used them as alternatives to conventional antiretroviral medications. Many patients using herbal mediations reportedly did not disclose its use to their physicians and care providers for the fear of being refused treatment by their orthodox physicians and care providers.

Awareness about HIV is very high among Nigerian populace. However, large scale discrimination and stigmatization are still prevalent, especially in non-official interactions. There is a large effort on the part of government to provide appropriate education and reduce stigmatization. However, it appears that the ignorance of the common people is still largely high. The hyperactive enlightenment program initiated by governmental and private agencies at the beginning of HIV epidemic in the early 90s seems to be now dormant. This is mainly because of the perceived belief that people are now well informed about the disease. The fight against HIV needs to be sustained at all levels of Nigerian social classes/strata.

Equally important is the level of funding directed toward treatment, counseling and education of HIV. Nigeria as a country relies heavily on foreign sponsorship and donations in the war against HIV. Nigeria, being one of the largest economies in Africa, needs to show more commitment in taking control of its future and channel more of its own resources towards education and eradication of HIV. Indigenous researchers and scientists should be supported to devote their energies to fighting and finding a cure for HIV. Various claims of HIV cure that are rampant in Nigeria need to be scientifically investigated to protect the innocent citizen from depending on and patronizing ineffective treatment modalities. It is obvious that the patronage of non-conventional medications is

very high in Nigeria. The current over reliance on foreign governments and donors cannot be to the best advantage of the Nigerian nation.

The aim of this study was to compare treatment outcomes in two groups of patients that were taking ARV only and those that were taking a combined therapy of ARV and herbal medications. Findings from this study have implications in nursing practice, research and education.

Nursing Practice

It is important to note that during data collection for this study that all the subjects in the combined group verbalized a desire not to disclose their dual therapy to their caregivers. Patients only disclosed that they were taking herbal medications after the researcher had gained their confidence and assured that confidentiality of subjects' information would be protected and would not be disclosed to individuals outside the study group. However, the researchers strongly advised and counselled subjects to disclose their dual therapy to their caregivers so that they could be adequately cared for. Most of the subjects verbalized the fear that their caregivers would not take care of them if they disclose that they were taking herbal medications. Similarly, many of the subjects did not disclose their HIV status to their spouses and family members for the fear of rejection. In nursing practice it is important that nurses establish a professional and trusting relationship with patients so that patients can confide in them and disclose treatment information that is necessary for better outcome. Knowledge of this information will enable nurses and physicians to consider possible side effects and interactions that could occur between the conventional ARV and herbal remedies. Non-disclosure of HIV status to spouses and significant others is a very big problem. In

practice, nursing staff could play an important role in providing sufficient education, encouragement, and support to HIV patients and facilitate voluntary disclosure of status by the patients to their loved ones. Knowledge gained from this study should guide nurses in professional interactions with patients. Nurses should specifically ask about dual therapy, and holistically look into issues relating to disclosure of HIV status.

Nursing Research

Through this study a comparative analysis of two different treatment methods, ARV-only therapy and combined therapy, was carried out. This study is a precursor to other new nursing research on HIV treatment modalities. This study did not investigate the lived experience of HIV patients during the course of treatment with either ARV only or with a combination of ARV and herbal medications. Since nursing is essentially a caring and nurturing profession, nursing concentrates on holistic care. As a result of this, nursing care tends to foster healthy, nurturing and therapeutic relationship with patients. Findings from this study show that there was a disconnect between the patients and their care providers, at least in the population under investigation. This disconnection is apparent in the patients' non-disclosure of their dual therapy. All subjects that were taking a combination of ARV and herbal medications reported non-disclosure of the use of herbal medications to their care providers. Nursing should be at the fore front of empirical research into reasons behind non-disclosure by carrying out studies to understand the different methods and approaches that could be used to foster trusting relationships between patients and their care providers. The profession of nursing is fundamentally equipped to investigate this essential phenomenon.

