KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,

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FACTORS THAT CONSTRAIN ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG HIV POSITIVE PATIENTS IN THE SEKONDI-TAKORADI METROPOLIS

BY

OPHELIA BENTSI SAM (BSC PHARMACY)

JUNE 2015

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,

KUMASI, GHANA

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A THESIS SUBMITTED TO THE DEPARTMENT OF HEALTH PROMOTION AND EDUCATION, COLLEGE OF HEALTH SCIENCES, SCHOOL OF PUBLIC HEALTH, IN PARTIAL FULFILMENT OF REQUIREMENTS FOR THE DEGREE OF MASTER OF PUBLIC HEALTH IN HEALTH PROMOTION AND EDUCATION.

JUNE 2015

DECLARATION

I Ophelia Bentsi Sam, hereby declare that, this is the result of my own hand work and that no previous submission for a degree has been done here or elsewhere. Also the work of others which served as reference has been duly acknowledged.

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SIGNATURE…… DATE……

OPHELIA BENTSI SAM

PG : 9910313

SIGNATURE…… DATE……..

MR. FRED MENSAH-ACHEAMPONG

(ACADEMIC SUPERVISOR)

SIGNATURE…… DATE……

MRS. ROSE O. ADJEI

(HEAD OF DEPARTMENT)

ABSTRACT

Background: The lack of adherence to antiretroviral therapy (ART) is a major challenge to HIV care and has serious public health implications as it can accelerate the emergence of drug resistant strains of HIV. As Ghana scales up access to ART in all health facilities, there is the need to estimate the level of adherence and understand the factors that prevent adherence in order to design appropriate interventions.

Method: A total of 426 HIV positive adult patients on ART were interviewed using structured questionnaire. Adherence rate was estimated using the patient self-report assessment of adherence. Data was analysed using SPSS for frequencies, cross-tabulations and Chi-Square tests using a statistical significance set at $p<0.05$. Variables found to be statistically significant under univariate analysis were subjected to multivariate logistic regression analysis. Odds ratio (OR) and its 95% confidence interval (CI) were computed.

Results: The optimal adherence level was 67%. Thirty seven percent (37%) of the respondents had missed at least one clinic appointment in the last six months. Three variables remained significant using logistic regression. These included forgetfulness (Adjusted OR=5.76; 3.89-8.59) being away from home (Adjusted OR=5.49; 3.76-8.02) and missing clinic appointment (Adjusted OR=1.78; 1.65-1.91).

Conclusion: Patients who miss clinic appointment should be monitored, the reasons behind the missed appointment investigated and appropriate support given. Patients who miss a dose because of forgetfulness should be educated on the use of prompters such as mobile phone alarm and text messages. Patients should also be encouraged to carry their ARVs on them when they are away from home.

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LIST OF ABBREVIATIONS/ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral therapy
ARV	Antiretroviral
CCC	Comprehensive Care Centre (ART clinic)
CHPS	Community-based health planning and services
EDM	Electronic drug monitoring
ENRH	Effia-Nkwanta Regional Hospital
GHS	Ghana Health Service
HAART	High active antiretroviral therapy
HIV	Human Immunodeficiency Virus
MEM	Medication Event monitoring
NACP	National AIDS Control Programme (Ghana)
PLWHIV	People living with HIV
UNAIDS	United Nations Joint Programme on AIDS
VCT	Voluntary counselling and testing for HIV
WHO	World Health Organization

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To all lecturers in the Department of Community Health who have contributed to the success of this work, I say God bless you.

Finally, I thank God for giving me the strength to complete this work and I pray for His blessing on all who contributed in diverse ways to make this a success.

DEDICATION

I dedicate this work to my dear husband, Ndede for his relentless support, my children David, Daniel and Lois who had to endure my absence from home during the period of my study, and my dear mum who passed away during the course of my study.

Finally, I thank the Almighty God for granting me strength and good health to go through this period.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

The Human Immunodeficiency Virus (HIV) epidemic is one of the most serious crises the world faces today. By the end of 2010, an estimated 34 million people were living with HIV globally including 3.4 million children less than 15 years of age (WHO, 2011). Antiretroviral therapy (ART) has been shown to delay progression to AIDS, resulting in a greater and more sustained viral suppression and improved immunologic response (Chi *et al*., 2009). It has improved mortality and morbidity, as over 2.5 million deaths in low and middle income countries globally has been averted since 1995, with sub-Saharan Africa accounting for a vast majority of this figure (WHO, 2011).

At the end of 2010, 6.65 million people were receiving ART in low and middle income countries (WHO, 2011). While ten low and middle income countries including Botswana, Namibia and Rwanda have already achieved universal access to ART (which is defined as providing ART to at least 80% of the people eligible for treatment), others such as Ethiopia, Namibia and Senegal are moving closer to the same target having covered between 50 and 80% of patients in need of treatment (WHO, 2011). In Ghana, a cumulative total of 73,339 people have been initiated on anti-retroviral therapy since 2003 when HAART was introduced in the country (NACP, 2012).

