

**SOCIAL SUPPORT AND ADHERENCE TO ANTI-RETROVIRAL
THERAPY AMONG HIV PATIENTS IN UNIVERSITY OF PORT-
HARCOURT TEACHING HOSPITAL, PORT-HARCOURT, NIGERIA**

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**A DISSERTATION IN THE DEPARTMENT OF EPIDEMIOLOGY AND
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ABSTRACT

HIV/AIDS is one of the most challenging pandemic of the 21st century. More than two-thirds of adults infected with HIV live in Sub-Saharan Africa. Adherence to Anti-Retroviral Treatment (ART) is a key factor that determines the success or failure of treatment, while non-adherence is a major cause of HIV drug resistance and subsequent immunological and clinical failure. Social support is a significant resource for individuals undergoing stress, and has been found to improve adherence among patients with chronic illness. The aim of this study was to measure the association between social support and adherence to ART among HIV patients in University of Port-Harcourt Teaching Hospital (UPTH), Port Harcourt.

The study was an unmatched 1:1 case-control study with 192 cases and 192 controls carried out among HIV patients attending the Anti-retroviral clinic of UPTH, between May to July 2016. A case was defined as a patient who has taken less than 95% of prescribed dose, while a control was a patient who has taken at least 95% of prescribed dose in the 2 weeks prior to the study. Consecutive patients were tested for adherence using self-report until 192 non-adherent cases were selected. Adherent patients were selected consecutively to make up 192 controls. A five-point questionnaire was used to calculate each client's self-reported adherence. Social support was measured using the Medical Outcomes Study Social Support Survey (MOSSSS). Structured interviewer administered questionnaire was used to collect data on socio-demographic characteristics, knowledge of HIV and its treatment, and on factors influencing adherence. Data was analysed with frequencies, t-test, chi-square and logistic regression with level of significance $\alpha < 0.05$.

The mean age of cases and controls were 36.7 ± 9.0 years and 37.5 ± 8.6 years respectively. Females constituted 78.6% of cases and 75% of controls. About half of the cases and controls were married. The mean CD4 count was $476.9 (\pm 274.10)$ and $499.6 (\pm 290.18)$ for cases and controls respectively. There were no significant differences in age, gender, marital status and CD4 count, between the cases and controls. The mean adherence rate was 87.2% (± 16.2) for cases and 99.8% (± 0.77) for controls ($p < 0.001$). The mean duration of treatment was 57.3 (± 39.0) months for cases and 60.3 (± 42.1) months for controls ($p = 0.463$). Poor social support was associated with non-adherence to ART, among patients in lower socio-economic classes III-

IV (OR=3.34, CI =1.43 – 7.81). Non-adherence was also associated with Poor emotional support (AOR =4.46; CI =1.98 – 10.05) and poor affectionate support (AOR=1.82; CI=1.03 – 3.22). Feeling depressed (p =0.001), unacceptable clinic waiting time (p =0.022) and dissatisfaction with support received from partner (p<0.001) were independent risk factors associated with non-adherence.

Poor social support is a risk factor for non-adherence. Satisfaction with support received from one's partner is protective of non-adherence. Emphasis should be placed on the importance of social support during adherence counseling sessions on every ARV clinic visit. Couple-based counseling should be incorporated into the adherence counseling sessions for HIV patients to improve the support received from partner and promote adherence to ART.


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CERTIFICATION

I hereby certify that this proposal is an independent work done by Dr Kanu Njideka Esther, an MPH student of the University of Ibadan, under my supervision.

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DEDICATION

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ABBREVIATIONS

AIDS	-	Acquired Immune Deficiency Syndrome
ART	-	Anti Retroviral Therapy
ARV	-	Anti Retroviral
APHA	-	American Public Health Association
GFATM	-	Global Fund to fight AIDS, TB and Malaria
HAART	-	Highly Active Anti-Retroviral Therapy
HIV	-	Human Immunodeficiency Virus
MEMS	-	Medication Event Monitoring System
NACA	-	National Agency for the Control of AIDS
NARHS	-	National AIDS and Reproductive Health Survey
PEPFAR	-	US President's Emergency Fund for AIDS Relief
PLWHA	-	People Living with HIV/AIDS
PMTCT	-	Prevention of Mother to Child Transmission
SACA	-	State Agency for the Control of AIDS
SASCP	-	State AIDS and STI Control Program
SES	-	Socio-Economic Status
UNAIDS	-	Joint United Nations Programme on HIV/AIDS
WHO	-	World Health Organisation

CHAPTER ONE

INTRODUCTION

1.1 Background

HIV/AIDS is a chronic and debilitating disease of global public health concern.(UNAIDS, 2013) The disease has been declared a global public health emergency by the World Health Organization. Thirty-four years after its first appearance, HIV still remains one of the most challenging pandemic and the greatest health crisis currently facing the world. The pandemic has caused millions of deaths worldwide and has crippled the lives of many more. Since the start of the epidemic, about 75 million people have become infected with the virus.(UNAIDS, 2012) In 2012 alone, there were 35.3 million people living with HIV and 1.7 million died from AIDS related causes worldwide.(UNAIDS, 2013)

Sub-Saharan Africa remains the worst affected region of the world, accounting for two-thirds of the global burden of disease. Current statistics put the numbers of people infected by the virus in Sub-Saharan Africa at 25 million adults and children, accounting for nearly 70% of the global total. There are an estimated 1.6 million new HIV infections and 1.2 million AIDS-related deaths in the region (Averting HIV and AIDS (AVERT), 2012). Nigeria bears the brunt of this epidemic with an estimated 3.2 million people living with HIV (NACA, 2011). The country ranks as one of the countries with the highest burden of HIV in the world, next only to South Africa. According to the National Agency for the Control of AIDS (NACA), the number of persons requiring Anti-Retroviral Therapy (ART) stands at 1,476,741 in 2013, and only 43% (639,397) are currently receiving treatment. (NACA, 2014) Statistically, the south-south zone currently has the highest rate of HIV infection at 5.5%. Rivers state with a sero prevalence of 15.2% has the highest prevalence in the country.(Federal Ministry of Health, 2014)

The world has not been resting on its oars however, as intense efforts are being made globally to control the spread of this infection. These efforts have recorded giant strides in the industrialized nations of the world, drastically reducing HIV disease burden and longer life spans for those infected with the disease. This has been largely possible through the introduction of the Highly Active Anti-Retroviral Therapy (HAART) which has turned what was once a death sentence to nothing more than a chronic illness.(American Public Health Association (APHA), 2004)

Remarkable progress has also been made in reversing the trend of HIV/AIDS epidemic in Nigeria, in the last decade. The National AIDS and Reproductive Health Survey (NARHS) conducted in 2013 showed a national HIV prevalence of 3.4% down from a peak of 5.8% in 2001 (Federal Ministry of Health, 2012). This achievement has been largely attributed to the Behaviour Change Programs, HIV care and support programs, Prevention of Mother to Child Transmission (PMTCT) and the use of Highly Active Anti-Retroviral Therapy (HAART), (NACA, 2011). The main aim of treatment with HAART is to achieve a reduction in viral load to undetectable levels. This allows immune reconstitution and leads to marked clinical improvement. Treatment with HAART has also been proven to prevent episodes of opportunistic infections. (United States Department of Health and Human Services, 2002) Adherence to HAART is crucial to achieving treatment goals of undetectable viral load, increasing CD4 cell counts and improvement in the clinical condition of people living with HIV-AIDS. However, drugs do not work in non-compliant patients and in the management of HIV/AIDS, optimum adherence to HAART is critical to the successful outcome of treatment (Shah, 2007) (Giri et al., 2013). The reported adherence rates to ART medication among people living with HIV (PLHIV) in Nigeria vary from 44% (Afolabi et al., 2009) to 98% (Onyeonoro et al., 2013). Factors shown to be associated with good adherence include text message as reminders (Maduka and Tobin-West, 2013), patient selected treatment partners, (Taiwo et al., 2010) use of pill box, (Ukwe et al., 2010) age and gender (Olisah et al., 2010). On the other hand, psychiatric morbidity negatively had adverse impacts on adherence (Salami et al., 2010).

Social support is a significant resource for individuals and family members encountering stress and is seen as one of the keys to well-being of individuals, especially for those experiencing major life transitions and crises (Caplan, 1974). Assessment of social support among PLWHA, should include (a) the kinds of support available, such as emotional support, information, financial aid; and (b) the sources of support, such as family, friends and peers. There is paucity of literature in our environment on the influence of social support on ART adherence. A literature search done on the subject using e-databases such as Medline, Pubmed, HINARI and AJOL as well as a search of local libraries yielded only five published studies done in Sub Saharan Africa that addressed the importance of social support to improve adherence, and none of these studies examined social support using these dimensions. In view of the foregoing, this

study intends to investigate the relationship between social support and ART Adherence among PLWHIV using the two key dimensions of social support.

1.2 Problem Statement

Where there is access to HAART, the problem becomes that of adherence to the treatment regimen. Indeed adherence is one of the key factors that determines the success or failure of HAART. However studies done in Nigeria have shown that about 21.7% (Igwegbe and Ugboaja, 2010) to 37.1% (Olowookere et al., 2008) of Nigerian patients on HAART are not adherent to their medication. If adherence of 95% and above is not achieved, treatment failure is most likely to occur. Thus, non-adherence to HAART is a major cause of HIV drug resistance and subsequent immunological and clinical failure (Machtinger, 2005). Globally, the world is witnessing a gradual increase in drug resistance to the anti-retroviral drugs. In North America, the overall prevalence of high-level resistance to 1 or more drugs increased from 3.4% to 12.4% within a 5 year period (Grant, 2002) with significant increases seen within each class of antiretroviral medication. The prevalence of resistance to drugs from 2 or more classes also increased from the earlier period to the later period, from 1.1% to 6.2%. Evidence is accumulating of a rising prevalence of transmitted HIV drug resistance (TDR), predominantly associated with non-nucleoside reverse transcriptase inhibitors (NNRTIs), in east and southern Africa (Hamers et al., 2013). A cross-sectional study of HIV drug resistance in adults with HIV-1 in Kenya, Nigeria, South Africa, Uganda, Zambia, and Zimbabwe revealed a drug-resistance prevalence of 5.6%, ranging from 1.1% South Africa, to 12.3% in Uganda (Hamers et al., 2011).

HIV/AIDS patients had repeatedly shared that they did not want to take their tablets in front of anyone including family members because of fear of stigmatization. This indicates that socio-cultural barriers may affect ART adherence (Afolabi et al., 2013). Much research has been done in the area of adherence to antiretroviral treatment and on interventions to improve adherence, however these have mostly been in the developed world, and had mainly focused on behavioural and cognitive interventions such as adherence counseling and different forms of reminders. There is not enough evidence for the wide spread implementation of interventions focused on improving patients' social support, largely due to insufficient knowledge of the impact of social support on adherence. Determination of the relationship between social support and adherence to

HAART is therefore of paramount importance if the gains of HAART are to be experienced and sustained both at an individual and national level.

1.3 Justification

Of all the factors thought to influence treatment failure, patient adherence to medication is the most important and most modifiable. (American Public Health Association (APHA), 2004) With the appreciable rise in drug resistance due to non-adherence, it is important to improve and maintain adherence to HAART among people living with HIV and AIDS. It is therefore necessary to reduce the rate of non-adherence among HIV patients. It is known that several sociological and psychological factors influence adherence of patients to treatment. Again, it is common knowledge that multi-faceted interventions, including social support are needed for good chronic disease care outcomes, however, research on ART adherence has tended to focus on micro factors limited to experimental control such as educational strategies, scheduling accommodations to the regimen, and various forms of reminders, which achieve only modest results. Adequate attention has not been paid to research required to understand how social factors influence adherence. Although multiple studies have confirmed the positive association between social support and adherence to medication regimens across different chronic illnesses (Becker and Maiman, 1980; Caplan et al., 1980), and on adherence to ART (Remien et al., 2003), these have been limited to the developed world and there's paucity of literature in our environment on studies assessing the effect of social support and adherence to ART.

Again, to successfully address the problem of adherence, it is crucial to measure it, and identify its determinants and influencing factors. Identifying factors that determine adherence will help to tailor interventions to address it. This underscores the need to conduct a thorough assessment of the patient specific factors, medication specific and health facility specific factors that influence adherence, develop and maintain a therapeutic alliance between the patient and his/her health care providers, and implement multiple interventions to address barriers to adherence. (APHA, 2004) This is of paramount importance if the gains of HAART are to be experienced and sustained both at an individual and a national level. The findings of this study could also prove useful to policy makers, program planners and antiretroviral service providers in the state and country for implementing large scale adherence interventions.

1.4 Research Questions

1. What is the rate of adherence among HIV patients on ART in Rivers State
2. What is the level of social support provided to patients on ART medication in Rivers State
3. Is there any association between patients' social support and non-adherence to ART
4. What factors determine non-adherence to ART among HIV patients on ART in Rivers State.

1.5 Aim and Objectives

1.5.1 General Objective

To determine association between social support and non-adherence to Anti-Retroviral Therapy among HIV patients in Rivers state

1.5.2 Specific Objectives

1. To determine the rate of adherence to anti-retroviral therapy among HIV patients on ART in Rivers State.
2. To measure the level of social support received by patients on ART in Rivers State
3. To determine the association between social support and non-adherence to ART among HIV patients in Rivers State.
4. To identify patient specific, medication specific and health facility specific factors associated with non-adherence to ART among HIV patients in Rivers State

1.6 Hypothesis

Ho: There is no significant association between social support and non-adherence to ART among HIV patients on ART in Rivers State

H1: There is a significant association between social support and non-adherence to ART among HIV patients on ART in Rivers State

CHAPTER TWO

LITERATURE REVIEW

2.1 The Burden of HIV/AIDS

The HIV/AIDS epidemic has emerged as one of the major challenges for the world, going from a relatively small problem in the 1980s to one of the leading causes of mortality and burden over the last decade. Since the beginning of the epidemic, almost 78 million people have been infected with the HIV virus and about 39 million people have died of HIV. Globally, about 35 million people were living with HIV, and 1.5 million people died of HIV-related illnesses worldwide in 2013. About 8 in every 100 adult aged 15-49 years, worldwide are living with HIV, although the burden of the epidemic varies considerably between countries and regions (World Health Organization, 2013). Sub-Saharan Africa remains most severely affected, with nearly 1 in every 20 adults living with HIV and accounting for nearly 71% of the people living with HIV worldwide.