In the course of recruitment for this study, it was discovered that many patients were using only herbal medications to treat HIV. This situation is very dire, as the effectiveness of only herbal therapy in the treatment of HIV is still not widely reported. This has great implications in nursing research. Nursing research need to focus investigation on the lived experience of HIV patients using herbal medications only. The use of qualitative methodology in the investigation of the experience of this group would provide valuable insight. This could enable us to gain a rich understanding of the reasons for using herbal medications. It will enable us to investigate the impacts of herbal therapy on HIV. This will help our understanding of the perception of patients in this group on their quality of life and on their symptom modifications.

Nursing Education

Evidence-based practice (EBP) is a cornerstone of nursing education. The focus of nursing education in the 21st century is to promote and incorporate evidence-based research findings into education. Transformation of practice environment is only possible when quality research findings are incorporated into education of nursing students and also into continuous in-service education of qualified nurses. Nursing education needs to emphasize the role of nursing in building therapeutic and trusting relationships with patients. The disconnection and distrust noted between patients in the combined group and the care providers could be prevented if the nursing staff in the hospital used their professional skills to foster trusting relationship with the patients in this group. With appropriate evidence-based practice, nurses could develop efficient pragmatic approaches to nursing care.

Strengths of this Study

This study was meticulously designed to ensure strict adherence to ethical issues. Patients' confidentiality was maintained and protected throughout the duration of this study. No subjects' identifiable data were collected or stored in any research documents. While this study possesses no direct risk to patients' physical health, it is possible that psychological and mental trauma may result if confidentiality of patients' information is breached. Only a randomly assigned patient number was used in all research documents. No recording or videotaping was used during this study. Patient information was electronically stored in a password-protected computer system. All paper copies were stored under lock and key in a fireproof cabinet. The paper copies were shredded after information was stored electronically.

Each subject was given extensive explanation about the study. Subjects were given the opportunity to ask questions. Patients' were given full disclosure of possible risks associated with the study. In addition to obtaining informed consent from each patient, a continuous re-negotiation of consent was maintained through process consent. This provided opportunity to provide continuous clarification and opportunity for questions. Process consent provided the opportunity for subjects to discontinue participation from the study at any time should they choose to do so.

Particular attention was paid to trustworthiness of data obtained from this study. The strength of the funding of this study is a function of the reliability of the study instruments. Instruments used for data collection were carefully selected to achieve high quality data. Two extensively used and well-tested instruments were used for data collection. The SSC-HIVrev was developed by renowned nurse scientists while the

WHOQOL-HIV BREF was developed by a group of reputable experts from World Health Organization (WHO). The two instruments used for data collection have been confirmed to have high reliability and validity. In spite of the documented reliability of these instruments, a pilot study was done at the beginning of this study. The pilot study was carried out prior to the main study to measure the Cronbach alpha reliability and face validity of the study instruments. The two instruments were found to be highly reliable in the population of study. Also, face validity of the instruments was determined by the researcher, and both instruments were considered to have high validity and high reliability. This high reliability was obtained even with the omission of the weight factor from the SSC-HIVrev instrument.

The differences noted in baseline CD4 counts between ARV group and combined group were statistically adjusted and controlled using analysis of covariance (ANCOVA). ANCOVA statistically controlled the effect of continuous variables that are not of primary interest in this study. The use of ANCOVA helped to statistically adjust and control the differences noted in baseline CD4 counts between the two groups before comparative analyses of the two groups were done.

The source of data used in this study was considered to be an important determinant of data quality. Hence, only data obtained from credible, verifiable sources was used in this study. The source of CD4 counts could be a potential source of confounding variable. Patients' CD4 counts could be obtained from different sources or directly from the patients. However, to ensure credible data, only CD4 counts obtained directly from patients' medical records were used in this study. CD4 count records given

by the patients were not used. This approach ensured that only quality and credible data sets were used for this study.