To scale up global access to ART, the World Health Organisation (WHO) and the United Nations Joint Program on AIDS (UNAIDS) launched the "3 by 5" Initiative on World AIDS Day in 2003. At that time, only 400 000 people in low- and middle-income countries had access to antiretroviral therapy. The "3 by 5" Initiative, which set a target of obtaining access to ART for 3 million people by the end of 2005, led to a fundamental shift in thinking about the feasibility of funding and delivering antiretroviral medicines and other drugs for people in resource-limited settings (WHO, 2003). Through the support and commitment of international partners and member states, the "3 by 5" target was met in 2007, and by the end of 2010, the number of people receiving treatment in low- and middle-income countries had reached 6.65 million, an increase of more than 16-fold in seven years (WHO, 2008).

The rapid scale-up of ART in low- and middle-income countries, especially during the past five years, has significantly reduced the number of people dying from AIDS-related causes. Local studies have confirmed that expanded access to ART is reducing AIDS mortality rates in sub-Saharan Africa. A recent study based on mortality records from the cities of Bulawayo and Harare in Zimbabwe has shown a 19% decline in crude mortality rates after ART access expanded (WHO, 2011). The effect of increased survival has enabled patients who are HIV positive and receiving combination ART to contribute to their family, local economies and social structure (Mills *et al*., 2011).

However, as treatment expands, the number of people living with HIV is also rising, with 34 million people living with HIV globally at the end of 2010 versus 28.6 million in 2001 – a 17% increase. This reflects the high numbers of people newly

infected with HIV along with significantly expanded access to ART, which has helped to reduce the number of people dying from AIDS-related causes, especially since 2004–2005 (WHO, 2011).

For most ART programs in Sub-Saharan Africa including Ghana, the emphasis has been on initiating people on ART than ensuring effective use of medicines. This is because their performance is measured in terms of access rather than the adherence/retention which is necessary for sustained health benefits and to safe guard public health against the risk of drug resistance caused by non-adherence to the antiretroviral drugs (WHO, 2006).

Now the challenge has shifted from access to adherence. This is because with increased access to ART (WHO, 2008), HIV has become a chronic disease where patients have to take antiretroviral drugs for a long time with substantial side effects and sometimes with complex regimens (WHO, 2003). Taking antiretroviral (ARV) drugs is a lifelong activity which needs distinctive strategies including maximum adherence to selected regimen to ensure its effectiveness and prevent development of drug resistance (NACP, 2010).

Ghana's response to the HIV epidemic included priority interventions which initially focussed on promotion of safe sex, condom use, improve management of sexually transmitted infections (STIs), safe blood transfusion, infection prevention and control, nursing/clinical care and counselling, home based care and Prevention of Mother-To-Child Transmission (PMTCT). These interventions were geared towards reducing the number of new infections and improving on the quality of life of

Persons Living with HIV/AIDS (PLWHIV). These interventions were under the core mandate of National AIDS/STI Control Programme (NACP). NACP is responsible for the coordination and implementation of the HIV and AIDS related aspects of the Ghana Health Sector Strategic Framework. It is a programme under the Disease Control and Prevention Department of the Public Health Directorate of the Ghana Health Service (GHS) (NACP, 2010).

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In patients with HIV/AIDS, the resistance to antiretroviral agents has been linked to lower levels of adherence. Partial or poor adherence at levels less than 95% can lead to the resumption of rapid viral replication, reduced survival rates, and the mutation to treatment-resistant strains of HIV (WHO, 2003; Kumari and Singh, 2012). Also, a study by Paterson *et al.* (2000) which examined patients' adherence to protease inhibitor therapy by the use of medication event monitoring system (MEMS) revealed that poor adherence correlated with clinical and virological failure at three months of follow-up. These results suggest that a high degree of adherence is necessary for maintenance of drug efficacy (Paterson *et al.*, 2000). A report by WHO (2003) indicates that good adherence to treatment with antiretroviral agents might have an important impact on public health by breaking the transmission of the virus because of the lower viral load found in highly adherent patients.

Improvement of patient adherence, simplification of therapy and minimization of drug resistance have been reported to be stepping stones towards the achievements of long term virus control among patients in developing countries (Nachega *et al.*,

2010). Sustaining adherence to ART over the long term, however, requires accurate and consistent monitoring as well as follow up of HIV/AIDS patients, and this is a considerable challenge for countries in sub-Saharan Africa (Nachega *et al*., 2010).

In the study of adherence to ART, there are a number of key issues that need to be considered. These include accurate measurement of adherence, assessment of the impact of adherence on viral load and clinical outcome, determination of the factors that affect adherence, and the development of interventions. By addressing these issues, valuable information may be obtained about which patients are most at risk for non-adherence and how adherence might be improved (Chesney, 2000).

The critical factors that influence adherence fall into four main groups. These include patient factors, such as drug use, alcohol use, disclosure of status, age, sex or ethnicity; the medication regimen, such as dosing complexity, number of pills, side effects or food requirements; the patient-health-care provider relationship; and the system of care. In general, it appears that the most important factors that affect adherence are patient-related (Chesney, 2000).

1.2 Statement of the problem

Sub-Saharan Africa continues to bear a disproportionate share of the global HIV burden with about 68% of all people living with HIV in the world residing in the region as at mid-2010 (WHO, 2011).