With a population of about 160 million (NACA, 2012), Nigeria currently has one of the highest HIV and AIDS epidemic burden worldwide. It has a generalized epidemic with a prevalence of 3.4%, (Federal Ministry of Health, 2012) an estimated 3.2 million people living with HIV, 2.2 million AIDS related deaths annually and 2,229,883 total AIDS orphans. HIV prevalence was highest among the 35-39 years age group (4.4%) and lowest among the 15-19 years age group (2.9%) while the widowed had the highest prevalence (6.2%). By December 2012 only 491,021 out of an estimated 1.66 million people who require anti-retroviral drugs (ARVs) were receiving them. (NACA, 2013)

HIV infects the cells of the immune system and destroys or impairs their function resulting in the body being unable to fight off infections and diseases. AIDS is the most advanced stage of HIV infection defined by the occurrence of any of more than 20 opportunistic infection such as tuberculosis or related cancers. HIV is transmitted through unprotected sexual intercourse (vaginal or anal) or oral sex with an infected person; transfusion of contaminated blood; the sharing of contaminated needles and other sharp instruments and from mother to baby during childbirth and breast feeding. (Federal Ministry of Health, 2005)

HIV/AIDS is one of the world's most significant public health challenges with 34 million people living with the virus, and an estimated 2 million deaths yearly. (UNAIDS, 2012) (UNAIDS, 2012) Since 1981 when the first case of HIV/AIDS was discovered and first described, to date, more than 27 million deaths have been attributed to HIV/AIDS. (UNAIDS, 2012) This has placed HIV/AIDS as the world's leading cause of death from an infectious disease. In Nigeria, according to the 2010 HIV National Sentinel Survey, the HIV sero-prevalence rate is estimated to be 4.6% with about 2.98 million (9% of the global total) people living with HIV. (Federal Ministry of Health, 2010)

WHO has classified HIV infection into four clinical Stages based on the patient's clinical presentations at the time of initial consultation with the healthcare provider; Clinical stage I are asymptomatic, II-Mild Symptoms- minor mucocutaneous manifestation, weight loss less than 10% of body weight etc, III-Advanced Symptoms-Pulmonary tuberculosis, Weight loss > 10% of body weight, Unexplained chronic diarrhoea > 1 month, Unexplained persistent fever etc, IV-Severe symptoms- HIV wasting syndrome, Pneumocystis Jiroveci pneumonia, Kaposi's sarcoma and other opportunistic diseases. (Federal Ministry of Health, 2010) Laboratory diagnosis is based either on detection of the antibodies in the plasma or serum or demonstration of the virus in the plasma. Generally, any HIV infected person can be detected by laboratory tests within 6 months of infection. Patients who test positive and meet the criteria for the initiation of Anti-Retroviral Treatment (ARV) can be offered. Four different classes of ARV available for HIV treatment in Nigeria are Non-nucleoside reverse transcriptase inhibitors (NNRTIs) such as nevirapine and efavirenz; Nucleoside reverse transcriptase inhibitors (NRTIs) such as zidovudine, lamivudine and stavudine; Nucleotide analogue (NtRTIs) such as tenofovir and protease inhibitors (PIs). (Federal Ministry of Health, 2010)

2.2 Antiretroviral Treatment Program

Substantial global action has emerged around the HIV/AIDS epidemic. New institutions such as UNAIDS, the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) (GFATM, 2010) as well as the US President's Emergency Plan for AIDS Relief (PEPFAR) were formed with substantial commitments to HIV/AIDS. These new global actors have been key in raising national policy awareness in many affected countries and in scaling up access to antiretroviral

therapies (El-Sadr et al., 2012). In 2011, eight million HIV-positive people received ARTs (a 20-fold increase since 2003), translating into 54% of all eligible people in low and middle-income countries.(UNAIDS, 2013) In Nigeria, the national ART program was initiated in January 2002. The program began in February 2002 involving 25 treatment centers across the 6 geo-political zones and was subsidized at a cost of \$10 per month for each patient.(Idigbe et al., 2005) Under this program, 10,000 adults and 5,000 children were treated with a 3 drug combination between 2002 and 2003. However, in 2004, the program suffered a major setback with loss of drugs, worth USD\$3.5 million. This created a structure-induced non-adherence as many patients were off drugs for up to 3 months. In 2006, the Federal Government of Nigeria introduced the free ARV treatment policy for all eligible persons, with a total of 74 treatment sites participating in this program by the end of 2006. Since then, the ART program has witnessed massive scale up in the number of sites providing ART services and in the number currently receiving treatment. The number of sites providing ART has increased from the 25 sites in 18 states in 2002 to 820 sites in 2013 and spanning all 36 states and the Federal Capital Territory (FCT). Also the number of adults and children currently receiving ART has increased to 639,837 persons as at 2013.(NACA, 2014)

2.3 Overview of ART Adherence

Medication taking behavior was initially discussed in terms of “compliance” which was meant to connote the level to which a patient’s behavior aligned with what the health care provider had prescribed (Sakett,1976). Since the 1970’s when this term was introduced, researchers have begun to recognize the fact that it places the patient in a subservient position to the doctor, essentially eliminating a patient’s right to exercise authority over health decisions regarding their own body (Drotar, 2000), (Vrijens, 2012). Since then “adherence” has replaced compliance as the appropriate term for talking about medication taking behavior. The term adherence requires that the patient must first agree to the treatment plan, after which their participation in that treatment plan is measured (Balkrishnan, 2005).

There is currently no standard clinical definition of adherence and thus several definitions are in use. Stedman’s Medical Dictionary defines adherence as the extent to which the patient continues the agreed upon mode of treatment under limited supervision (Williams & Wilkins, 1995). Adherence in the context of HIV Medicine can be defined as the whole process from

choosing, starting, managing to maintaining a given therapeutic medication regimen to control HIV viral replication and improve function of the immune system.

Non-Adherence is thus defined as the discontinuity or cessation of part or all of the treatment such as dose missing, under dosing, overdosing or drug holidays.(Fong, 2003) Medication adherence can also be defined mathematically as the percentage of prescribed doses taken.(Ickovics, 1997) Most experts agree that for best results, at least 95% treatment adherence to HAART is optimum.(Shah, 2007; Reiter et al., 2000; Paterson et al., 2009) The Nigerian National Guidelines for HIV and AIDS Treatment and Care in Adolescents and Adults concurs with this cut off asserting that for a patient to be tagged as adherent he/she must not miss more than one dose in ten days if on a twice daily regimen.(FMOH, 2010)

Treatment adherence is defined as the extent to which a person currently takes prescribed medication.(Monjok and Smesny, 2010) It is widely agreed that in order to achieve an undetectable viral load and prevent the development of drug resistance, a person on ARV drugs needs to take at least 95% of the prescribed doses on time. Highly active antiretroviral therapy is the only proven treatment for HIV/AIDS. HAART is the combination of three or more drugs from at least two different classes of antiretroviral (ARV) therapy.(Idoko and Taiwo, 2006) Drug adherence is a key determinant of successful HAART. More than 95% of the doses should be taken for optimal response while lesser degrees of adherence are more often associated with virological failure.(Olowookere et al., 2008) Poor adherence can lead to treatment failure, development of drug resistance and subsequent immunological and clinical failure (Olowookere et al., 2008),(Olowookere et al., 2015). Treatment failure is typically defined as a detectable viral load usually accompanied by a falling CD4 T-cell count.

Much research has been carried out on issues surrounding adherence to Anti-Retroviral Treatment, since it has been proven that patients with good adherence to HAART tend to experience remarkable improvement in viral load, CD4+ cell counts and clinical status and have better quality of life. It is a well-documented fact that adherence to ARV treatment is the second strongest predictor of progression to AIDS and inevitably death, after CD4 count (Hogg et al., 2002; Paterson et al., 2000)

Much research work has also been done in respect to testing interventions to improve adherence. Many of these studies have employed experimental and quasi-experimental study designs, while

a few have been cohort studies. Interventions to improve adherence are manifold. Some researchers have categorized them as Cognitive, Behavioural, Affective and modified DOTS (Heyer, 2006),(Simoni and Frick, 2003), (Fogarty et al., 2002). The World Health Organization in its publication on adherence, rather than classifying all the various interventions to improve adherence advocated individual interventions as a response to the 5 dimensions of adherence earlier discussed (World Health Organization, 2003).

CD4 cell counts are used as a biological tool for staging of HIV disease, cutoff for commencement of HAART and a monitoring tool for treatment progress. With regards to patient monitoring the three main measures that are advocated include virological monitoring with significantly reducing viral RNA in plasma leading up to undetectable viral loads (mRNA < 50 copies/ml), immunological monitoring measured by improvement in CD4+ cell counts and clinical monitoring. Increases in CD+ cell counts typically accompany a virologic response to therapy but may also be seen independent of optimal virologic suppression. The gold standard of patient monitoring is the viral load assays. However these are cost intensive and scarcely available in resource poor settings.

Thus CD4+ cell counts have been found to be a useful tool globally and especially in countries with limited resources. The National ART treatment guidelines advocates as mandatory, a baseline and three to six monthly CD4+ cell counts for all patients on HAART.

Many studies have shown that increasing adherence is strongly related to increasing CD4+ cell count levels and vice versa. Wang et al in their study of adherence and its outcomes in China found out that mean CD4+ cell counts increased from 254 cells/ml at baseline, to 275 cells/ml after three months, and 310 cells/ml after six months of consistent adherence to medication.(Wang et al., 2009)

However many other studies could not establish significant increases in mean CD4+ cell counts even though adherence improved among the study participants.(Goujard and Bernard, 2003)

2.4 Measurements of Adherence

The measurement of adherence has been the focus of much discussion and debate among researchers. Researchers agree that there is no gold standard for measuring adherence, as there is no way to measure adherence in outpatient settings with absolute accuracy.(Sahay et al., 2011; Miller and Hays, 2000) Several approaches have been used. They include: patient self-report,

patient attendance at programmed visits, pill counts, pharmacy records, measurement of drug levels, biological surrogate markers and use of Medication Event Monitoring System (MEMS-cap). All these methods have clear advantages and disadvantages. Pill counts can be conducted in clinic or at unannounced home visits. It is usually calculated by counting the remaining doses of medication and assuming that remaining pills in excess of what is expected represent missed doses. (Machtiger, 2005) The sensitivity of pill counts for detecting adherence is compromised when patients remove pills from their containers without taking them (ie, "pill dumping" or "decanting"). This practice leads to an overestimate of adherence. Unannounced pill counts were developed to account for this practice but are too intrusive and cumbersome for common clinical practice. Biological markers of adherence refer primarily to plasma concentrations of antiretroviral drugs. Plasma concentrations of PIs have been significantly associated with adherence behavior in a limited number of studies, (Murri et al., 2000). Plasma concentrations are limited by their ability to detect only recent adherence behavior. Furthermore, low concentrations of antiretrovirals also may be caused by factors other than adherence, such as mal-absorption, drug interactions, and individual metabolic differences. Pharmacy refill data measures adherence by providing the dates on which antiretroviral medications were dispensed. If the refills do not follow a timely order, it is assumed that the patient is not taking medication between refills or is missing doses in a way that allows the medication to last longer than it should. This provides a less intrusive means of measuring adherence than most other measures. The method widely agreed to give the most accurate indication of adherence is the MEMS-cap, (Martin et al., 2009) which comprises of a computer chip placed on the caps of medication containers. This chip records the days and times each container is opened. The information on the chip can then be downloaded on a computer and analyzed to give an overview of adherence (DeKlerk et al., 1997). This method is however faulted for being very expensive and too sophisticated for resource poor settings (APHA, 2004; Miller and Hays, 2007). On the other hand, patient self-report of adherence in the form of diaries, interviews and surveys, are relatively easy to obtain and are inexpensive. The argument against this method of assessment however, is the tendency for recall bias and an overestimation of client adherence. (APHA, 2004) Thus researchers caution that skepticism is warranted when patients report high adherence, though patients should generally be believed when reporting poor adherence. (Gill et al., 2005) For these reasons some researchers advocate a combination of two or more methods in order to

obtain a more valid estimation. However these researchers also agree that in resource poor settings this may be impractical (Geletkko et al., 1996). Thus self-reported adherence measures are still the most widely used till date in spite of its obvious limitations.

2.5 Adherence Rates

The rate of adherence has been the focus of several research efforts both in developed and developing populations. Several studies have shown that adherence rates are quite low worldwide. A meta-analysis to evaluate HAART adherence in sub-Saharan Africa and North America, involving 31 American and 27 Africa study (including 12 sub-saharan Africa studies) populations published by Mills et al. in August 2006, showed that proportion of clients achieving adequate adherence to HAART documented by the studies under review ranged from 33% to 88% with a pooled estimate of 55%, and 77% of clients achieving adequate adherence in the American and African studies respectively (Mills et al., 2006). This is a far cry from the recommended adherence level of 95% agreed by most scholars to be necessary to maintain optimum levels of the drug in the blood stream so as to adequately control viral replication and ensure clinical improvement. Quite a number of indigenous cross sectional and longitudinal studies have been done on adherence to HAART and all of them agree that adherence levels are generally suboptimal. The reported adherence rates to ART medication among people living with HIV in Nigeria vary from 44% to 98%. (Akinboro et al., 2014) In Rivers State alone, a search of the literature identified two studies done in the last ten years (Nwauche et al., 2006) (Asekomeh, Ebong, & Onwuchekwa, 2010). In the study of adherence to HAART in UPTH by Nwauche et al in 2006 (Nwauche et al., 2006), it was discovered that less than half (49.2%) of the study subjects were adherent to their treatment. However, the 2010 study of Asekomeh et al (Asekomeh et al., 2010) conducted in the University of Port Harcourt Teaching Hospital (UPTH) and the Braithwaite Memorial Specialist Hospital (BMSH) discovered an adherence rate of 72.2% among study participants; an improvement on the 2006 study. This finding by Asekomeh et al is consistent with the findings from the retrospective study done by Agu et al (Agu et al., 2010) at the Central Hospital Benin, which found that 18 months after commencement of HAART, adherence level was 73.8% in the study group. Two recent studies by Oku et al, (Oku et al., 2013) in a tertiary hospital and rural community (Oku et al., 2014) in Cross-Rivers State

showed adherence rates of 59.9% and 50.4% respectively, a deviation from the rates in other parts of the south-south.