In selecting a sample for this study, a random assignment technique was used. Sampling was done randomly from matched subjects that are similar in terms of important extraneous variables. Randomization eliminated the sources of bias in the treatment, enhanced the external validity of the study finding, and ensured representativeness of sampling. This enhanced the generalizability of the study findings to the larger Nigerian population. The matching of samples for important extraneous variables helped to eliminate confounding variables that could adversely affect study findings. The study design and implementation, analytical procedure and reporting process for this study followed a high standard expected of sound scientific study.

Limitations of this Study

This study was initially designed to have three groups namely;

- Group A: Participants were to be drawn from patients who were using only herbal therapies for their treatment.
- Group B: Participants were to be drawn from patients who were using only conventional antiretroviral medications.
- Group C: Participants were to be drawn from patients who were using a combination of herbal therapies and conventional antiretroviral medications for their treatment.

It was presumed that the inclusion of herbal group only would help the researcher to determine the impact of using only herbal medications on HIV treatment outcome and

to evaluate the efficacy of herbal therapy only. However, recruitment of subjects into this group was very difficult, as it was hampered by multiple factors. The first major factor was the stigmatization associated with HIV in Nigeria. During recruitment efforts for this group, it was found that patients using only herbal medications were trying to hide their status by not seeking treatment in conventional HIV clinics and hospitals. The second factor that hampered recruitment efforts for this group was the condition that needed to be met before recruitment into this group. Recruitment for this group could only be done if the researcher committed to funding the cost of herbal treatment for patients in this group. The budget for this study could not fund such treatment. Also, ethical issues may arise as a result of this undertaking, as it may appear that the researcher influenced the treatment choice of the patients. This study was designed to study treatment outcomes in patients already receiving a specific treatment but not to influence patients' treatment choice. The inability to enroll into this group was a very important deviation from the initial plan of this research. It is the hope of this researcher that future studies will compare treatment outcomes in these three groups.

Also, this study was initially designed to use CD4 counts and viral load as biomarkers of physiological treatment outcomes. However, the state specialist hospital has no viral load records for any of the patients receiving treatment in the hospital. In fact, viral load was not available in many clinics contacted in Nigeria. The only available option for getting patients' viral load was for the researcher to fund the test. However, this study lacked the funding for such an expensive laboratory test. Information about viral load could, in conjunction with CD4 counts, help determine the efficacy of different

treatment options. It is important that future studies should obtain viral load in addition to CD4 counts.

HIV infection is a debilitating health problem that requires holistic treatment approach. It is important to evaluate the lived experience of Nigerian HIV patient in the course of their daily life and treatment regime. This study did not investigate the lived experience of the patients during their treatment regimens. It is recommended that future studies should employ qualitative methods to evaluate the lived experience of HIV patients during the course of their different treatments. In spite of the identified limitations of this study, the study provided findings that could shape future studies and improve treatment and care of HIV patients.

Recommendations

This study is considered to be the beginning of exploration of the vast area of herbal therapy in the treatment of HIV. Further studies are necessary to provide expanded insight into the use of herbal remedies in HIV treatment. Similarly, further study is necessary to evaluate and compare different HIV treatment protocols. This study was unable to recruit and enroll sufficient number of patients taking herbal medications only. However, a lesson learned from the recruitment efforts for this group revealed that patients in this group could easily be enrolled into future studies if the researcher could provide partial or full funding of herbal treatment. Because of insufficient funds and possible ethical issues, this researcher was unable to enroll patients taking herbal medications only. It is therefore recommended that future studies should focus on comparing treatment outcomes in those patients taking ARV only, herbal medications

only and combined therapy. Findings from these studies would enable us to determine and compare efficacy of these treatment protocols.

Similarly, there is a need to evaluate the lived experience of patients in each treatment group. It is recommended that future studies explore qualitative methods to investigate the lived experience of patients receiving ARV only, combined therapy and herbal medications only. The use of qualitative methodology will show the richness of the experiences of individuals during the course of their respective therapies.