Data from the WHO (2011) Progress Report on the proportion of people who remain on ART over time in low and middle-income countries is not encouraging as it continues to show that most attrition (discontinuation of ART) occurs within the first year of starting therapy. The average retention rate at 12 months after initiating antiretroviral therapy was 81% (from 92 reporting countries), 75% at 24 months (73 countries) and 67% at 60 months (46 countries) respectively (WHO, 2011). This calls for improved retention through interventions such as testing and counselling, and initiation and maintenance of lifelong ART. Reducing the currently high proportion of people living with HIV who initiate ART but are eventually lost to follow-up is key to achieving universal access by 2015 (WHO, 2011).

There is an estimated 235,982 persons living with HIV/AIDS in Ghana, consisting of 87,524 males, 120,724 females and 27,734 children (NACP-HSS, 2012). Ghana's HIV prevalence was at 1.37% in 2012 as against 1.5% in 2011, and was highest in the Eastern Region (10.1%) of Ghana, and lowest in the Northern Region (0.2%) of the country. Western Region recorded a prevalence of 2.4% (NACP-HSS, 2012). In 2012, 2,200 (3%) of HIV patients on ART were lost to follow up, 1,124 (2%) died, and 145 (0.2%) stopped treatment due to adverse clinical events in Ghana (NACP, 2012). It must, however, be stated that some people who were once declared as lost to follow up were found to have returned to restart their treatment.

Currently, 164 health facilities are providing HAART, including 14 private for profit facilities (NACP, 2012). This has contributed significantly to the reduction of HIV-related morbidity and mortality and is prolonging life in the country. A total of

13,648 adults made up of 3,557 males and 10,091 females were put on HAART in the year 2012 as against 13,441 in the previous year (NACP, 2012). With number of adults on ART increasing each year, coupled with the inadequate number of available personnel to provide HIV clinical care, factors negatively influencing adherence need to be determined and addressed.

Even though ART has improved the lives of many people worldwide, lack of adherence to ART is still a great challenge to AIDS care and has serious public health implications. Poor adherence to ART often leads to treatment failure and is likely to accelerate the emergence of drug resistant strains of HIV. According to WHO (2003), in developed countries, adherence to long-term therapies in the general population is around 50% and is much lower in developing countries.

As Ghana continues to scale up access to ART in all health facilities, there is the need to ensure that optimum levels of adherence are observed by patients. Specifically, in the study area, there is very little information on ART adherence. There was therefore the need to get a quick assessment of the situation in order to improve service delivery. This study therefore investigated the barriers to adherence among HIV patients on ART, exploring whether patients' level of knowledge of ART, interpersonal relationship with doctors, socio-cultural and institutional factors have any association with adherence to ART**.** Hence, the study question was **'**What are the barriers to antiretroviral therapy adherence among HIV positive patients?

1.3 Justification/Rationale

With increasing access to antiretroviral drugs in Ghana, there is growing concern at the level of adherence, due to the possible emergence of drug resistant strains of the virus. To guarantee the long term success of ART programs, there is the need to understand the factors that affect adherence so that appropriate interventions can be developed. This will reduce HIV/AIDS related deaths that have led to the loss of bread winners and left many children orphaned. In addition, the cost of treatment and management of HIV/AIDS, which is a great drain on the nation's resources will be reduced when issues of non- adherence are addressed. This study therefore sought to estimate ART adherence levels and identify the factors associated with non-adherence to ART among HIV patients in Ghana.

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1.4 Conceptual Frame Work

The study hypothesizes that adherence to antiretroviral therapy among HIV positive patients is affected by a number of factors including socio-cultural factors, patients' knowledge of ART, patient –doctor interpersonal relationship, institutional factors, medication-related factors and disease related factors. These factors interplay to influence adherence to ART (Figure 1.1).