A cross-sectional study among pregnant women in south-eastern Nigeria, (Igwegbe, Ugboaja, & Nwajiaku, 2010) revealed a non-adherence rate of 21.7%. Another study by Uzochukwu et al (Uzochukwu et al., 2009) among HIV patients in the University Teaching Hospital, detected a non-adherence rate of 75%. However, the most recent study on adherence in eastern Nigeria (Onyeonoro et al., 2013), conducted in a teaching Hospital in Nnewi, showed an adherence rate of 86% and mean level of adherence of 97.8%.

Studies in south-west Nigeria, such as the ones done by Idigbe et al (Idigbe et al., 2005) and Adedayo et al (Adedayo and Modupeola, 2005), both in 2005, discovered that 86% of the sample population were adherent to HAART. Interestingly, though Idigbe et al used a very small sample of only 44 people while Adedayo et al studied 689 patients on HAART, the outcome in terms of proportion adherent to HAART was similar. Lower adherence rate of 44% was reported in 2009 by Afolabi et al (Afolabi et al., 2009) in Osun state. In another study by Olowokere et al, (Afolabi, Afolabi and Odewale, 2013) in Ibadan, non-adherence was found to be 37.1% implying an adherence rate of 62.9%, which is in agreement with a recent study by Akinboro et al (Akinboro et al., 2014) study which reported an adherence rate of 62.6% in Osogbo. A recent study in Lagos (Kasumu, 2014) showed an adherence rate of 78.4%.

In Northern Nigeria, a (Iliyasu et al., 2005) study among AIDS patients in Aminu Kano Teaching hospital showed that only 54% of them were adherent to their treatment. However, Bello found that 73.3% of patients on HAART in Ilorin, (Bello, 2011) were adherent, based on self report. This improvement in adherence is in agreement with a recent study in North Central Nigeria (Avong et al., 2015), which found an adherence rate of 97.3%. It must be noted that some of these authors used different thresholds for measuring adherence other than the generally advocated 95%. For instance Idigbe and Iliyasu et al used 80% adherence threshold. All the other indigenous studies identified, used the 95% adherence threshold.

2.6 Overview of Social Support in Public Health

Social support is a significant resource for individuals and family members encountering stress. It is seen as one of the keys to well-being of individuals, especially for those experiencing major

life transitions and crises (Caplan, 1974) Social support possesses different dimensions and is expressed in different forms and different ways. In the context of HIV/AIDS, the source of social support can come in the form of emotional support from family, friends, and peers (Greenberger, et al., 2000). It can also emanate from social interactions in the community including professionals (Brashers, 2002) and even from interaction with the environment. Having people in one's life during a stressful episode from whom one receives emotional, informational, and/or tangible support is a major factor mediating such outcomes. It is postulated that individuals who have access to resources such as social support are more likely to be effective in managing stressful situations and less likely to experience poor outcomes. Conversely, those who are deficient in resources such as social support are less able to manage the situation effectively, and thus are more likely to experience negative outcomes. (Lazarus, 1984) Extensive evidence suggests that social support contributes to positive adaptational outcomes, even in the most difficult of situations, and its absence contributes to poor outcomes. For example, social support has been found to mitigate depressive symptoms of HIV-positive individuals (Hudson et al., 2001).

ART programmes are rapidly expanding throughout sub-saharan Africa, bringing hope to people living with HIV/AIDS. However, ART is complex and requires consistency in adherence to treatment regimes. This requires careful monitoring of patients which could be best achieved with the support of a partner, family member and peers from the community. Disclosing HIV status and ART initiation to long term partners are therefore often said to be key to ART adherence. (Skovdal et al., 2011)

With regards to care of PLWHA, two sources of support have been identified and proved functional. The first relates to family and friends, and the second to community-based support, government agencies, and the health care industry (Yadav, 2010). This non-family support also include those relating to nursing practice and care of PLWHA as information provided for referral and counseling by counselors, health workers. Medical treatment given is considered tangible support. This support was found to be greater than family support network in a recent study on PLWHA in Nepal (Yadav, 2010). Support from families and others has been reported to have either positive or negative effect after disclosure, satisfaction with family support was reported to have helped PLWHA overcome depression, reduce high-risk behaviors, seek medical

treatment, and go on with life normally, this finding was also reported to encourage safer sex practice and is best positive predictor of medication adherence in PLWHA (Salter et al., 2010) (Vyavaharkar et al., 2007). Positive support from friends and family is valuable to counter stigma. This finding was also reported in a study on African-American from an HIV social service agency that only perceived social support from friends was found to be related to reduced perceived stigma (Yadav, 2010), (Galvan et al., 2008), (Ahmed and Lemkau, 2007). Different cultures may have different perceptions of support. African-American men compared to their counterpart HIV-infected older white men reported more support from family members, and were less likely to disclose their HIV sero-status to close friends due to stigma (Heckman et al., 2000). The health benefits of satisfaction with social support has also been reported in children living with HIV, vulnerable children have low levels of perceived social support (PSS), and high level of PSS is associated with better psychological health (Hong et al., 2010), (Okawa et al., 2011) (Hong et al., 2010), (Zhao et al., 2011). Greater perceived social support from friends has been associated with a lower negative self-image about being HIV positive (Galvan et al., 2008). Family members, particularly spouses or partners, appear to be the most important source of social support, and account for most of the association between social support and health. There is evidence that support from sources outside the family cannot compensate for what is missing in the family and that the family is the main source of care and support for PLWHA in most developing countries. Also, siblings and special persons can be effective sources of social support for PLWHA (Hong et al., 2010), (Okawa et al., 2011)

In a recent study in Nigeria, where the family and community were actively involved in care and support of PLWHA, there was better perception of psychological care received from family than from community, and improvement in community based care has shown to improve the wellbeing of PLWHA (Ileban and Fabusoro, 2011).

Various types of support like informational, instrumental, and emotional supports may be needed in varying combinations at different stages in the process of HIV infection. Various forms of support rendered to PLWHA by family members is documented, such as accompanying the patients to the health facilities, paying hospital bills, some prayed, some provided financial assistance, psychosocial and emotional support (Oluwagbemiga, 2007)

Although all types of social support were associated with reduced depression, informational support was especially beneficial for those in early stages of the disease (Friedland, Renwick, & McColl, 1996). Also, better perception of social support from peers and non-parental figures has been associated with greater condom use behavior among young urban slum inhabitants in southwest Nigeria (Adedimeji et al., 2009). Being HIV positive does not necessarily translate to poor social support. This is because social support is not only regarded as availability of support but rather its perceived adequacy (Yadav, 2010). This concept is also confirmed in studies, where HIV positive status was associated with higher perceived social support (Okawa et al., 2011)

2.7 Adherence Knowledge, Practice and Behaviour

The WHO in their 2003 adherence report identified patient knowledge and beliefs about their treatment as a possible barrier or facilitator of adherence. This point of view is shared by the American Public Health Association (APHA) in their document on adherence best practices stating that patient knowledge of the treatment plan and regimen has a strong relationship to treatment adherence (American Public Health Association (APHA), 2004). Agu et al in their study of treatment outcomes in patients receiving ART in Central Benin found out that 84.1% of their study participants had good knowledge of their medication details (Agu et al., 2010) whereas Wang et al in their own study on factors associated with adherence found out that 24.6% of their study participants (n=181) could not describe the correct method of taking their prescribed medications (Wang et al., 2009). Johnson et al in their study found out that patient lack of knowledge of their treatment was associated with decreased adherence. (Reiter et al., 2000) Furthermore, the Hulka et al study found out that patients who learned the names of their medications were more adherent than those who did not know. The Mehta et al study found out that patient non adherence was significantly associated with the patient not knowing the correct dose of medication. Hill et al also observed in their publication on Patterns of adherence to antiretrovirals, that an individual's knowledge of ART has significant impact on his adherence behaviour. Thus adherence behaviour is based on personal interpretation of good adherence practice. Cognitive Interventions have the potential to improve ART related knowledge but may not address adherence behaviour and practice. Ogunbanjo et al in their review showed that cognitive interventions improve HIV and ART related knowledge but that this is not consistently

associated with better adherence. They thus suggested that a combination of cognitive and behavioural interventions is more desirable in addressing adherence behaviour. (Heyer, 2006)

2.8 Factors Influencing the Practice of Adherence

The World Health Organization in its publication on the subject of adherence discusses adherence generally under five dimensions which include patient related factors, therapy related factors, socioeconomic related factors, health care team /health system related factors and condition related factors (World Health Organization, 2003). The American Public Health Association on the other hand crystallizes these WHO five dimensions into three sub groups, which are patient based factors, provider based factors and treatment based factors. In many of the studies discussed below, the researchers endeavoured to elicit the factors influencing adherence behaviour in the populations under study.

The Nwauche et al study conducted at the University of Port Harcourt teaching hospital before the era of the free HAART program found that respondents singled out cost constraints, unavailability of drugs, medication side effects among others as the chief reasons for poor adherence (Nwauche et al., 2006). In the study by Asekomeh et al, majority of study participants identified forgetfulness, no pills at dosing time, feeling uncomfortable after taking medication, trying to save money and having too many medications as their reasons for lack of adherence (Asekomeh et al., 2010). The Daniel et al study identified stigma and rejection, depression, poor judgement, preference for spiritual/alternative medical solution, improved physical condition (client feeling better), cultural practices, and cost of transportation as the factors responsible for poor adherence. The study done by Adedayo et al highlighted cost of drugs, accessibility to treatment, level of knowledge, drug supply issues, and traditional health beliefs as the factors responsible for poor adherence (Adedayo and Modupeola, 2010). Iliyasu et al in their study of HIV treatment compliance in Aminu Kano Teaching Hospital identified educational level, availability of drugs, financial situation, and ability to remember as factors influencing adherence to HAART treatment (Iliyasu et al., 2011).

Other studies evaluating the factors affecting adherence levels have found these barriers and facilitators to adherence to HAART to be numerous and varied between developed and developing nations. One such study is a systematic review of 84 adherence studies done in developed (72 studies) and developing countries (12 studies) by Mills et al. This review revealed

that studies done in developed and developing countries shared many similarities with regards to facilitators and barriers to HAART adherence. However some factors were more prevalent with developing countries. Some of the barriers identified from the meta analysis include fear of disclosure, forgetfulness, a lack of understanding of treatment benefits, complicated regimens, and being away from their medications were consistent barriers to adherence across developed and developing nations. More common to developing settings were issues of access, including financial constraints and a disruption in access to medications (Mills et al., 2006). Facilitators of adherence identified by both quantitative and qualitative studies in developed and developing countries include, feeling of self-worth, acceptance of status, understanding the need for adherence, disclosure to supportive family and friends, belief in the efficacy of the drugs, simplified regimen, positive relationship with health care providers and being actively involved in treatment decision making (Mills et al., 2006).

A cross-sectional survey of 116 individuals with advanced HIV and on HAART was conducted between June and July 2006 by Harvey et al to evaluate adherence to HAART in adults living in Jamaica. Their findings show that factors associated with non-adherence include being away from home, sleeping through dose-time, forgetfulness, and running out of pills. Having no food, not wanting to be seen taking medication, and intolerable side effects were other reasons given for non-adherence in this study group. These findings led the researchers to conclude that more emphasis needs to be laid on preparing adults for HAART treatment (Harvey et al., 2006.). In the Boye S et al National Cross-sectional survey on financial barriers to HIV treatment in Yaounde Cameroon, they observed that over 20% of the clients on ARV had difficulties procuring their drugs due to financial constraints. They thus concluded that adherence would greatly improve if the removal of user fees was implemented (Boyer et al., 2009). Many other studies have tried to investigate the relationships between adherence behaviour and socioeconomic status. For instance a systematic review of 17 original articles exploring the relationship between socioeconomic status and adherence to HAART done by Falagas did not discover any conclusive evidence of a clear association (Falagas and Zarkadoulia, 2008).

CHAPTER THREE

METHODOLOGY

3.1 Study Area

The study was carried out in Rivers State, one of the 36 states in Nigeria located in the oil rich region of the Niger Delta. The State has a total population of about 5.18 million, projected from 2006 census with a growth rate of 3.0% and is home to many ethnic groups: Igbo, Ikwerre, Ijaw, Kalabari, Etche, Ogba, Ogoni and others. Rivers State has one of the biggest economies in Nigeria, mainly due to large deposit of crude oil. There has been a rising trend of HIV/AIDS and other sexually transmitted diseases within the state which has been attributed to the high incidence of transactional sex and risky sexual behavior due to influx of highly mobile young, sexually active populations into the oil rich region. With a HIV/AIDS prevalence of 15.2% (the highest in the country), Rivers state is not exempt from the HIV/AIDS pandemic prevalent in Sub Saharan Africa. The State Agency for the Control of HIV-AIDS (SACA) is in charge of coordinating all HIV prevention and control activities within the state, while State AIDS and STI Control Program (SASCP) is responsible for all health sector-driven prevention interventions in the state. They receive support from the State Ministry of Health, several non-governmental organizations and community based civil society organizations.