Findings from this study show that stigmatization is still very high in Nigeria. The quality of life of HIV patients is a function of social factors such as stigmatization. The quality of life of HIV patients could be better enhanced if stigmatization attached to HIV is adequately addressed. Efforts should be increased by the government and other stakeholders to reduce stigmatization of HIV patients. To prevent targeting of HIV patients, efforts should be made to provide privacy for patients during treatment. This will make it possible for HIV patients to be cared for without compromising patients' identity. There should be an interplay of community action and political initiatives to combat stigmatization and foster acceptance of HIV patients.

Also, this study was initially designed to use CD4 counts and viral load as biomarkers of physiological treatment outcomes. However, records of viral loads of patients were not available in the State Specialist Hospital. As a result of this, the study could not compare the viral load of patients in each group. It is recommended that future studies should use both CD4 counts and viral load as biomarkers of physiological treatment outcomes.

A frightening trend was noted during this study. Finding from this study show that majority of people seeking treatment were disproportionately female, low-income earners and poor individuals. The question that arises is "Where are the men of affluence and elites seeking treatment?" Since HIV infection cut across social strata, it is important that educational efforts be designed to target Nigerian elites and the well-to-do members of the society. This will prevent a public health epidemic. In light of Smith's (2007) assertion that sexual and economic disparities and contradictory moralities could contribute to HIV epidemic in Nigeria, Nigerian male populations need to be encouraged to seek testing and treatment for HIV. Any strategic efforts to combat the spread of HIV that exclude this group of Nigerians might be counterproductive because of their social power to negotiate sexual relationship with the poor members of the society. It is expected that future studies will look into ways and strategies to bring many well-to-do Nigerians into testing and treatment in conventional clinics and hospitals.

Findings from this study revealed that100% of the participants did not disclose use of herbal medication to their primary physicians and care providers. Reasons given for non-disclosure include fear of being refused treatment, admonition by their physicians, and fear of incurring their displeasure. This disconnection and lack of disclosure could affect the overall health outcome of patients. Physicians and care providers need to have the totality of information needed to efficiently care for the patients. Also, there is a possibility of cross-reaction or possible interaction between the ARV and herbal medications that physicians might not be aware of. It is recommended that future studies look into strategic interventions and approaches that could foster trust and enhance disclosure on the part of the patients.

A trend similar to the above was also seen to be prevalent among many of the subjects of this study. It was found that majority of the patients did not disclose their HIV status to their spouses and loved ones. Reasons for non-disclosure include fear of rejection by their spouses and family members, fear of ostracization by the community and consequences of stigmatization. It is very sad to imagine the difficulty of facing HIV infection without the support of loved ones. Efforts need to be increased to encourage disclosure of HIV status to family members, especially to spouses of HIV patients. The patients need to be empowered to make the disclosure and there should be a continuous system to support patients and families throughout their journey. Extensive efforts and resources have been deployed toward HIV education. However, efforts should be increased to provide more education for the general public. Stigmatization stems from lack of education about HIV. Our generation needs to defeat HIV. However, non-disclosure of HIV status to spouses will only take our generation further away from effective prevention of the disease. Health care providers need to encourage patients to disclose status to their partners and family members. It is also recommended that nurse scientists and researchers investigate methods and approaches that can foster disclosure of status without jeopardizing the right, confidentiality, and wellbeing of the patients.

There is documented evidence of the efficacy of herbal medications in the treatment of HIV. However, there are many herbal medications with a similarly large number of claims of efficacy. Scientific efforts should be directed at investigating the potency and efficacy of different herbal medications. Specifically, herbal medications should be isolated and the safety and efficacy of each medication should be evaluated. It is also necessary to thoroughly investigate the pharmacodynamics and pharmacokinetics

of each herbal medication. This way, only herbal medications that can withstand sound scientific scrutiny will be available for patients' use.

Conclusion

This study has provided expanded insight and understanding into the treatment outcome during HIV treatment with different protocols. The study compared the treatment outcomes in patients using only ARV and patients using a combined therapy of ARV and herbal medications. CD4 count was used as a biomarker of treatment outcome in the two groups. Outcome comparison was also done using quality of life index and symptom experience. Two highly reliable and well-tested instruments were used to evaluate patients' quality of life and symptom improvement. In spite of the high quality of this study, it has its limitations as described above.