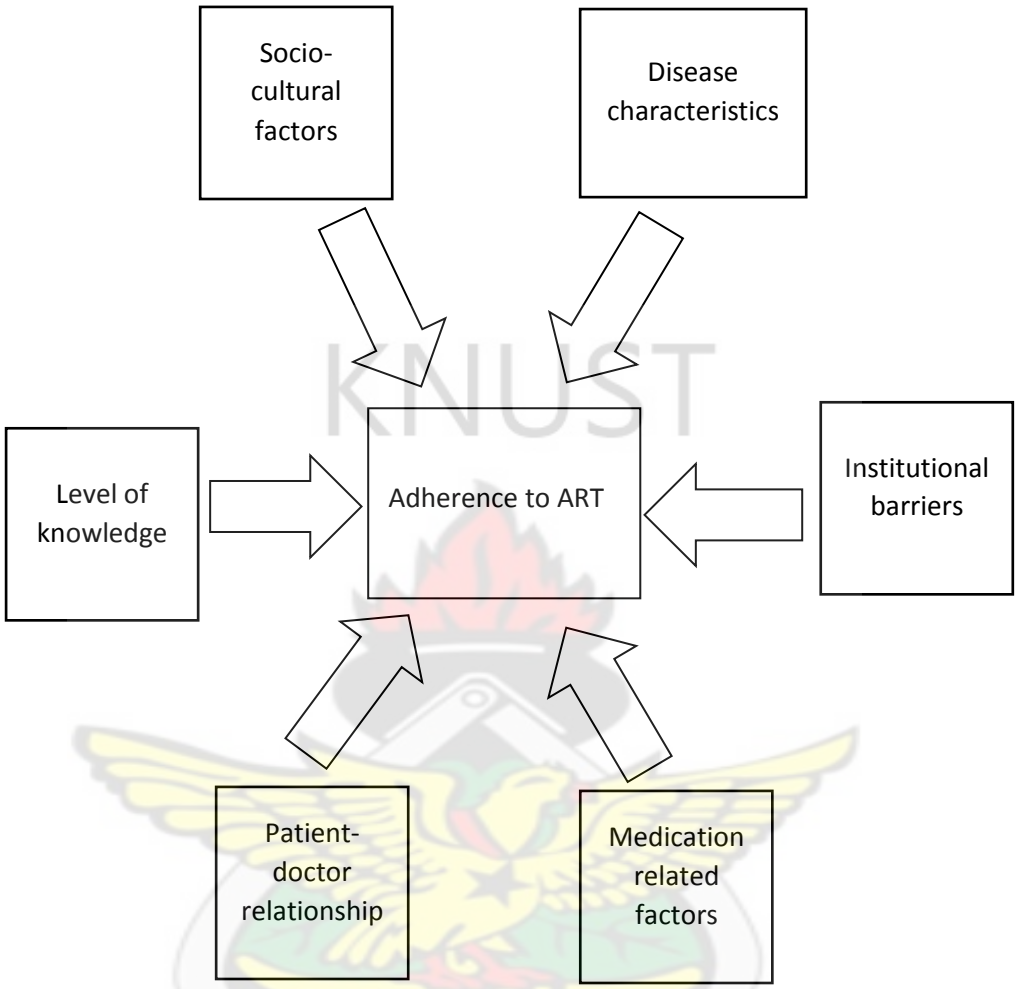

Figure 1.1 Conceptual framework

1.5 Research objectives

1.5.1 General objective

To investigate the factors that prevent adherence to antiretroviral therapy among HIV positive patients.

1.5.2 Specific objectives

The specific objectives of the study were to:

1. Assess the level of knowledge of HIV patients on ART.
2. Examine interpersonal relationship between HIV patients on ART and doctors.
3. Investigate the socio-cultural factors affecting ART adherence.
4. Examine institutional barriers to ART adherence and
5. Estimate adherence to ART.

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1.6 Definition of key concepts

Adherence is defined as the "extent to which a client's behaviour coincides with the prescribed health care regimen as agreed through a shared decision-making process between the client and the health care provider" (WHO, 2003).

Antiretroviral: According to the WHO (2006), "antiretrovirals are drugs that act at different stages of the HIV life cycle to stop the multiplication of the HIV virus".

Antiretroviral therapy: refers to treatment of HIV infection with a triple combination of antiretrovirals. Antiretrovirals of different classes are used in combination as shown below:

- 2 Nucleoside/tide Reverse Transcriptase Inhibitors (NRTIs) and 1 Non-Nucleoside Reverse Transcriptase Inhibitor (NNRTI) or
- 2 NRTIs and 1 boosted Protease Inhibitor (PI).

Combination ART in use in Ghana include Zidovudine plus Lamivudine plus Nevirapine, or Efavirenz, Tenofovir plus Lamivudine plus Efavirenz or Nevirapine,

and Lopinavir/Ritonavir plus Lamivudine plus Zidovudine or Tenofovir (NACP, 2010).

CD4 T-cell- A type of immune system cell that is depleted during the progression of HIV infection. A blood test involving a CD4 cell count can be used to determine the stage of the disease and is one of the criteria that can be used for deciding when to start ART and to monitor response to therapy.

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Viral load- Levels of virus found in the blood per 10 millilitres (mL).

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

The provision of comprehensive HIV care and the administering of ART aim at attaining the following goals: suppression of HIV replication to the barest minimum; the preservation or enhancement of the immune function (CD4 restoration), thereby preventing or delaying the clinical progression of HIV infection; improvement in quality of life; reduction in HIV related morbidity and mortality, and promotion of growth and neurological development in children (NACP, 2010). Lucas (2005) indicates that the clinical goals of HIV treatment will be optimally accomplished through consistent high-levels of adherence to HAART and durable suppression of the viral load.

2.2 Adherence to ART

Several studies have been conducted on adherence to ART among HIV positive patients in Africa (Mills *et al.*, 2006; Dahab *et al.*, 2008; Alagaw *et al.*, 2013; Chimbindi *et al.*, 2014). Gill *et al.* (2005) that reported that adherence rates in Africa are quite variable and often poor and that large numbers of patients are likely to progress to disease stage if adherence is suboptimal. The effects of ART in resource-constrained countries like Uganda, according to a prospective cohort study by Mills *et al.* (2011) revealed that an almost normal life expectancy can be achieved by patients receiving ART.

Paterson *et al.* (2000) found that adherence levels of less than 95% independently predicted viral resistance, opportunistic infections and hospital admissions. Also, Bangsberg *et al.* (2000) observed that some patients with adherence less than 90% progressed to AIDS. Another study by Nachega, *et al.* (2010) revealed that ART regimens require 70–90% adherence in order to be effective. A high degree of adherence is therefore necessary to achieve a long term viral suppression (Chesney, 2000).