The antiretroviral therapy service in the state commenced in 2005, and the number of sites providing ART services increased from 2 in 2005 to 8 in 2009 (Tobin-West and Okeh, 2012). There are currently eight treatment facilities offering HAART services within the State. The University of Port-Harcourt Teaching Hospital; funded by the Federal Government, Braithwaite Memorial Specialist Hospital, Bonny General Hospital, Kelsey Harrison medical Centre, the Ahoada General Hospital, Bori General Hospital, Health of the Sick Catholic Hospital and Military Hospital. These clinics cater to about 480-600 patients on a daily basis and provide free antiretroviral treatment to all those accessing care.

The University of Port Harcourt Teaching Hospital is a 750 bed tertiary institution owned and managed by the Federal Government of Nigeria. The Anti-retroviral Clinic is domiciled at the Medical Outpatient Clinic of the hospital and is co-managed by the Internal Medicine, Haematology and Community Medicine departments. The clinic was previously run twice

weekly but was recently extended to daily clinics as a result of huge volume of patients. At present, the hospital has a data base of about 12,000 registered HIV/AIDS patients in ART. The clinic attends to an average of 60-70 HIV patients daily, and about 50% of these patients are co-infected with TB. It has one consultant, two nurses, an average of six doctors per clinic day, one ward maid, three pharmacy staff and two records staff attached to it. Members of the counselling and social welfare department are also involved in the clinic. There are two designated consulting rooms, a pharmacy and a waiting area for clients. Each clinic session starts with general health education sessions conducted by the nurses and counselors after which the clients are given the opportunity to see a doctor or simply proceed to the pharmacy for drug refills depending on their preference. New clients are seen, investigated and commenced on HAART if eligible.

3.2 Study Design

The study was an un-matched case-control study in a ratio of 1 Case: 1 Control. The social support of non-adherent HIV positive patients (cases) was compared with that of adherent patients (Controls).

3.2.1 Case Definitions

A case was defined as a patient who has taken less than 95% of prescribed dose in the 2 weeks prior to the study (ie non-adherent patient).

A control was a patient who has taken at least 95% of prescribed dose in the 2 weeks prior to the study (Adherent patient).

3.2.2 Operational Definitions

Social Class: The classes are described as follows:

I – Professionals (Accountants, Engineers, Journalist)

Managerial and Technical Occupations - (Teachers, Secretaries, Nurses)

II – Skilled workers (Drivers, carpenters, mechanics, caterers, tailor)

III – Semi-skilled workers and small scale traders

IV – Unskilled workers (petty traders, night guards, cleaners, students)

Adherence: To take at least 95% percent of prescribed dose in the two weeks prior to study. For a patient to be tagged as adherent in this study, he/she must not miss more than one dose in fifteen days if on a twice daily regimen.

Non-Adherence: To take less than 95% percent of prescribed dose in the two weeks prior to study.

Social Support: The sum total of informational, emotional, affectionate and tangible support received by patients including positive social interactions experienced by the patient.

3.3 Study Population

All adult clients on ART regimen, accessing treatment at the University of Port Harcourt Teaching Hospital, Port Harcourt, in Rivers State.

3.3.1 Inclusion Criteria

1. Adult HIV patients 18 years and above
2. Patients with confirmed HIV-positive status who had received Anti-Retroviral drugs for at least 3 months prior to the study. This was to allow adequate time for adherence issues, if any, to have surfaced.

3.3.2 Exclusion Criteria

1. Pregnant women
2. Terminally ill/debilitated patients
3. Patients on admission

3.4 Sample Size Determination

Sample size formula for Case – Control study was used to estimate sample size as follows;

$$n = \frac{(r+1)(p)(1-p)(Z_{\beta}+Z_{\alpha})^2}{r(P_1-P_0)^2}$$

$$P_1 = \frac{P_0 \times OR}{[1 + P_0 \times (OR - 1)]}$$

$$P = \frac{(r \times P_0 + P_1)}{(r + 1)}$$

Two-sided confidence interval = 95%, and a desired Odds Ratio of 2 or greater

n = Sample size in the case group

Z_{β} = Desired power = 0.84

Z_{α} = Level of statistical significance = 1.96

P_0 = Percent of controls exposed = Prevalence of social support among HIV patients in a previous study = 64.5% (Williams, 2007)

r = Ratio of Controls to Cases = 1

$$P_1 = \text{Proportion of cases exposed} = \frac{0.645 \times 2}{1 + 0.645(2-1)} = 0.78$$

$$P = \text{Average proportion exposed} = 1(0.645 + 0.78)/2 = 0.72$$

$$n = \frac{1+1(0.72)(1-0.72)(1.96+0.84)^2}{1(0.78-0.645)^2}$$

$$n = \frac{2 \times 0.72 \times 0.28 \times 7.84}{0.0183}$$

$$= 172.7$$

Correcting for non-response (rate of 10%); New sample size = $n \times 100/100-x$ (where x is non response rate of 10%)

Therefore minimum required sample size is $172.7 \times 100/90$ which is $n = 192$ per group.

This resulted in a minimum sample of 192 cases and 192 controls.

3.5 Sampling Technique

Stage 1: Selection of Facility: Purposive sampling

The University of Port Harcourt Teaching Hospital was purposively selected for the study. This is because the hospital has the largest HIV patients base in the state.

Stage 2: Recruitment of participants: Consecutive sampling

Patients were recruited as they present and tested for adherence using self-reported adherence until 192 non-adherent cases were selected. The adherent patients were also selected consecutively, to make up the required number. Recruitment was done over an 8 weeks period. Only those who meet the eligibility criteria were enrolled into the study until 384 respondents were interviewed.

3.6 Data Collection Method

3.6.1 Description and design of Study Instruments

Adherence assessment tool: A five point questionnaire was used to calculate each client's self-reported adherence. This five point questionnaire was used to measure participants' knowledge of their medication and to calculate each client's self-reported adherence. (See appendix I)

Social Support measurement tool: Social support was measured using the Medical Outcomes Study Social Support Survey (MOSSSS). (Sherbourne, 1991) This instrument was developed for use with chronically ill patients, and designed to measure the individual's perception of the availability of support along four dimensions: emotional/informational, affectionate, tangible, and positive social interaction. The 19 items describe the different types of support, rated on a 5-point response format of how often a type of support is available if needed, with responses ranging from none of the time (1) to all of the time (5). The survey consists of four separate social support subscales and an overall functional social support index. A higher score for an individual scale or for the overall support index indicates more support. (Appendix II)

- a.) To obtain a score for each subscale, calculate the average of the scores for each item in the subscale.
- b.) To obtain an overall support index, calculate the average of (1) the scores for all 18 items included in the four subscales, and (2) the score for the one additional item (see last item in the survey).

c.) To compare to published means, scale scores can be transformed to a 0-100 scale using the following formula: (Social Support Survey Instrument scoring, 1992)

$$100 \times \frac{(\text{Observed score} - \text{minimum possible score})}{(\text{maximum possible score} - \text{minimum possible score})}$$

A pre-tested structured interviewer administered questionnaire on factors influencing adherence was used to collect information from the respondents. (Appendix III) The questionnaire consisted of five sections lettered A-E:

Section A: Socio-demographic details – age, sex, marital status, ethnicity, religion.

Section B: Socio-economic details – highest level of education, current employment status, occupation, average monthly income, number of dependents.

Section C: Patient related factors – Knowledge on HIV, Patient readiness, social support (disclosure of HIV status to family or friends, support from family and friends, support group membership), alcohol use, presence of substance abuse (use of marijuana, cocaine, heroine).

Section D: Treatment related Factors – Reasons for missing medications

Section E: Provider related Factors – promptness of service, availability of doctor, satisfaction with waiting time, discussion of challenges, discussion on importance of adherence, communication between health worker and client, explanation of side effects, health worker's courtesy and respect to client, overall satisfaction with all aspects of care at the treatment centre.

3.6.2 Training of the research assistants

The research team comprised the principal researcher and three trained research assistants. The research assistants were trained for 5 days on how to administer the study questionnaires and calculate adherence using the national guidelines. The ARV clinics run Monday to Friday every week. Data was collected on daily basis for a period of 2 months.

3.6.3 Pre-test of the study instruments

Questionnaire was pre-tested in Braithwaite Memorial Specialist Hospital (BMSH) ARV Clinic, Port-Harcourt, Rivers State among 20 randomly selected HIV patients.

3.6.4 Field Work

Field work was carried out over a period of 2 months.

3.7 Data Management and Analysis

Measurement of Variables

3.7.1 Dependent Variables

Self-Reported Adherence: This was calculated based on client self-report of number of pills missed in the past fourteen days. The formula used for calculating adherence was number of doses taken /no of doses prescribed \times 100%. A cut off of 95% was used to distinguish those who are adherent from those who are not. Adherence was assessed at recruitment.

A patient is said to be non-adherent if he/she reports <95% adherence to prescribed dose.

3.7.2 Independent Variables

Patient's Social Support: The Medical Outcomes Study: Social Support Survey consists of four separate social support subscales and an overall functional social support index. A higher score for an individual scale or for the overall support index indicates more support.

To obtain a score for each subscale, the average of the scores for each item in the subscale was calculated. To obtain an overall support index, the average of (1) the scores for all 18 items included in the four subscales, and (2) the score for the one additional item (last item in the survey) was calculated.

Education, Employment status, Occupation, Monthly income, Drug and Alcohol Abuse, Knowledge on HAART, patient-related, treatment and provider-related factors affecting adherence. These were determined via the questionnaire.

3.7.3 Analysis Methods

Quantitative data obtained from the study were entered and analyzed in Epi-info version 7. Data was entered, cleaned and analysed by the researcher.

Univariate Analysis was expressed as frequency distribution, percentages, mean, standard deviation and adherence rates. Frequencies were presented using tables and charts. Mann

Whitney U Test was used to median incomes of the two groups. Independent samples t-test was used to compare mean scores of overall social support between the two groups. The score for each sub-scale was obtained by calculating the average of the scores for each item in the subscale. Overall support index was calculated by adding the average of the scores for all 18 items in the four subscales and the score for the one additional item. (Rand Health, 1992). This score was then transformed to a scale of 100, by using the formula provided. The maximum obtainable score for social support was 100%. Presence and absence of social support was determined by using the midpoint score 50% (out of a total score of 100), as the cut off point for good social support. Scores below 50 were graded as poor while scores of 50 and above were graded as good. A knowledge score was used to grade the responses. Incorrect responses were scored zero and correct responses were scored 1. A total score of 2 and above was graded as good knowledge while scores of 0 and 1 were graded as poor knowledge.

Chi-square test for associations was used to test for associations between social support and adherence to HAART. Odds ratios and their 95% confidence intervals were calculated. Stratified analysis was conducted to identify potential confounding variables and assess for interaction. Stepwise forward logistic regression was employed to determine independent factors associated with ART Adherence. All factors that had a p-value ≤ 0.2 on bivariate analysis were fitted into the logistic regression model. Level of significance was set at $p < 0.05$.

3.8 Ethical Approval

Ethical Clearance for the study was sought from the Research and Ethics Committee of the University of Port-Harcourt Teaching Hospital. Informed consent was obtained from each participant after the study must have been explicitly explained to them. Before the interview, every participant was read his/her rights concerning participation and withdrawal through informed consent form (See Appendix IV). One could stop participating in this study at any time; even if he/she had already given his/her consent. Refusal to participate or withdrawal from the study did not involve penalty or loss of any benefits to which one was otherwise entitled. Research assistants were trained on the need to maintain confidentiality so as to avoid issues of stigma and discrimination associated with HIV-AIDS. None of the data record sheets or questionnaires contained client names so as to further preserve confidentiality.

CHAPTER FOUR

RESULTS

4.1 Demographic characteristics of Respondents

Table 1 illustrates the demographic characteristics of respondents. The highest number of respondents 98 (25.5%) were within the age group 30 – 34 years. The youngest and oldest respondents were aged 18 and 82 years respectively. The mean age of cases and controls were 36.7 ± 9.0 years and 37.5 ± 8.6 years respectively. This was comparable between the two groups.

More females were enrolled into the study than males. However, there was no significant difference in the male: female ratio between the two groups. The cases and controls were similar with regards to marital status.

The study respondents were from 27 different ethnic groups. However the Igbos were the most populous ethnic group represented -166 (44.9%), followed by the Ikwerres 50 (13.5%), then the Ibibios 33 (8.9%). Other ethnic groups represented include Ogonis 17 (4.6%), Ijaws 15 (4.1%) and Efiks 11 (3.0%), Kalabari 8 (2.08%), Urhobo 6 (1.6%), Yoruba 7 (1.8%). There was no significant differences ($p = 0.292$) in the distribution of respondents among the ethnic groups.

Majority of the study respondents (99.5% of cases and 98.9% of controls) were Christians. Two of the controls (1.1%) were muslims while 1 (0.5%) case practiced no religion.

Details of the distribution of respondents by socio-demographic status are shown in Table 1.

Table 1: Demographic characteristics of Respondents in UPTH, 2016

Variables	Cases n = 192 (%)	Control n = 192 (%)	χ^2	p - value
Age group (years)				
≤ 24	7 (3.7)	3 (1.6)	4.111	0.391
25 – 34	85 (44.3)	74 (38.5)		
35 – 44	64 (33.3)	78 (40.6)		
45 – 54	25 (13.0)	28 (14.6)		
≥ 55	11 (5.7)	9 (4.7)		
Mean age	36.7 ± 9.0	37.5 ± 8.6	t= 0.89	0.375*
Gender				
Male	41 (21.4)	48 (25)	0.717	0.397
Female	151 (78.6)	144 (75)		
Marital Status				
Single	65 (33.9)	63 (32.8)	0.051	0.997
Married	103 (53.7)	105 (54.7)		
Divorced / Seperated	4 (2.1)	4 (2.1)		
Widowed	20 (10.4)	20 (10.4)		
Partner's HIV Status				
Positive	70 (36.8)	73 (38.0)	0.592	0.744
Negative	67 (35.3)	72 (37.5)		
Unknown	53 (27.9)	47 (24.5)		
Ethnicity				
Igbo	78 (40.6)	88 (45.8)	4.810	0.307
Ikwerre	30 (16.5)	20 (10.6)		
Efik-Ibibio	23 (12.0)	21 (10.9)		
Ijaw	10 (5.2)	5 (2.6)		
Others (Yoruba, Hausa- fulani, Tiv, Urhobo, Anan etc)	51 (26.6)	58 (30.2)		
Religion				
Christianity	188 (100.0)	189 (98.9)	0.487	0.485
Islam	0 (0.0)	2 (1.1)		

*Student's t-test

**Fisher's Exact

4.2 Socio-economic characteristics of Respondents

About half of the study participants (49.7%) had secondary school education. There was no significant difference between the educational levels in both groups ($p=0.37$). Majority of the respondents, 342 (89.1%) were employed. Most of them 231 (60.3%) were self-employed, 68 (17.8%) were in private non-self jobs, while 42 (11.0%) of them were either unemployed or were looking for work. The distributions among the two groups were comparable ($p=0.799$).