This study has enriched our understanding of the treatment outcomes in patients using only ARV and patients using a combination of ARV and herbal medications. The study has revealed salient points and issues that require further exploration and appropriate interventions. Findings from this study have shown that a vast majority of patients on combined therapy do so without disclosing the use of herbal remedies to their physicians and care providers. It is expected that physicians and care providers would incorporate this knowledge into their care model, build trusting and supportive relationships with patients and specifically solicit information about the use of herbal therapy in combination with ARV. This knowledge will enable physicians, nurses and other care providers to explore possible side effects and cross reactions between ARV and herbal remedies. Since herbal therapies are widely used in Sub-Saharan Africa and since access to ARV is still largely and comparatively difficult, further studies need to be

done, particularly in the group of patients using herbal remedies only. Incorporation of this group in future comparative study would enable researchers and scientists to determine the efficacy of herbal medications in comparison to ARV only and combined therapy.

It is important that the Nigerian government and all other stakeholders negotiate social policies to empower the female population and enhance the ability of Nigerian females to negotiate social relationships. Health care professionals, especially nurses should play pivotal roles in empowering Nigerian females with education and resources to engage in safe sexual relationships. Extensive education and support systems should be given to HIV patients to facilitate voluntary disclosure of their HIV status to their spouses and family members. Such support systems and education should be sustained and extended to family members of HIV patients after disclosure is made to them. Universal acceptance, reduced stigmatization, and continuous therapeutic support are important factors that can impact positively on the quality of life of HIV patients.

APPENDICES

APPENDIX A

SIGN AND SYMPTOM CHECK-LIST FOR PERSONS WITH HIV DISEASE

(SSC-HIVrev)

Below is a list of potential problems that you may experience today. If you have the problem, rate the degree of INTENSITY that best describe the extent of the problem. If you do not have the problem, do not check a box.

INTENSITY			
Mild	Moderate	Severe	Problem
FATIGUE			
____	_____	_____	Muscle aches
____	_____	_____	Weakness
____	_____	_____	Painful joint
____	_____	_____	Fatigue
FEAR			
____	_____	_____	Difficulty Concentrating
____	_____	_____	Depression
____	_____	_____	Memory loss
____	_____	_____	Fear/worries
FEVER			
____	_____	_____	Fever
____	_____	_____	Chills
____	_____	_____	Day sweats
____	_____	_____	Night sweats
GI UPSET			
____	_____	_____	loose stools
____	_____	_____	Diarrhea
____	_____	_____	Gas/bloating
____	_____	_____	Abdominal pain
____	_____	_____	Nausea
____	_____	_____	Vomiting
SOB			
____	_____	_____	Shortness of breath at rest
____	_____	_____	Wheezing
____	_____	_____	Shortness of breath with activity
SORE THROAT			
____	_____	_____	Sore throat
____	_____	_____	Painful swallowing

____	_____	_____	Mouth ulcers
____	_____	_____	White spots in mouth/thrush
NUMBNESS			
____	_____	_____	Numbness/tingling of arms
____	_____	_____	Numbness/tingling of hands/fingers
____	_____	_____	Numbness/tingling of legs
____	_____	_____	Numbness/tingling of feet/toes
HEADACHE			
____	_____	_____	Dizziness
____	_____	_____	Headache
____	_____	_____	Heart racing
____	_____	_____	Chest pain
RECTAL ITCH			
____	_____	_____	Rectal Itching
____	_____	_____	Rectal bleeding
____	_____	_____	Rectal discharge
BRUISING/BLEEDING			
____	_____	_____	Sore/bleeding gums
____	_____	_____	Nose bleeds
____	_____	_____	Easy bruising
____	_____	_____	Blood in spit/sputum
Items that did not load on factor scores			
____	_____	_____	Swollen glands
____	_____	_____	Swollen feet
____	_____	_____	Dry mouth
____	_____	_____	Thirst
____	_____	_____	Coughing
____	_____	_____	Lack of appetite
____	_____	_____	Constipation
____	_____	_____	Concern over weight loss
____	_____	_____	Flushing
____	_____	_____	Rash
____	_____	_____	Itchy skin
____	_____	_____	Insomnia/can’t sleep
____	_____	_____	Anxious
____	_____	_____	Blurred vision
____	_____	_____	Seizure/tremors
____	_____	_____	Nipple discharge
____	_____	_____	Breast pain/changes
____	_____	_____	Sores or lumps on genitals
____	_____	_____	Burning with urination