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Patient adherence to therapy is a critical component of successful treatment outcomes. While ART is known to be effective in slowing disease progression, its long-term benefit can only be sustained if resistant strains of HIV do not emerge. Among the factors that can result in the emergence of resistance to therapy, non-adherence is perhaps the most amenable to intervention (Chesney *et al*., 1999).

Non-adherence may take many different forms. Patients may fail to fill prescriptions or if prescriptions are filled, may not take the medication at the correct time or take the wrong dose because they misunderstood or forgot the health professional's instructions. Patients may also forget a dose completely, prematurely terminate the medication due to pill burden or may self-adjust their regimen because of side-effects or personal beliefs (WHO, 2003).

According to Chesney (2000) in both clinical trials and clinical practice, non-adherence to medications is widespread among patients with chronic diseases and should therefore be expected in patients receiving ART. A cause of great concern is the fact that health care providers are unable to predict very accurately the patients

who will adhere to their medication regimen and those who will not. Many providers believe that factors associated with socioeconomic status such as lack of education and poverty are good predictors of non-adherence. However, predictors of adherence vary greatly across populations and settings and no one factor has been consistently associated with non-adherence (Chesney, 2000*;* Osterberg and Blaschke, 2005).

2.3 Barriers to ART adherence

Patients' level of knowledge on HIV and ART, socio-cultural factors such as stigma, medication regimen factors such as dosing complexity, poor patient-healthcare provider relationship and ineffective system of care are among the barriers to ART adherence (Chesney, 2000). A patient's behaviour is the critical link between a prescribed regimen and treatment outcome and therefore the most effective regimen will fail if the patient does not take the medication as prescribed (Chesney, 2000).

2.3.1 Demographic characteristics

Demographic factors such as age, gender, education, income, housing status, illiteracy, low level of education, and poverty may have significant effect on adherence (WHO, 2003). In a study by Hardon *et al*. (2007) gender was identified as being strongly associated with acceptance of HIV status; it was found that women talk more about HIV, test early and accept their status better than men and this can possibly result in increased disclosure and improved adherence. Some studies have found old age (>50 years) to be positively associated with good adherence than younger ages (<50 years) (Barclays *et al*., 2007; Shah *et al*., 2007). According to Wellons *et al*. (2002) older patients are less likely to interrupt their ART and this

implies better adherence. A study by Talam *et al.* (2008) found no association between educational status and adherence to ART. Some studies, however, found an association between educational status and adherence (Uzochukwa *et al.,* 2009; Weiser *et al.* 2003). They found that higher educational status was associated with poor adherence to ART). Employment has been found to be associated with better adherence to treatment (Gordillo *et al.,* 1999; Escobar *et al.,* 2003; Campos *et al.,* 2010).

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Falagas *et al.* (2008) reported that there was no clear association between socio-economic status (SES) and adherence among patients infected with HIV/AIDS and that though there seemed to be a positive trend among components of SES (income, education, occupation) and adherence to ART in many of the reviewed studies, most of the studies did not establish a statistically significant association between determinants of SES and adherence.

A study by Amberbir *et al*. (2008) showed that adherence is a dynamic process which changes overtime and cannot reliably be predicted by a few patient characteristics that are assumed to vary with time. Adherence is apparently most difficult for patients with lower levels of education and literacy (WHO, 2003)

2.3.2 Level of knowledge

Patients' knowledge about HIV and ART is an essential factor influencing adherence. The knowledge and beliefs that patients have about their illnesses, the motivation to manage it, the confidence (self-efficacy) in their ability to engage in illness-management behaviours, and their expectations regarding the outcome of

treatment and the consequences of poor adherence, interact in ways not yet fully understood to influence adherence behaviour (WHO, 2003).

Inadequate knowledge about the disease and treatment options available as well as misunderstanding of treatment instructions can lead to poor adherence. A study by Olowookere *et al.* (2012) found that patients with good knowledge about HIV/AIDS and ART and a positive attitude towards the disease tend to be more adherent to ART than those with poor knowledge.

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Another study by Boateng *et al.* (2013) also demonstrated that knowledge and understanding of ART could influence patient adherence to ART. The authors stressed the need for educational interventions which aim at increasing the understanding of ART by both literate and illiterate women in society as necessary steps to develop positive behaviours and enhance adherence to ART.

2.3.3 Socio-cultural factors affecting adherence

Social and cultural issues such as a person's beliefs about diseases and medicines, as well as disclosure and support from significant others have serious implications on adherence. Negative beliefs regarding the efficacy of treatment and non-acceptance of the disease has consistently been associated with decreased adherence (WHO, 2003) Non-disclosure to family members and friends was seen as a constraint to successful adherence and in cases of non-disclosure among partners, the partner on ART may resort to hiding pills, occasionally skipping medications and failure to keep clinic appointments for refills or review (Hardon *et al*., 2007). Disclosure on the

other hand allow for support which plays a vital role in encouraging good adherence (Ross *et al*., 2011). Patients who disclose their status and their being on treatment to a spouse, relative or friend may get emotional or financial support from them if need be. Many studies conclude that patients who do not have support from family, friends and the society at large are less likely to continue their treatment with optimal adherence (Mehta *et al.*, 1997; Ammassari *et al*., 2002; WHO, 2003).