When asked about their average monthly income, some of the respondents 56 (14.6%) did not respond. Table 2 below shows that the majority of respondents 168 (43.8%) had a monthly average income of N20,000 and below. The median monthly income was 20,000 naira with a range of 1,000 – 2,000,000 naira. There was no significant difference between incomes of the two groups (Mann-Whitney U Test = 0.766, $p=0.381$).

Social class was determined based on occupation. People were assigned to the classes first by being allocated to an occupational group according to the kind of work they do. Majority (78.1%) of cases were in the social classes I – II, while most of the controls (66.2%) were in social classes III and IV. This difference was statistically significant with $p < 0.001$.

Twenty-four (6.3%) of study participants had only one dependant. On the other hand 113 (29.4%) of respondents had five or more dependents. The distributions of dependants was comparable across both groups ($p=0.59$).

Majority of the respondents 235 (61.2%) lived within the LGA. There was no significant difference between the cases and controls in terms of place of residence.

About half of the patients 201 (52.3%) have been on ART for less than 5 years. This was however not statistically significant between the two groups.

Table 2: Socio-economic characteristics of respondents in UPTH, 2016

Variables	Case	Control	χ^2	p-value
Monthly Income				
20000	84 (43.8)	84 (43.8)	1.494	0.828
20001 – 50000	48 (25.0)	45 (23.4)		
50001 – 100000	22 (11.5)	18 (9.4)		
>100000	11 (5.7)	16 (8.3)		
No Response	27 (14.1)	29 (15.1)		
Highest Level of Education				
None	3 (1.6)	6 (3.1)	3.186	0.363
Primary	24 (12.5)	15 (7.8)		
Secondary	94 (48.9)	97 (50.5)		
Tertiary	71 (37.0)	74 (38.5)		
Current Employment status				
Employed	169 (88.0)	173 (90.1)	0.427	0.513
Unemployed	23 (12)	19 (9.90)		
Type of Employment				
Government	22 (13.0)	20 (11.7)	1.007	0.799
Private self	116 (68.6)	114 (66.7)		
Private non-self	31 (18.3)	37 (21.6)		
Social class (based on occupation)				
I – Professionals	36 (18.8)	38 (19.8)	240.60	<0.001*
II – Skilled worker	114 (59.4)	27 (14.1)		
III – Semi-skilled worker	16 (8.3)	106 (55.2)		
IV – Unskilled worker	26 (13.5)	21 (10.9)		
Social class (re-grouped)				
I – II	150 (78.1)	65 (33.9)	74.570	<0.001
III – IV	42 (21.8)	127 (66.2)		
Number of Dependents				
0 – 1	30 (15.6)	35 (18.2)	2.708	0.596
2 – 4	74 (38.5)	84 (43.8)		
5 – 7	50 (26.0)	38 (19.8)		
≥ 8	13 (6.8)	12 (6.3)		
Not applicable	25 (13.0)	23 (12.0)		
Residence				
Outside the state	17 (9.7)	14 (7.7)	3.742	0.154
Within the LGA	122 (69.3)	113 (62.4)		
Outside the LGA	37 (21.0)	54 (29.8)		
Duration on ART				
< 5 years	100 (52.1)	101 (52.6)	0.011	0.921
≥ 5 years	92 (47.9)	91 (47.4)		

*Fisher's Exact

**Student's t-test

***Mann-Whitney U Test

4.3 Health related characteristics

4.3.1: Rate of non-adherence to anti-retroviral therapy among respondents

Table 3 shows the rate of ART medication adherence by the patients. This was grouped according to the number of days, doses were missed. The adherence rate ranged from 0% (among cases who had missed doses for 10-14 days), to 100% (among controls who have never missed their medication). A total of 205 patients (192 cases and 13 controls) missed their medication at least once in the past 2 weeks.

One hundred and seventy nine (93.2%) controls achieved 100% adherence rate in the two weeks prior to the study. Among those that had missed their medications, 79.2% of cases and 6.8% of controls had achieved adherence rate of 91.9%. However 5 (1.3%) cases had missed all doses in the 2 weeks prior to the study.

The mean adherence is the average adherence rate of respondents. In general, the mean adherence rate for the cases was $87.2\% \pm 16.1$ and $99.8\% \pm 0.77$ among the controls.

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Table 3: Rate of Adherence to ART medication among HIV patients in UPTH, 2016

No of days in which doses were missed in the past 2 weeks	Case n=192 (%)	Control n=192 (%)	χ^2	p-value
1 – 2 days	152 (79.2)	13 (6.8)	328.24	<0.001
3 – 4 days .	32 (16.6)	0 (0.0)		
5 – 6 days	3 (1.6)	0 (0.0)		
10 – 14 days	5 (2.6)	0 (0.0)		
Never missed	0 (0.0)	179 (93.2)		
Total	192 (100)	192 (100)		
Mean Adherence rate in % (SD)	87.2 (16.12)	99.8 (0.77)	10.88	<0.001**

** Student t-test

3.2: Differences in CD4 Cell Count among Respondents

CD4 cell counts of patients were categorized in two groups: CD4 ≤ 200 cells/ml and >200 cells/ml. The mean CD4 cell count was compared between cases and controls. The mean CD4 Count was 276.9 (± 274.10) and 499.6 (± 290.18) for cases and controls respectively. This difference was not statistically significant with a t-test p-value of 0.442.

The result in Table 4 shows that there was no significant differences in CD4 cell count between the two groups. ($p = 0.442$)

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Table 4: Differences in CD4 cell count among HIV patients in UPTH, 2016

	Case n = 180 (%)	Control n = 185 (%)	χ^2	p – value
< 200 cells/ml	32 (17.8)	30 (16.2)	0.067	0.797
≥ 200 cells/ml	148 (82.2)	155 (83.8)		
Total	180 (100)	185 (100)		

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3.3: Reasons for missing ART medication among HIV patients in UPTH, 2016

Table 5 shows that the commonest reasons for missing medications were being away from home (5.5%), being busy with other things (53.4%) and simply forgetting to take the medications (7.9%).

Other reasons for missing medications include falling asleep 140 (36.5%), running out of pills 83 (2.1%) and because they did not want other people to notice them taking medication, 17 (0.4%).

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3.3: Reasons for missing ART medication among HIV patients in UPTH, 2016

Table 5 shows that the commonest reasons for missing medications were being away from home (5.5%), being busy with other things (53.4%) and simply forgetting to take the medications (27.9%).

Other reasons for missing medications include falling asleep 140 (36.5%), running out of pills 85 (22.1%) and because they did not want other people to notice them taking medication, 37 (9.6%).

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Table 5: Reasons given by respondents for missing ART medication

Reasons for missing medications*	Frequency	Percentage
Were away from home	213	55.5
Busy with other things	205	53.4
Simply forgot	184	47.9
Fell asleep/Slept through dose time	140	36.5
Ran out of pills	85	22.1
Did not want others to notice me taking medication	37	9.6
Felt depressed	21	5.5
Feel frequency of dose is cumbersome	17	4.4
Wanted to avoid side effects	16	4.2
Had too many pills to take	14	3.7
Felt like the drug was toxic/harmful	11	2.9
Felt sick	4	1.0

*Multiple responses

4.4 Disclosure of status and Membership of support groups

Table 6 shows the disclosure status and membership of support groups by respondents. When asked about disclosure, 273 (71.1%) respondents had disclosed their HIV status to their partners, 247 (64.3%) had disclosed their status to family members and 107 (27.9%) had disclosed their status to close friends.

Of those who had disclosed their status, 247 (64.4%) were satisfied with the support they were getting from their spouse, 242 (63.0%) were satisfied with support from their family members, and 103 (26.8%) were satisfied with support from friends.

In addition, 221 of them (57.5%) claimed that their family/friends helped remind them to take their medications.

Concerning membership of support groups however, few of the respondents 54 (14.1%) belonged to and actively participated in support group meetings. More than half of those who belonged to social group 36 (66.7%) felt that support group activities were beneficial in helping them attain and maintain adherence ($n=54$). The distribution of the responses across the groups was comparable as is shown in Table 6.

Table 6: Disclosure of HIV Status and Membership of Support Groups among HIV patients in PTH, Port Harcourt, 2016

Variable		Case n = 192 (%)	Control n = 192 (%)	χ^2	p-value
Disclosed HIV status to partner	Yes	134 (69.8)	139 (72.4)	0.203	0.653
	No	58 (30.2)	53 (27.6)		
Disclosed HIV status to family	Yes	127 (66.1)	120 (62.5)	0.408	0.523
	No	65 (33.9)	72 (37.5)		
Disclosed HIV status to friends	Yes	48 (25.0)	59 (30.7)	1.296	0.255
	No	144 (75.0)	133 (69.3)		
Membership of support groups	Yes	23 (12.0)	31 (16.1)	1.056	0.304
	No	169 (88.0)	161 (83.9)		
Support group meetings are very beneficial to my treatment	Yes	13 (56.5)	23 (74.2)	1.146	0.284
	No	10 (43.5)	8 (25.8)		

5 Relationship between lack of social support and non-adherence to ART

5.1: Mean Score of social support among cases and controls

Table 7 illustrates the difference in the mean scores of social support between cases and controls. The overall mean social support index among respondents was 3.57 (s.d; 1.11) out of a total score of 5.0.

The table shows that the highest mean score was in the dimension of Emotional/Informational support (3.8) for the controls and Tangible support (3.9) for the cases while the lowest mean score for both cases and controls was in the area of positive social interaction.

There was no significant difference in the mean score between cases and controls, across the 4 dimensions of social support measured, and in the overall average social support score.

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Table 7: Mean scores of dimensions of MOSSS Social support scale among HIV Patients in UPTH, 2016

Dimensions	Case	Control	t – test	p-value
	Mean (SD)	Mean (SD)		
Emotional/Informational support	3.7 (1.3)	3.9 (1.0)	1.87	0.062
Tangible support	3.8 (1.2)	3.8 (1.1)	0.04	0.964
Affectionate support	3.4 (1.6)	3.7 (1.4)	1.94	0.053
Positive social interaction	3.3 (1.5)	3.2 (1.4)	0.60	0.550
Overall social support Index	3.6 (1.1)	3.7(0.9)	1.19	0.237

5.2: Relationship between social support and adherence to ART

Table 8 shows that 19.8% of cases and 12.0% of controls had poor social support. This difference was statistically significant at $p=0.036$. The odds of having poor social support was 1.8 times higher among non-adherent patients than in patients with adherence of 95% and above.

Table 9 shows the relationship between the different dimensions of social support and non-adherence to ART. The result showed that 25% of cases and 17% of controls had poor emotional support, while 32.8% of cases and 20% of controls had poor Affectionate support. These differences were statistically significant.

The non-adherent patients were 3.4 times more likely to lack emotional/informational support and 1.9 times more likely to have poor affectionate support than the adherent patient.

There was no significant difference between the two groups in terms of tangible support and Positive social interaction.

Table 8: Relationship between social support and adherence to ART

Social Support	Case n=192 (%)	Control n=192 (%)	χ^2	p-value	Odds Ratio	95% Confidence Interval
Poor	38 (19.8)	23 (12.0)	4.385	0.036	1.81	1.03 – 3.18
Good	154 (80.2)	169 (88.0)				
Total	192	192				

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Table 9: Relationship between dimensions of social support and adherence to ART

Dimensions of Social support		Case n (%)	Control n (%)	χ^2	p-value	Odds Ratio	95% Confidence Interval
Emotional/Informational support	Poor	48 (25.0)	17 (8.9)	16.67	<0.001	3.43	1.89 – 6.22
	Good	144 (75.0)	175 (91.1)				
Tangible support	Poor	22 (11.5)	21 (10.9)	0.0003	0.985	1.06	0.56 – 1.99
	Good	169 (88.5)	171 (89.1)				
Affectionate support	Poor	63 (32.8)	40 (20.8)	6.42	0.011	1.86	1.17 – 2.94
	Good	129 (67.2)	152 (79.2)				
Positive social interaction	Poor	52 (27.1)	52 (27.1)	0.01	0.909	1.00	0.63 – 1.57
	Good	140 (50.0)	140 (50.0)				

Significant p-values and confidence intervals in bold

STRATIFIED ANALYSIS

4.5.3: Stratification by Social Class

Table 10 illustrates stratification of the relationship between social support and non-adherence by social class. The result of the analysis above shows that there is a significant difference in the OR between the strata. Effect modification has occurred.

The relationship between poor social support and non-adherence to ART is therefore, statistically significant only among patients in lower socio-economic classes of III and IV. (p=0.007)

Among patients in higher social classes I – II, there is no significant association between poor social support and non-adherence to ART. (p=0.54)

Social class therefore modifies the effect of poor social support on non-adherence to ART.