GYN-RELATED PROBLEMS
For women only

____	_____	_____	Vaginal discharge
____	_____	_____	Irregular period
____	_____	_____	Heavy period
____	_____	_____	Bad cramps
____	_____	_____	Vaginal itching
____	_____	_____	Vaginal odor
____	_____	_____	Bleeding between periods
____	_____	_____	Pelvic pain

SCORING:

1. Scaling: 0= not present today; 1= mild; 2= moderate; 3= severe
2. Factor scores: Sum the item scores (0-3) for each item in a factor and divided by the number of items.
3. Total score: Sum the item scores (0-3) for each of the 45 items from the factor scores.

Sources: Holzemer, W.L., Hudson, A., Kirksey, K.M., Hamilton, M.J., & Bakken, S. (2001).

APPENDIX B

DEMOGRAPHIC QUESTIONNAIRE

Check the appropriate box

Age

18-19 _____ 20-24 _____ 25-29 _____ 30-34 _____
35-39 _____ 40-44 _____ 45-49 _____ 50-54 _____
>54 _____

Gender

Male _____ Female _____

Ethnicity

Yoruba _____ Hausa _____ Igbo _____ Tiv/Idoma _____
Ijaw _____ Others _____ (Please specify)

Religion

Christain _____ Muslim _____ Traditionalist _____
Others _____ (Please, specify)

Marital Status

Single _____ Married Monogamous _____
Married Polygamous _____ Divorced/Separated _____
Living with a partner _____

Education

None _____ Elementary _____
Some High School _____ High School _____
Some College _____ College_____
Graduate _____

Employment

Full-time _____
Part-time _____
Retired _____

Income Level

Which annual income bracket best describes your household?

>N1,200,000	_____
N1,000,000 to less than N1,200,000	_____
N9000,000 to less than N1,000,000	_____
N800,000 to less than N900,000	_____
N700,000 to less than N800,000	_____
N600,000 to less than N700,000	_____
N500,000 to less than N600,000	_____
N400,000 to less than N500,000	_____
N300,000 to less than N400,000	_____
N200,000 to less than N300,000	_____
N100,000 to less than N200,000	_____
N37,000 to less than N100,000	_____
0 to less than N370,000	_____

HIV Medication

Do you take antiretroviral Medications? Yes_____ No _____

Do you take herbal medication?

Yes_____ (Please list all herbal medications including vitamins)

No _____

Adapted from Sunmola, A. (2005). Sexual practices, barriers to condom use and its consistent use among long distance truck drivers in Nigeria. *AIDS Care, 17*(2), 208-221.

APPENDIX C

WHOQOL-HIV BREF INSTRUMENT

ABOUT YOU

Before you begin we would like to ask you to answer a few general questions about yourself: by circling the correct answer of by filling in the space provided.

What is your **gender** Male / Female

How old are you? (age in years) _____

What is the highest **education** you received? None at all / Primary / Secondary / University/Postgraduate

What is your **marital status**? Single/ Married/ Living as married/ Separated/ Divorced/Widowed

How is your health? (G1.2)

Very poor	Poor	Neither poor nor good	Good	Very good
1	2	3	4	5

Do you consider yourself currently ill? Yes / No

If something is wrong with your health what do you think it is?_____

Please respond to the following questions if they are applicable to you:

What is your **HIV serostatus**? Asymptomatic / Symptomatic / AIDS converted

In what year did you first **test positive** for HIV? _____

In what year do you think you were infected? _____

How do you believe you were **infected with HIV**? (circle one only):