People Living with HIV (PLHIV) are sometimes unwilling to disclose their HIV status because of the fear of stigmatization and discrimination (Portelli *et al*., 2012). Failure of patients to disclose their HIV positive status affects adherence in different ways. It leads to patients taking their ART secretly and irregularly because it becomes difficult for them to take their drugs when they are among people to whom they have not disclosed their HIV status (WHO, 2006). It also affects their attendance at clinic appointments because unintentional disclosure can occur when they meet others on their way to or at ART clinics (WHO, 2006). In addition, they are not able to receive adequate social support and encouragement to take their drugs regularly and on time (Hardon *et al.*, 2007; Portelli *et al*., 2012).

Studies have shown that depression and active substance abuse especially alcohol and intravenous drugs are predictive of poor adherence rates to medication (Holzemar *et al*., 1999; WHO, 2003; Do *et al.*, 2010). Studies on adolescents with HIV showed that those who reported high levels of depression, active substance abuse and lack of perceived social support demonstrated lower adherence than their peers who did not have such experiences (Gordillo *et al.*, 1999; Chesney *et al.*, 2000; Murphy *et al*., 2001).

According to Amberbir *et al*. (2008) adherence is a not a single event, but a process that requires adherence support to be integrated into regular clinical follow up to ensure successful adherence.

2.3.4 Interpersonal relationship between HIV patients on ART and doctors

A good patient–healthcare provider relationship is an important motivating factor for adhering to drug therapies (Portelli *et al*., 2012). Factors such as the patient's overall satisfaction and trust in the provider and clinic staff; the patient's perception of the provider's competency; communication quality and clarity, compassion, the provider's willingness to include the patient in the decision-making process, the adequacy of referral and convenience of visiting the doctor have been identified as strengthening patient-health care provider relationships (Chesney, 2000; WHO, 2003; Portelli *et al*., 2012). Sullivan *et al.* (2000) found that patients' perceptions of their primary care physician's HIV knowledge and empathy were highly related to their satisfaction with the physician, and this may enhance adherence to treatment.

Collaboration between patients and their healthcare provider can result in the selection of regimen that is tailored to meet the lifestyle needs of the patient. Such regimen often have benefits of convenient dosing, low pill burden, and tolerable side effects that enhances adherence, effectiveness, and the patient's willingness to remain on antiretroviral therapy long term (Chesney, 2003).

The WHO (2003) states that the relationship between the patient and the health care provider (be it physician, nurse or other health practitioner) must be a partnership that draws on the abilities of each other. Effective treatment relationships are characterized by an atmosphere in which alternative therapeutic means are explored, the regimen is negotiated, adherence is discussed, and follow-up is planned.

Several studies have proved that higher quality physician-patient relationships are associated with better medication adherence while lesser quality relationships hinders adherence (Robert, 2002; Schneider *et al.*, 2004; McCoy, 2005; Beach *et al.*, 2006). Also studies by Ross *et al.*, (2011) and Portelli *et al.*, (2012) found out that patients greatly valued their relationship with the health care provider. Most often when patients were dissatisfied with their care, it was because there was a mismatch between the patient's expectations of care and the physician's consultation style (Roberts, 2002). The physician-patient relationship quality is a potentially important point of intervention to improve patients' medication adherence. Thus strengthening and promoting the bonds between physicians and HIV positive patients should be an absolute priority, at both the interpersonal level of physician-patient interactions and at the organizational level (Robert, 2002).

2.3.5 Institutional barriers to ART adherence

Structural factors such as the general environment of the health care facility, flexibility of clinic appointments, provision of privacy, presence of healthcare providers experienced in HIV treatment system, availability and accessibility of antiretroviral medications and healthcare facilities for diagnosis and treatment, and

availability of counselling services and lack of them can influence adherence respectively (Reda and Biadgilign, 2012). Lack of clear instructions from health professionals and poor implementation of educational interventions negatively affect patient adherence to medication (WHO, 2003).

Kagee *et al*. (2011) indicated that logistical barriers, overburdened health care facilities, limited access to mental health services and difficulties in ensuring adequate counselling hinder adherence. According to Chimbindi (2014) long queues, short health worker-patient contact time, poor staff attitudes, and facility uncleanliness may affect patient satisfaction, which is a determinant of treatment uptake, adherence and retention, as well as important health systems outcome.

A study conducted by Hardon *et al.* (2007) among ART users in three African countries namely, Botswana, Tanzania and Uganda, also identified other treatment costs such as registration and user fees at private health facilities and lost wages due to long waiting times as main obstacles to optimal adherence. Additional spending on meals and snack due to long waiting hours was also of concern to participants of that study.

2.4 Estimating adherence

Accurate measurement of antiretroviral adherence is essential for targeting and rigorously evaluating interventions to improve adherence and prevent viral resistance. In clinical settings, methods to measure adherence must be efficient, practical and inexpensive and be able to identify patients in need of interventions. (Berg and Arnsten, 2006). Commonly used methods for measuring adherence include indirect measures, such as self-reports, electronic drug monitoring, pill

counts, and pharmacy refill records, and direct measures include detection of drugs or drug metabolites in blood plasma (Osterberg and Blaschke, 2005; Berg and Arnsten, 2006).