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Table 10: Adherence and Social support among HIV Patients in UPTH, 2016; stratified by Social class

Social Class I - II

	Case	Control	Odds Ratio	95% Confidence Interval	χ^2	p-value
Poor Social Support	25 (16.7%)	8 (12.3)	1.43	0.61 – 3.35	0.370	0.543
Good Social Support	125 (83.3)	57 (87.7)				
Total	150 (100.0)	56 (100.0)				

Social Class III - IV

	Case	Control	Odds Ratio	95% Confidence Interval	p-value	MH Odds Ratio	MH χ^2 corrected (p-value)
Poor Social Support	13 (31.0%)	15 (11.8)	3.34	1.43 – 7.81	0.007	2.11	5.483 (0.019)
Good Social Support	29 (69.1%)	112 (88.2)					
Total	42 (100.0)	127 (100.0)					

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Risk factors associated with adherence to ART among study subjects

3.1: Understanding the disease and its treatment

The respondents were asked 1 question concerning their understanding of HIV and 3 questions concerning their knowledge of ART. Approximately 21% of cases and 15% of controls did not fully understand HIV and the drug treatment. About 28% and 20% of cases and controls respectively did not know that ART is a lifelong treatment, and 40% of patients in both groups did not understand that ART reduces the risk of HIV transmission.

Knowledge of HIV and ART treatment were comparable across the two groups as shown in table 1.

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Table 11: Knowledge of HIV and ART among HIV Patients in UPTH, 2016

		Case n (%)	Control n (%)	χ^2	p-value	Odds Ratio	Confidence Interval
Understanding of HIV and the drug treatment	Poor	41 (21.4)	28 (14.6)	2.544	0.110	1.59	0.94 – 2.70
	Good	151 (78.7)	164 (85.4)				
Knowledge of ART	Poor	73 (38.0)	70 (36.5)	0.045	0.833	1.07	0.71 – 1.62
	Good	119 (62.0)	122 (63.5)				

4.6.2: Relationship between Disclosure of HIV status, Satisfaction with social support and Adherence to ART

Majority of the HIV patients had disclosed their status to their spouses, family members or friends. The cases and controls did not differ in terms of disclosure of their HIV status to partners, friends and family members (Table 12). However, the cases were less likely than controls to be satisfied with support received from partner with an odds ratio of 0.1 (0.06 – 0.20). Satisfaction with support received from family ($p = 0.61$) and friends ($p = 1.12$) was not significantly different between the two groups.

Satisfaction with support received from partner appeared to significantly protect patients from non-adherence ($p < 0.001$). The association between disclosure of HIV status, satisfaction with social support and adherence to ART is illustrated in Table 12.

Table 12: Relationship between Adherence and Disclosure of HIV status, and satisfaction with support received by respondents in UPTH, 2016

Variable		Case	Control	χ^2	p-value	Odds Ratio	95% Confidence Interval
Disclosed HIV status to partner (n = 384)	Yes	134 (69.8)	139 (72.4)	0.202	0.653	0.88	0.57 – 1.37
	No	58 (30.2)	53 (27.6)				
Satisfied with support received from partner	Yes	76 (56.7)	127 (91.4)	41.17	<0.001	0.12	0.06 – 0.25
	No	58 (43.3)	12 (8.6)				
Disclosed HIV status to family	Yes	127 (66.2)	120 (62.5)	0.229	0.523	1.17	0.77 – 1.78
	No	65 (33.8)	72 (37.5)				
Satisfied with support received from family	Yes	125 (98.4)	117 (97.5)	0.473	0.676**	1.60	0.26 – 9.76
	No	2 (1.6)	3 (2.5)				
Disclosed HIV status to friends	Yes	48 (25.0)	59 (30.7)	1.296	0.255	0.75	0.48 – 1.18
	No	144 (75.0)	133 (69.3)				
Satisfied with support received from friends	Yes	47 (24.9)	60 (32.1)	2.064	0.151	0.70	0.45 – 1.09
	No	142 (75.1)	127 (67.9)				

6.3: Alcohol and Substance Abuse

When asked about intake of alcohol 87 (22.7%) of the respondents admitted to have taken alcohol the previous month. Of this number, 2 (2.3%) took alcohol nearly every day, 21 (25.2%) admitted to taking alcohol 1 – 3 times a week, while 47 (12.2%) took it 1 – 3 times a month. There was no significant difference in alcohol use between the groups. The comparisons are shown in Table 13.

Substance abuse was less common among the respondents as only 16 (4.2%) of the respondents admitted to ever smoking marijuana, 2 (0.5%) to ever using cocaine. No one admitted to using heroine. The responses by the groups are shown in the table 13.

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Table 13: Use of Alcohol and Substance among study respondents

	Case	Control	χ^2	p-value	Odds Ratio	95% Confidence Interval
Drink alcohol	51 (26.6)	36 (18.8)	2.913	0.087	1.57	0.97 – 2.54
Do not drink alcohol	141 (73.4)	156 (81.3)				
Use Marijuana	11 (5.8)	5 (2.6)	1.630	0.125	2.27	0.77 – 6.67
Do not use marijuana	181 (49.2)	187 (50.8)				
Use Cocaine	1 (0.5)	1 (0.5)	0.503	1.000**	1.0	0.06 – 16.10
Do not use cocaine	191 (99.5)	191 (99.5)				

** Fisher's Exact p-value

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6.4: Provider-related Factors

When respondents were asked questions concerning their satisfaction with provider-client relationship, waiting time, professional attitude of providers, availability of a doctor and promptness of service, majority of study participants expressed satisfaction. For example 378 (98.4%) of respondents agreed that the health care staff at the treatment facility discussed the importance of adherence with them, 98.9% of them agreed that they understood the medication better after discussing with health worker, 97.9% acknowledged that providers' attitude helped them take their drugs regularly and 371 (96.6%) of respondents acknowledged that the health care workers are generally courteous and respectful. About 82% of respondents were satisfied with the waiting times and finally, 96.1% of respondents were completely satisfied with provider services.

Comparisons of levels of satisfaction between the groups, however showed that the waiting time was less acceptable to the non-adherent patients when compared to the adherents with an odds ratio of 0.5, as shown in Table 14.

Table 14: Satisfaction of HIV patients with health care providers and services at the treatment centre in UPTH, 2016

		Case	Control	χ^2	p-value	Odds Ratio	95% CI
Promptness of Service	Yes	181 (94.3)	176 (91.7)	0.637	0.425	1.50	0.67 – 3.31
	No	11 (5.7)	16 (8.3)				
Acceptable Waiting Time	Yes	147 (76.6)	166 (86.5)	5.599	0.018	0.51	0.30 – 0.87
	No	45 (23.4)	26 (13.5)				
Attitude of the health workers helped me take drugs regularly	Yes	189 (98.4)	187 (97.4)	0.362	0.724**	1.68	0.39 – 7.14
	No	3 (1.6)	5 (2.6)				
Discussion of Challenges with health care staff	Yes	187 (97.4)	189 (98.4)	0.362	0.724**	0.59	0.14 – 2.52
	No	5 (2.6)	3 (1.6)				
Discussion of Importance of adherence with health care staff	Yes	189 (98.4)	189 (98.4)	0.657	1.000**	1.00	0.19 – 5.02
	No	3 (1.6)	3 (1.6)				
Understand medication usage after discussing with health worker	Yes	190 (99.0)	190 (99.0)	0.688	1.000**	1.00	0.14 – 7.17
	No	2 (1.0)	2 (1.0)				
Discussion with health worker is useful	Yes	191 (99.5)	190 (99.5)	0.500	1.000	2.01	0.18 – 22.36
	No	1 (0.5)	2 (1.0)				
Health workers are courteous and respectful to clients in the treatment facility	Yes	184 (95.8)	187 (97.4)	0.287	0.574	0.62	0.19 – 1.91
	No	8 (4.2)	5 (2.6)				
Complete satisfaction with all aspects of care (n=100)	Yes	182 (94.8)	187 (97.4)	0.146	0.292	0.49	0.16 – 1.45
	No	10 (5.2)	5 (2.6)				

Significant p-value in bold ** Fisher's Exact p-value

C.) MULTIVARIATE ANALYSIS

4.7 Multivariate analysis for Factors associated with non-adherence to ART

Multiple logistic regression analysis (Table 15), reveals that poor social support was significantly associated with non-adherence. This relationship is more pronounced among patients with poor emotional and affectionate support.

The result also showed that feeling of depression/unhappiness and unacceptable waiting times at the health facility were independent risk factors for non-adherence among HIV patients in this study.

Being satisfied with support received from one's partner was significantly protective of non-adherence.

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Table 15: Unconditional Stepwise Forward Logistic Regression for factors associated with non-adherence to ART

Variables	Adjusted Odds Ratio	95% Confidence Interval	p-value
Social Support (Poor/Good)	1.81	1.03 – 3.18	0.038
Reside Outside the LGA (Yes/No)	0.75	0.47 – 1.21	0.244
Affectionate support (Poor /Good)	1.82	1.03 – 3.22	0.039
Emotional Support (Poor /Good)	4.46	1.98 – 10.05	0.0003
Satisfaction with support from partner (Yes/No)	0.10	0.04 – 0.23	<0.001
Disclosed status to friends (No/Yes)	1.17	0.6 – 2.1	0.61
Alcohol Use (Yes/No)	1.41	0.86 – 2.34	0.176
Smoke Marijuana (Yes/No)	2.34	0.77 – 7.12	0.134
Feel depressed/unhappy/overwhelmed (Yes/No)	11.58	2.63 – 51.00	0.001
Acceptable waiting time (No/Yes)	1.92	1.09 – 3.36	0.022

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 DISCUSSION

5.1.1 Demographic and Socio-economic characteristics

Majority of the patients were young persons between the ages of 20 – 39 years. This corresponds with the age group most commonly affected with HIV/AIDS according to the 2012 National HIV/AIDS, Reproductive and Health which found HIV prevalence to be highest among the 35 – 39 year age group (FMOH, 2014). Females were disproportionately more affected than males. The age and sex distribution of this study is similar to what has been reported in other studies which found HIV to be more among females (Pennap and Makpa, 2010) (Adeyeye et al., 2010). It therefore implies that HIV most likely affects young persons and females. This high proportion of female being infected is commonly referred to as feminization of HIV (GBC Health, 2007). A relatively greater proportion of females accessing ART may also, be a reflection of differential health seeking behavior of the two sexes, especially in a traditional African setting where women are known to have better care seeking behavior than men (Onyeonoro et al., 2013).

Social classifications based on occupation are generally used by central government to analyze social and health variation, and thus direct policy and resource allocation (UCL, 2013). Until 2001, the standard classification of social class was the Social Class based on Occupation (SC for short). Although this has been superseded by the National Statistics Socio-economic Classification, some countries including Nigeria still use the social classification based on occupation for social stratification. Socio-economic class in this study was therefore determined on the basis of occupation. Although the distribution of respondents did not differ by educational level, they differed significantly in their occupation. This is understandable as the difference was mainly in social classes III and IV, which may consist mostly, of people with same level of education. Most of the cases were in the higher social classes I to II, made up of professionals and skilled workers while most of the controls were in the lower socioeconomic class III and IV, which comprised of semi-skilled, unskilled workers and the unemployed. This difference was significant and appeared to interact with the level of social support received by these patients. When asked of their monthly income, a good number of the patients decided not to answer this question, probably due to the sensitive nature of personal finances. In addition, the reported

monthly income in this study is likely to be underestimated and unreliable, because it is common knowledge in our environment, that income is difficult to estimate based on a person's job, because there may be other undeclared sources of livelihood and our people are usually unwilling to declare the alternative sources.

About a third of the patients in this treatment centre come from either outside the state or outside the LGA. Stigma, discrimination and lack of social support system could be why some HIV positive patients prefer to access care in places far from their place of residence, they probably do not want people around them to be aware of their sero-status.

5.1.2 Rate of adherence to anti-retroviral therapy among HIV patients

The mean adherence rate of 93.5% in this study, is very close to 97.9% obtained in Enugu (Onyeonoro et al., 2013) and is significantly higher than 73.8% reported in Benin City, Nigeria (Agu et al., 2010). This is sub-optimal compared with standard level of 95% drug adherence, and is a pointer to the fact that adherence to ART is still a major challenge to many people living with HIV in Nigeria. Studies indicate that despite earlier fears of poor medication adherence (Harries et al., 2001), patients in developing countries are able to achieve adherence levels similar to or higher than those of patients in developed countries (Orrell et al., 2003). For instance, a review by Vreeman and colleagues (Vreeman et al., 2008) indicated that the majority of the studies in developing countries report adherence levels of more than 75% (range 45–100%), while in developed countries the majority report less than 75% (range 20–100%). A systematic review by Mills et al (Mills et al., 2006) obtained a pooled estimate of adequate adherence by sub-Saharan Africa patients of 77% (95% confidence interval, 68–85%), whereas the figure for North American patients was 55% (95% confidence interval 49–62%). The same study concluded that adherence is a concern in North America.

5.1.3 Level of social support received by patients on HAART

The overall mean social support score in this study was above average. Most of the patients claimed to receive adequate support for their treatment. The level of support however varied across the different types of support received. In assessing social support, the perception of patients on the level of support they receive is key to the measurement, as perception is generally a better predictor of health outcome than the receipt (Wethington and Kessler, 1986). Studies indicate that HIV-positive people who perceive they have higher levels of social support

experience less physical symptomatology, hopelessness, and depression than those with lower levels of support (Mizuno et al., 2003) (Serovich et al., 2001). For example, Leserman et al. (1999) examined the effects of stress, depressive symptoms, and social support on the progression of HIV among 82 men living in North Carolina. The men were assessed for HIV progression (CD4 cell count and HIV viral load) at six-month intervals for five and a half years. When all three variables were entered to predict HIV progression, only social support and stress had a significant correlation with the health outcome variables.