Sex with a man / Sex with a woman / Injecting drugs / Blood products / Other (specify)

Instructions

This assessment asks how you feel about your quality of life, health, or other areas of your life. **Please, answer all the questions.** If you are unsure about which response to give to a question, **please choose the one** that appears most appropriate. This can often be your first response. Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last two weeks**. For example, thinking about the last two weeks, a question might ask:

		Not at all	A little	A moderate amount	Very much	Extremely
	How well are you able to concentrate?	1	2	3	4	5

You should circle the number that best fits how well are you able to concentrate over the last two weeks. So you would circle the number 4 if you were able to concentrate very much. You would circle number 1 if you were not able to concentrate at all in the last two weeks.

Please read each question, assess your feelings, and circle the number on the scale for each question that gives the best answer for you.

		Very poor	Poor	Neither poor nor good	Good	Very good
1(G1)	How would you rate your quality of life?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2(G4)	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about how much you have experienced certain things in the last two weeks.

		Not at all	A little	A moderate Amount	Very much	An extreme amount

3(F1.4)	To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4(F1.4)	How much are you bothered by any physical problems related to your HIV infection?	1	2	3	4	5
5(F1.4)	How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
6(F1.4)	How much do you enjoy life?	1	2	3	4	5
7(F1.4)	To what extent do you feel your life to be meaningful?	1	2	3	4	5
8(F1.4)	What extent are you bothered by people blaming you for your HIV status?	1	2	3	4	5
9(F1.4)	How much do you fear the future?	1	2	3	4	5
10(F1.4)	How much do you worry about death?	1	2	3	4	5

		Not at all	A little	A moderate Amount	Very much	An extreme amount
11(F5.3)	How well are you able to concentrate??	1	2	3	4	5

12(F16.1)	How safe do you feel in your daily life?	1	2	3	4	5
13(F22.1)	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about **how completely** you experience or were able to do certain things in the last two weeks.

		Not at all	A little	Moderately	Mostly	Completely
14(F2.1)	Do you have enough energy for everyday life?	1	2	3	4	5
15(F7.1)	Are you able to accept your bodily appearance?	1	2	3	4	5
16(F18.1)	Have you enough money to meet your needs?	1	2	3	4	5
17(F51.1)	To what extent do you feel accepted by the people you know?	1	2	3	4	5
18(F20.1)	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
19(F21.1)	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

		Not at all	A little	Moderately	Mostly	Completely

20(F9.1)	How well are you able to get around?	1	2	3	4	5

The following questions ask you how **good or satisfied** you have felt about various aspects of your life over the last two weeks.

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	satisfied	Very satisfied
21(F3.3)	How satisfied are you with your sleep?	1	2	3	4	5
22(F10.3)	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
23(F12.4)	How satisfied are you with your capacity for work?	1	2	3	4	5
24(F6.3)	How satisfied are you with yourself?	1	2	3	4	5
25(F13.3)	How satisfied are you with your personal relationships?	1	2	3	4	5
26(F15.3)	How satisfied are you with your sex life?	1	2	3	4	5
27(F14.4)	How satisfied are you with the support you get from your friends?	1	2	3	4	5
28(F17.3)	How satisfied are you with the conditions of your living place?	1	2	3	4	5

29(19.3)	How satisfied are you with your access to health services?	1	2	3	4	5
30(F23.3)	How satisfied are you with your transport	1	2	3	4	5

The following question refers to **how often** you have felt or experienced certain things in the last two weeks

		Never	Seldom	Quite often	Very often	Always
31(F8.1)	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	1	2	3	4	5

Did someone help you to fill out this form?_____
How long did it take to fill this form out? _____
Do you have any comments about the questionnaire?
_____
_____
_____

THANK YOU FOR YOUR TIME AND HELP

Source: (WHO, 2012). Retrieved from

http://www.who.int/mental_health/publications/whoqol_hiv_bref.pdf

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