2.4.1 Patient self-report

Patient self-report is the most widely used adherence measure. It has advantages of low staff and respondent burden, is inexpensive, flexible, and takes very little time. Studies have also indicated that self-reports correlates well with both viral load and clinical outcomes (Nieuwkerk and Oort, 2005; Berg and Arnsten, 2006). In clinical settings, self-report allows for a discussion of reasons for missed doses and potential solutions Most commonly, respondents are asked to report the number of doses they missed during a specified recall period or to estimate their overall percent adherence on a visual analogue scale. They assume, however, that patients can accurately recall their behaviour and are providing honest answers. A limitation of self-report is that it over-estimates adherence, as patients may report to be perfectly adhering when, in fact, they may not be doing so (Chesney, 2000; Berg and Arnsten, 2006). According to a study by Amberbir *et al* (2008) on predictors of ART adherence among HIV infected patients, self-reported dose adherence in the study area was 94.3%, but the composite adherence rate considering the combined adherence indicators of dose, time and food was 75.7%.

2.4.2 Pill counts

The return of excess pills provides tangible evidence of non-adherence. Logistically, pill counting requires both that patients bring the pill bottle to the visit, and that there

is sufficient time to count the pills. Two pill-counting techniques for measuring adherence are the announced pill count and unannounced pill count. Announced pill counts takes place at clinical appointments or scheduled research visits at which the patient brings their medication bottles. However, announced pill counts can be inaccurate if patients empty pill containers without ingesting any pills ("pill dumping"), if the accurate start date for the pill supply cannot be determined, or if patients use multiple pill containers. In contrast, unannounced pill counts used in research settings minimize the risk of pill dumping and have been shown in some studies to predict viral load slightly better than electronic drug monitoring (EDM) (Lui *et al*, 2001; Berg and Arnsten, 2006).

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2.4.3 Pharmacy Refill Records

The underlying premise of this method is that if patients do not receive timely refills from the pharmacy, they are either missing doses (as measured by prolonged periods between refills) or not taking the medication at all. However, this premise is invalid if patients are obtaining medications in alternate ways such as free samples from family members or friends or from other pharmacies. Adherence rates from pharmacy refill records are determined either by comparing actual to expected refill dates or by identifying "medication gaps," defined as periods of time during which the patient's supply of medication is assumed to have been exhausted. This method of measuring adherence further relies on the major assumption that patients who receive timely pharmacy refills ingest their medications correctly. The benefits of pharmacy refill records for measuring adherence are potential immunity to social desirability and reporting bias, ability to obtain population level data and absence of patient-level burden. The major disadvantage of this method is its limited feasibility, which makes

it inappropriate for adherence assessments in clinical settings (Chesney, 2000; Berg and Arnsten, 2006).

2.4.4 Therapeutic drug monitoring

Monitoring of drug levels is a feasible way in both clinical and research settings to measure medication adherence. Low drug levels in blood plasma have been associated with self-reported non-adherence and virologic failure. Therapeutic drug monitoring is expensive and cumbersome in addition to lack of technological standardisation across various settings. It typically measures recent doses and thus provides limited data. Adherence may be overestimated if patients are more conscientious about taking their medication before a clinic visit (Berg and Arnsten, 2006; Chesney, 2000).

2.4.5 Electronic monitoring device

Electronic monitoring systems, such as the Medication Event Monitoring System (MEMS), are inserted into medication bottle caps. They contain a computer chip that records the date and time of opening and closing of the bottle. Interpretation of these data assumes that a single dose is taken each time the bottle is opened, and may lead to inaccuracies if multiple doses are removed at once. Even though the use of electronic monitoring device (EDM) seems reliable and less prone to respondent bias, the advanced technology, high cost, and logistic requirements involved have precluded its wider application in Sub-Saharan Africa (Osterberg and Blaschke, 2005).

Despite the limitations of these measurement techniques, adherence data is providing valuable insight into the association between drug taking and viral load, as well as approaches that may be useful for improving adherence (Chesney, 2000). A combination of these techniques is often used to allow the strength of one method to compensate for the weakness of the other. In developing countries, however, pharmacy refill reports and patient self-reports are usually employed (Chesney, 2006; Nachega *et al*., 2010).

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CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Area

3.1.1 Geographical characteristics

Sekondi-Takoradi Metropolis is the largest district in the Western Region. It covers a land area of 219km² with Sekondi as the administrative headquarters. It has four sub metropolitan areas namely Sekondi, Takoradi, Effia-Kwesimintsim and Essikado-Ketan. The Metropolis is bordered to the West by Ahanta West District, to the North by Wassa East, to the East by Shama District and to the South by the Gulf of Guinea. The Metropolis is located on the West Coast of Ghana, about 280km west of Accra and 130km East of Ivory Coast.