The patients in this study had high social support scores in informational/emotional and tangible support in both groups, and this suggests that most HIV patients have people who they can talk to and receive advice and/or information concerning their situation, people who would help them perform duties such as daily chores, and help them if they were confined to bed. A study in Uganda (Ssewaya, 2011) revealed that 99% of HIV patients had close friends and/or relatives with whom they felt at ease with and with whom they talked about personal life, including health problems (positive emotional support). This finding is also consistent with findings by Swindells et al which found high informational, tangible and emotional supports among HIV patients and proposed that the qualitative components of perceived satisfaction from these three major components (i.e., informational, tangible, and emotional supports) are more important than the quantitative aspects of social support (Swindells et al., 1999). Harris and Larsen (Larsen & Stege, 2010) suggested that non-family members such as health workers, counselors, volunteers, and friends have vital contributions in providing information and tangible support for livelihood and treatment. Therefore, the concept of providing information support should be based on the information to acquire emotional support from family and other social relations. The non-adherents in this study, however, appeared to have poor affectionate support, that is, people who would show them love, and make them feel wanted. A study by Taiwo et al, (Taiwo et al., 2010) highlighted the benefit of having active treatment supporters for patients on ART. Treatment supporters, in addition to enhancing adherence to treatment, may be helpful in offering affectionate support.

Lower scores in positive social interaction among the patients indicate that societal interconnection among HIV patients is poor. This is further buttressed by the fact that very few of the patients in this study belonged to, and participated actively in social group. A study carried

out in a treatment center in south-south Nigeria, found that most of the study participants lacked the relevant social support structure, provided by belonging to a support group (Maduka & Tobin-West, 2014), which can facilitate treatment adherence. They concluded that the absence of such support may also be related to the reluctance of some respondents to disclose their HIV status to close family members or friends. This poor social interaction among HIV patients have been reported in other studies carried out on quality of life of HIV patients in Ibadan, Nigeria (Folasire, et al., 2012) and in Ethiopia (Deribew et al., 2009), which found that the quality of life of HIV patients was poor in the social relationship domain. Absence of membership and inactive participation in social groups among these patients, has also been documented in other studies. For example, a PhD thesis in Uganda (Ssewaya A., 2011) demonstrated that very few patients, belonged to any formal association. This poor social support network can impact negatively on the physical and psychological health of HIV patients, as strong social support network has been shown to have positive effects on the mental and physical health of those diagnosed with HIV (Davison et al., 2000).

The study by Mills et al as well as other studies have shown that social support could be a strong facilitator of adherence, while noting that fear of disclosure is a barrier to adherence (Mills et al., 2006). In this study, disclosure of HIV status to patients' spouse and family members was not a problem, as most of the respondents in this study had disclosed their HIV status to their partners and family members (father, mother, brother, sisters, sons, daughters). However, very few patients had disclosed their status to their friends. This high level of disclosure is consistent with findings in other part of the country. A study conducted among HIV positive mothers in Northern Nigeria, (Sagay et al., 2006) showed that 89% of patients had disclosed their status to their partners, although one-third of them required the assistance of a health worker. In addition, most of the partners were supportive following disclosure. About two-thirds of clients in the same study have also disclosed their HIV status to someone other than their partners. Another study in South-west, Nigeria among HIV positive patients attending a tertiary health facility, (Adebayo et al., 2014) found that three-quarters of the patients had disclosed their HIV status to their partners. Married couples were 12 times more likely to disclose their status compared to singles. Although there may be other explanations, these high disclosure rates are suggestive of reduced stigma in the study population. It can also be argued that increased awareness and better knowledge of the disease may also be factors promoting high disclosure

levels among the study populations. This finding is however in contrast to findings in Illorin (Salami, et al., 2011) and amongst HIV patients attending ART Clinics in Ogun state (Amaran, 2012) and in the Niger delta (Ebuenyi et al., 2014), which found low rates of disclosure of HIV status. In all these studies, disclosure to sexual partners were studied and being married was significantly associated with disclosure. Hiding one's HIV status, or failing to disclose that one is taking ART, may make it difficult to take ART on a regular basis, both because of not wanting to take ART in front of others and lacking outside cues for assistance. Much is still desired to foster disclosure of HIV status in Nigeria, especially among the unmarried.

Most patients in this study were satisfied with support received from family and friends. Studies have shown that family support is a major source of emotional support (Crystal and Kersting, 1998; Shippy, 2007), and limited emotional support can inhibit social relationship. A study by Friedland et al. (Friedland et al., 1996) and Ichikawa (Ichikawa and Natpratan, 2006) suggested that family acceptance was significantly related to the social relationship domain of quality of life. Harris and Larsen (Harris and Larsen, 2007) suggested that non-family members such as health workers, counselors, volunteers, and friends have vital contributions in providing information and tangible support for livelihood and treatment. Therefore, the concept of providing information support should be based on the information to acquire emotional support from family and other social relations, which would further increase the social relationship of PLWHA.

Satisfaction with support received from their spouses seemed poorer among the non-adherent. In the study conducted in Jos, by Sagay, (Sagay et al., 2006) although majority of the partners were supportive following disclosure, this seemed to decline over the years. It appears that, as the implications of the patient's HIV positive status becomes more apparent over time, the supportive attitude of partners wane giving room to more quarrelsome and abusive tendencies. This trend was similar for both HIV negative and HIV positive partners in the study carried out in Jos. Health care providers should therefore provide regular couple counseling in order to mitigate these negative behaviours and promote spousal support for PLWHA.

5.1.4 Relationship between social support and non-adherence to HAART

Poor social support was associated with non-adherence in this study. A review by Ammassari et al (Ammassari et al., 2002) which summarized the results of 20 studies investigating the issue of

barriers to optimal highly active antiretroviral therapy (HAART) adherence, revealed that lack of social or family support, amongst other factors were most consistently associated with non-adherence. A prospective study in Cote d'Ivoire found low social support to be independently associated with poor adherence (Diabaté et al., 2007) with a relative risk of 1.8. In a regional study conducted in three African countries on challenges to ART adherence, researchers found that those with sub-optimal adherence lacked the necessary social support they needed and could not take their medications on time because they did not disclose their HIV status (Hardon, 2007). This underscores the important roles social support plays in the lives of people living with HIV. Successful ART programs should therefore seek to positively influence social support domains. On the other hand, results from Tanzanian study, on factors associated with adherence to ART, in which social support was measured with a modified version of the Medical Outcomes Study (MOS) social support scale, showed no association between social support and adherence to ART (Melrose et al., 2015). Social support was also not significantly associated with adherence in a study in Uganda (Byakika-Tusiime et al., 2005). Despite finding no association, the researchers however noted that, social factors are important to address in ART programs.

The relationship between poor social support and non-adherence in this study, was however modified by the patient's socio-economic class. When the analysis was stratified by social class, poor social support was found to be a risk factor for non-adherence among patients in the lower social classes IV and V. These social strata comprise the semi-skilled workers and small scale traders, as well as unskilled workers and the unemployed. This interaction is not surprising as individuals in higher social strata tend to have more friends and closer ties with family members, who cannot afford to lose them, and tend to value them more than their poorer relatives. Hence they have better support than lower class individuals. Socio-economic class was therefore an effect modifier in the relationship between poor social support and non-adherence to ART.

Family plays a crucial role in any type of treatment, both for children and adults. Family and community members can both play positive and negative roles in ART treatment initiation and adherence. For instance, the stigma associated with HIV infection or AIDS in the community may be more severe than that of other illnesses, creating barriers to treatment initiation and support for adherence that might otherwise be available.

The non-adherent patients were more likely to have poor emotional and affectionate support than the adherents. Emotional support has to do with having people in one's life who they could count on to listen to them when they need to talk, someone to give them information and good advice about a crisis, someone to confide in or talk to about their problems, and whose advice they really want, someone to turn to for suggestions about how to deal with a personal problem, and someone to share their most private worries and fears with. Meta-analyses establish significant average r -effect sizes between adherence and practical and emotional social support (DiMatteo, 2004). The mechanisms through which social support exerts an influence on adherence have not been studied as often. DiMatteo 2004 suggest that the relationship between emotional support and adherence may be mediated by a reduction in stress and depression, or an increase in self efficacy or self esteem.

Affectionate support deals with having someone who shows them love and affection, someone who hugs them and makes them feel wanted. This study shows that the cases significantly received less of these kinds of support, and these dimensions of support are best given by a person's significant other, a family member or a friend. Other studies have found that social and/or family stigmatization are closely related to poor adherence (Nachega and Stein, 2004).

In a study conducted in South-eastern United State, satisfaction with support and coping with HIV medication were the best predictors of adherence. In this study however, satisfaction with support received from family and friends was not significantly different between the two groups. However, poor satisfaction with support received from partner seemed to be a factor associated with poor adherence as there was a significant difference between the cases and controls in terms of satisfaction with support received from partner. This shows that, even when the patients disclose their status to their partners, they still do not get enough support from them, and this can invariably lead to non-adherence. In a randomized controlled trial to assess the efficacy of couple-focused adherence counseling (Remien et al., 2005), intervention participants were significantly more likely than controls to achieve adherence rates greater than 95%. Involvement of HIV patient's partner in adherence counseling and management of the disease may, therefore, improve adherence to ART, by strengthening partner support.

5.1.5 Factors associated with Non-adherence to ART

Patient-related Factors

Patients in higher social classes (social classes I – III) were 7 times more likely to be non-adherent than those in the lower social strata. This could be because people in the higher strata are more likely to be away from home (on job-related matters) and are busier than those in the lower class. However, studies have shown that it is not clear what effect socioeconomic factors have on adherence to ART. A systematic review of 17 original studies to evaluate the relationship between socio-economic status and adherence to ART (Falagas and Zarkadoulia, 2008), showed that there seemed to be a positive trend among components of SES (income, education, occupation) and adherence to antiretroviral treatment in many of the reviewed studies, however most of the studies did not establish a statistically significant association between determinants of SES and adherence. Another systematic review with a focus on middle and low income countries (Peltzer and Pengpid, 2013), had similar findings. The researchers therefore concluded that available evidence does not provide conclusive support for existence of a clear association between SES and adherence among patients infected with HIV/AIDS.

Almost half of the patients earned a monthly income of 20,000 naira and less. Although this was not significantly different between the two groups, this may be a reason for poor adherence because, although the ARV medications are free, the patients still incur other costs such as transportation costs, cost of laboratory investigations such as the CD4 cell count and even the cost of maintaining a healthy diet may be a challenge to these patients. In their study on factors influencing adherence in University of Port Harcourt Teaching Hospital and Braithwaite Memorial Specialist Hospital in 2007, Asekomeh et al (Asekomeh et al., 2010), identified trying to save costs as a reason proffered for poor adherence. Other studies in developing countries have identified transportation costs, financial constraints and other finance related challenges as reasons for poor adherence (Iliyasu et al., 2005; Daniel et al., 2004). This study however, did not explore the impact of these indirect costs on adherence to medication. There is need for further research on the subject, as it pertains to adherence to ART.

Majority of respondents claimed to fully understand HIV and its treatment, and acknowledged that the drugs reduce risk of transmission while having a positive effect on their health. Although

studies have shown that these findings are facilitators of adherence (Mills et al., 2006), in this particular study, there was no difference between the cases and controls with respect to their understanding of the disease and its treatment.

Although alcohol use among respondents in this study was not significantly associated with non-adherence, about one-third of patients in this study admitted to consuming alcohol. Use of psycho-active substances such as marijuana and cocaine was however, uncommon among the study respondents. Patient's indulgence with alcohol or other abusive substances while under medication could impair their sense of responsibility and judgment and lead to missed doses as demonstrated by some studies (Adedayo et al., 2005). Studies have also shown that alcohol intake and other forms of substance abuse have a negative impact on adherence (World Health Organization, 2003). It is therefore pertinent for counselors to identify patients with such challenges and offer timely management of substance addiction, while referring difficult cases for psychotherapy.

Treatment-related Factors

Feeling depressed was the most prominent treatment related factors identified in this study. A study by (Starace et al., 2002) identified depression as a risk factor for sub-optimal adherence to ART. Although, no published investigation has specifically focused on the relationship between depression and adherence to antiretroviral therapy, findings from available studies show a substantial and consistent relationship between adherence to antiretroviral regimens and depression. Early recognition and proper management of depressive co morbidity could be an effective intervention strategy to improve adherence and may make a difference in social functioning, and disease course of people with HIV.

The commonest reasons for missing drugs, identified in this study were being away from home, being busy with other things, simply forgetting to take drugs, sleeping through dose time and running out of pills. These were in conformity with the results on barriers to ART adherence (Maduka and Tobin-west., 2014) which found being away from home during medication times, being busy with other things, forgetfulness, running out of pills, difficulty taking pills at specified times, the need to avoid side effects and lack of a social support system as the main barriers to adherence. The study by Asekomeh et al. (Asekomeh et al., 2010) also identified

forgetfulness, no pills at dosing time, feeling uncomfortable after taking medication, trying to save money and having too many medications as the commonest reasons for non-adherence to ART. A systematic review of 84 studies on HIV drug adherence carried out in 72 developed and 12 developing countries also revealed that forgetfulness, a lack of understanding of treatment benefits, complicated regimens, and being away from their medications were major barriers to adherence (Mills et al., 2006). One important effect of these barriers is the risk of HIV drug resistance with severe implications for patient management and survival and the ARV treatment program in general.

Provider-related Factors

Generally, the patients were satisfied with services at the treatment centre, with almost all the patients asserting that they understood medication dosage and importance of adherence better after discussing with health worker. The area of least satisfaction was with waiting time. About a quarter of non-adherent cases were dissatisfied with the waiting time, and this was statistically significant, when compared with one-eighth of the controls. Dissatisfaction with waiting time remained significant when inputted into the logistic regression model. While there is no published research on the relationship between waiting time and adherence to ART, an evaluation of challenges to ART adherence in Africa, conducted in Tanzania, Uganda and Botswana (Hardon et al., 2007) identified long waiting times as a major challenge. Almost half of health workers interviewed in Tanzania identified long waiting time as a problem, and in Botswana, more than half of respondents reported that they spend four or more hours at the clinic, with the longest wait being 12 hours. In the Tanzanian study, perceived quality of patient-provider interaction and ever missing a clinic appointment were shown to be associated with poor adherence. Although the reasons for missing clinic attendance were not reported, long waiting times may discourage patients from going to clinics.

Positive interaction between patients and providers has been consistently associated with better adherence to ART in North American studies (Heckman et al., 2004) (Burke-Miller et al., 2006; Wroth et al., 2006). Adherence is likely to be improved when patients feel they can ask questions and honestly share their experiences with health care providers, and when providers listen to their patients and impart relevant information and skills (Schneider et al.). The impact of long

waiting time can therefore be mitigated if health workers can engage in more inter personal communication with clients while improving on clinic waiting time.

5.1.6 Study Limitation

Self-reported measures have shown to consistently over-estimate adherence when compared with more objective measurements such as pill counts or electronic pill caps. As such, some researchers query that it may not be the best measure of adherence especially in view of more accurate measures such as MEMS Cap and use of biological markers. However these methods of measurement involve sophisticated and expensive equipment (MEMS-CAP) not readily available in resource poor settings. Since there is no agreed 'gold standard' for measuring adherence, the researcher chose to use self-report based on its ease of use and availability, low cost implications and its acceptance in Public health.

Respondents CD4 cell count was not measured directly, but was obtained from the patients' case file. The results were therefore based on the last recorded CD4 cell count, which was between 6 to 8 months prior to the study, and this may not reflect the true health status of these patients.

5.2 CONCLUSION

Most HIV patients have disclosed their HIV status to their partners and family members. It is not mere disclosure, but satisfaction with support received from the person whom they have disclosed to, that is important to adherence to ART.

Overall social support received by HIV patients was fair. Non-adherent patients were twice more likely than adherent patients to lack social support. The non-adherents lacked more emotional/informational and affectionate support than the adherent patients.

Socio-economic class is an effect modifier in the relationship between social support and adherence, as poor social support was only a risk factor for non-adherence, among persons in the lower socio-economic class, IV and V.

Knowledge on ART and understanding of HIV and its drug treatment was not associated with adherence.

Satisfaction with support received from one's partner is a protective factor for non-adherence.

Feeling depressed and unacceptable waiting time in the clinic are independent risk factors associated with non-adherence to ART.

5.3 RECOMMENDATIONS

Health Facility

1. Couple-based counseling should be carried out by health care providers in order to promote support from partners of HIV patients on ART. This will not only improve the level of support received but could also promote adherence to ART.
2. Health workers and/or counselors should lay emphasis on the importance social support in the improvement of adherence during counseling sessions on every ARV clinic visit.
3. HIV patients who would volunteer their time and labour, should be trained to provide care and support to other patients in every health care setting.
4. HIV Support groups should be formed in every facility and every HIV patient should be encouraged to participate in such groups, in order to strengthen their social support network.

Ministry of Health

5. The MOH should train volunteers, (preferably HIV positive patients) who would act as role models and provide care and support to other HIV patients.
6. Further research needs to be done among HIV patients to further explore the issues surrounding partner support and the challenges these patients face as it affects adherence with the view to address the problems and further improve their lives.

Family

7. Family members of HIV patients should play the role of treatment supporters and provide the much needed informational, emotional and affectionate support to HIV patients.

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APPENDIX I: Evaluation of Self Reported Adherence

DATE: _____ STUDY GROUP: _____ QUESTIONNAIRE NO: _____

1. Drug names and dosages.

Drug Name		Dosage	
Patient	Provider	Patient	Provider

2. Do you ever forget to take your medicines? Yes No

3. In the past 2 weeks for how many days did you forget to take ALL your medicine?

(Missed doses during the day are equivalent to missing for that day)

0 1-2 3-4 5-6 7-8 9-10 11-14 15-21

4. How many doses did you miss? _____

5. How often do you follow your specific dosage times and instructions?

Never Some of the time Most of the time the time

6. Calculation of Adherence:

Total number of doses taken over the past 15 days X 100% = _____ %

_____ / Total number of prescribed doses over the past 15 days

7. CD4 Count _____

APPENDIX II: Medical Outcomes Study: Social Support Survey Instrument

People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it? Circle one number on each line.

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
Emotional/informational support					
Someone you can count on to listen to you when you need to talk	1	2	3	4	5
Someone to give you information to help you understand a situation	1	2	3	4	5
Someone to give you good advice about a crisis	1	2	3	4	5
Someone to confide in or talk to about yourself or your problems	1	2	3	4	5
Someone whose advice you really want	1	2	3	4	5
Someone to share your most private worries and fears with	1	2	3	4	5
Someone to turn to for suggestions about how to deal with a personal problem	1	2	3	4	5
Someone who understands your problems	1	2	3	4	5
Tangible support					
Someone to help you if you were confined to bed	1	2	3	4	5
Someone to take you to the doctor if you needed it	1	2	3	4	5
Someone to prepare your meals if you were unable to do it yourself	1	2	3	4	5
Someone to help with daily chores if you were sick	1	2	3	4	5
Affectionate support					
Someone who shows you love and affection	1	2	3	4	5
Someone to love and make you feel wanted	1	2	3	4	5
Someone who hugs you	1	2	3	4	5
Positive social interaction					

Someone to have a good time with	1	2	3	4	5
Someone to get together with for relaxation	1	2	3	4	5
Someone to do something enjoyable with	1	2	3	4	5
Additional item					
Someone to do things with to help you get your mind off things	1	2	3	4	5

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APPENDIX III: Factors Influencing Adherence

PATIENT AND TREATMENT RELATED FACTORS

A) Socio-demographics

1. Age (as of last birthday): _____

2. Gender :

Male Female

3. Ethnicity: _____

4. Marital Status:

Single Married Widowed

Divorced/Separated

5. Partner's HIV status

Positive Negative Unknown

6. Religion:

Christianity Islam Traditional None

Section B: Socio-economic details

7. Highest level of Education

None Primary Secondary

Tertiary Others (specify) _____

8. Are you currently employed? Yes No

9. If yes to Q8, what is your employment status? Government Private-Self

Private Non-self

10. What is your occupation? _____

11. What is your average monthly income in Naira? _____

12. How many people are you currently dependent on this income? _____

13. Where do you live? Outside the state Within LGA Outside the LGA

14. How long have you been on ART? _____ Months _____ Years

Section C: Patient-related factors Please circle the most relevant option in response to the questions below.

Knowledge of HIV and ART	Yes	No	Don't Know
1. I fully understand what HIV is and what the drug treatment of this condition entails			
2. ART is a life-long treatment			
3. ART reduces risk of HIV transmission			
4. ART provides cure for HIV			

5. I have disclosed my status to my partner. Yes No

6. I have disclosed my status to person(s) among my friends. Yes No

7. I have disclosed my status to persons among my family members. Yes No

8. If yes to (5), I am satisfied with the support I am getting from my partner/spouse concerning my HIV status and treatment. Yes No

9. If yes to (6), I am satisfied with the support I am getting from friends concerning my HIV status and treatment. Yes No

10. If yes to (7), I am satisfied with the support I am getting from family concerning my HIV status and treatment. Yes No

11. My friends and family members help me remember to take my medication. Yes No

12. I am a member of and actively participate in support group meetings. Yes No

13. I find support group meetings very beneficial in helping me keep to my treatment and stay healthy. Yes No

14. How often have you had an alcoholic drink – a glass of beer, wine, a mixed drink, or any kind of alcoholic beverage – in the last 30 days? Check one.

Daily Nearly every day 3 or 4 times a week Once or twice a week
 3 times a month Once a month Never

If Never, skip ahead to question #16.

15. On days when you drank any alcoholic beverages in the last 30 days, how many drinks did you usually have altogether? By a drink we mean a can or glass of beer, a glass of wine, a shot of liquor, or a mixed drink with a shot of liquor? Check one.

- 1 or 2 drinks per day 3 or 4 drinks per day 5 or 6 drinks per day
 7 or 8 drinks per day 9 to 11 drinks per day 12 or more drinks per day

16. Please check "Yes" or "No" for each question.

- Ai) Have you ever used marijuana (ganga, wee wee)? Yes No
 ii) If you used this drug, have you used it within the past 6 months? Yes No
 B i) Have you ever used cocaine (powder, crack, or freebase)? Yes No
 ii) If you used this drug, have you used it within the past 6 months? Yes No
 C i) Have you ever used heroin? Yes No
 ii) If you used this drug, have you used it within the past 6 months? Yes No

Section D: Treatment Related Issues

People miss taking their medications for various reasons. Here is a list of possible reasons why you may have missed taking any medications within the past one month

In the past one month have you missed taking your medication because you

		Yes	No
1	Were away from home		
2	Were busy with other things		
3	Simply forgot		
4	Had too many pills to take		
5	Feel frequency of dose is cumbersome		
6	Wanted to avoid side effects		
7	Did not want others to notice you taking medication		
8	Fell asleep/ Slept through dose time		
9	Felt like the drug was toxic/harmful		
10	Felt sick or ill		

11	Felt depressed/unhappy/ overwhelmed		
12	Ran out of pills		
13	Felt good (didn't need to take drugs)		

Others (specify) _____

Section E: Provider Related Factors

Please answer the following questions about your experiences at the ARV centre over the last 3 visits

		Yes	No
1.	In the past 2 months do you feel that you were served promptly at the treatment centre?		
2	If you waited in the treatment centre for your turn to see the doctor, was the amount of time you waited acceptable to you?		
3	Did the attitude of the health providers help to take your drugs regularly?		
4	Did any health care staff discuss the challenges you might have been facing with taking your drugs		
Please answer the following questions about when you started ARV treatment at this facility....			
5	Did a health staff discuss the importance of adherence with you		
6	After speaking to the health staff, did you understand how to take your medication correctly?		
7	Was the discussion between you and the health staff at the treatment facility useful/helpful?		
Please answer these questions about your overall satisfaction with services during your most recent visit..			
8	Have the health care staffs at this facility been courteous and respectful during your recent visits to the treatment facility?		
9	Are you completely satisfied with the services you received at this treatment centre on your last visit		

APPENDIX IV: Consent Form for Research

Title of Research Project: Poor Social Support and Non-Adherence To Anti-Retroviral Therapy Among HIV patients In a University Hospital, Port harcourt: A Case-Control Study

Principal Investigator: Dr Kanu Njideka Esther

What you should know about this study

You are being asked to join a research study

This consent form explains the research study and your part in the study

Please ask questions at any time about anything you do not understand

Ask any member of the study team to explain any words or information in this informed consent that you do not understand

Purpose of Research Project:

This study is aimed at determining the relationship between social support and non-adherence to anti-retroviral therapy among HIV patients.

Procedures:

You was required to answer some questions on the above-stated topic. This should take about 15-20 minutes of your time. Please try to be sincere brief and clear as possible in your contributions.

Risk/Discomfort:

You may feel uncomfortable with divulging personal information or expressing your feelings on the certain aspects of your life and health status. There will be no needle pricks or bloodletting for any tests to be done.

Anticipated Benefits:

Your participation in this study will significantly improve the knowledge base on the level of social support received by HIV patients and its relationship to patients' adherence to medication. This may serve as baseline reference for policy formulation, program planning, implementation

and evaluation towards improving adherence to anti-retroviral therapy among HIV patients in Rivers state and in Nigeria.

Voluntary Participation:

You are a volunteer. You have the right to change your mind, or decide not to participate at any point during the course of the study. There was no penalty or loss of benefit if you decide to quit the study. You should ask the research assistant or principal investigator any question you may have about this research study. During the study, we will tell you if we learn any new information that might affect whether you wish to continue to be in the study.

Who do I call if I have questions or problems?

Call the Principal investigator (DrKanuNjideka Esther), at 08036766669, if you have questions about the study or get sick as a result of being in this study

Call or contact University of Port-Harcourt Teaching Hospital Ethical committee, if you have questions about your right as a research participant or if you think you have not been treated fairly.

The committee contact information is: Medical Research Ethics Committee, University of Port-Harcourt Teaching Hospital, Rivers State.

What does your signature on this consent form mean?

Your signature on this form means:

You have been informed about this study's purpose, procedures, possible benefits and risks

You have received a copy of this consent

You have been given the chance to ask question before you sign

You have been told that you can ask any question at any time

You have voluntarily agreed to be in this study

You are free to stop being in this study at any time

If you stop being in this study, you understand it will not in any way affect your treatment at the ARV Clinic

You have agreed to co-operate with Dr Kanu Njideka Esther and the research staff and to tell them immediately if you experience any unexpected or unusual symptoms.

Please indicate your name (participant): _____

Signature or Mark of Participant: _____ Date: _____

Signature of Person obtaining consent: _____ Date: _____

Witness to consent if participant is unable to read or write _____ Date _____

Signed Copies of this consent form must be:

Retained on a file by the principal investigator

Given to the subject. This consent document is NOT valid without the Ethical Committee stamp of approval.

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B. J. Thom-Manuel (Mrs.)
(Public Administration, UPTH)
Secretary

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4th July 2016

Dr. Kanu Njideka Esther
Department of Community Medicine
University of Port Harcourt Teaching Hospital
PORT HARCOURT

ETHICAL APPROVAL

SOCIAL SUPPORT AND ADHERENCE TO ANTI-RETROVIRAL THERAPY AMONG HIV PATIENTS IN RIVERS STATE: A CASE-CONTROL STUDY

We refer to your letter dated 25th May 2016 requesting for Ethical Approval of your research project titled "Social Support and Adherence to Anti-Retroviral Therapy among HIV Patients in Rivers State: A Case-Control Study".

After a critical appraisal of your proposal by the University of Port Harcourt Teaching Hospital Ethical Committee and the Research Ethics Group of the Centre for Medical Research and Training, College of Health Sciences, University of Port Harcourt, approval is hereby given to you to commence your study.

Note the following:

1. The study can only be started after it is approved by the examining body.

The Hospital reserves the right to withdraw this approval if at any time during the conduct of the study you infringe on the ethical regulations of the Hospital or the ethical rights of your study subject.

B. J. Thom-Manuel (Mrs.)
Secretary
for: Chairman