The natural vegetation has largely been degraded due to slash and burn farming practices and other human activities. The average annual temperature is 22^{o}C. The mean annual rainfall is about 1,380mm and covers an average of 122 rainy days. Precipitation occurs mainly from March to July where close to 70% of the rainfall takes place. Minor rainfall occurs between September to November and is very severe but of short duration. The dry seasons are short and pronounced; a short one occurring from August to September and a more extended one from December to February which heralds the harmattan and dries up the area.

3.1.1.1 Spatial Analyses

The Metropolis currently has 44 settlements and close to 13 of these dwellings have a population exceeding 7,000. The major settlements are Takoradi, Effia-Kwesimintsim, Effiakuma, Anaji, Kojokrom, Tanokrom and Sekondi.

3.1.2 Demographic characteristics

The population of the Metropolis based on the 2010 Population Census was 559,548 comprising 273,436 males and 286,112 females.

3.1.2.1 Economic Profile

The Metropolis is the third most industrialized and largest city in Ghana and has gradually emerged as the 'Oil City' since the discovery of oil in commercial quantity off the coast of Cape Three Points in Western region. The services, agriculture and manufacturing contributes to 59.9%, 21% and 19.1% respectively to the local economy.

3.1.2.2 Social and Communication Systems

The telecommunication system in Sekondi-Takoradi is very efficient, haven undergone extensive expansion and modernization. People in the city can access any part of the world without hindrance through landline, mobile and internet connectivity. The city enjoys constant supply of electricity power with about 100% of the Metropolis energized. Almost 95% of the metropolis has access to potable water.

3.1.3 Health Profile

There are thirty four health facilities in the metropolis and six maternity homes. Categories of health facilities within the metropolis include private, military, quasi government and public health facilities. A greater proportion of these facilities are concentrated in the central business area. There are three public hospitals, three health centre and twenty five private clinics. Eight community-based health planning and services (CHPS) compounds have been established in the peripheral communities. Currently, there are five ART centres in the Sekondi -Takoradi metropolis.

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3.2 Study type and design

The study was observational and the design was a cross sectional study. It was to assess the barriers to ART adherence among HIV positive adults on ART in the Sekondi -Takoradi metropolis so that appropriate interventions can be planned. The field work was carried out from July to September, 2014.

3.2.1 Study population

The study population consisted of HIV positive adult patients who had been on ART for at least six months and were attending ART clinic at the Effia-Nkwanta Regional hospital (ENRH).

Inclusion criteria: All adult patients (aged 18 years or above) who had been on ART for at least six months and were willing to be part in the study were eligible for inclusion.

Exclusion criteria: HIV positive patients who were less than eighteen years of age or those who were above eighteen years but had been on treatment for less than six months were excluded. Patients who were more than 18years of age and not willing to participate in the study were also excluded.

3.2.2 Sampling technique

Systematic random sampling with a sampling interval of three was used to select 426 HIV patients on ART attending clinic at the ENRH. Patients who were selected were interviewed using structured questionnaire after they had collected their ART from the Pharmacy. ENRH is a Regional hospital and centrally located in the city and therefore receives HIV patients from all over the metropolis. Therefore, the data obtained is a representation of the general population in the district.

3.2.3 Sample size

The sample size was calculated using the probability sampling formula below:

n= z2pq/d^2, where n = sample size

z=standard deviation, usually at 1.96 for 95% confidence interval

p=proportion of HIV patients on antiretroviral therapy, usually 0.5

q=1-p, d=degree of accuracy desired, usually 0.05

n = $(1.96)^2$ * 0.5 (0.5)/0.05^2

= 3.8416* 0.25/0.0025

=0.9604/0.0025

=384.16

A response rate of 90% (0.9) was anticipated, therefore to make room for non - response, the sample size for this study is =384/0.9 = 426.

3.2.4 Data collection technique and tool

A structured questionnaire was used to collect data. The questionnaire consisted of open and closed ended questions. Options or predetermined alternative responses were provided for respondents to choose from by making a tick against the option chosen. Interviewer-administered questionnaire was administered to patients to determine their demographic information, other characteristics of the patients and adherence factors. Exit interviews were carried after respondents have collected their medication at the ART dispensary. The questionnaires were administered after informed consent had been sought from the participants by the researcher. The principal investigator carried out the data collection with two research assistants, who were given two days training workshop prior to the data collection. It involved a detailed presentation and discussion in English and Fante (as the interview was conducted in the local dialect) on the objectives and methodology of the study, as well as a collective review of the questionnaire.

Adherence rate was estimated using patients' self-report method of measuring adherence. Respondents were asked to recall the frequency of their medication intake over the previous seven days preceding the interview and report the number of missed antiretroviral doses. Respondents' ART appointment cards were also

reviewed to determine patient who had missed clinic appointments for drug refill in the previous six months.

The questionnaire had six sections as outlined below:

Section A – Demographic data such as age, gender, marital status, educational level and occupation

Section B - Level of knowledge of ART

Section C – Interpersonal relationship between patients and doctors

Section D – Socio-cultural factors affecting ART adherence

Section E – Institutional barriers to ART adherence

Section F- Estimating adherence to ART

3.3 Study variables

The Dependent variable was adherence to ART.

The Independent variables were:

- Socio-demographic characteristics
- Patient-doctor relationship
- socio-cultural factors
- Level of knowledge of ART
- institutional barriers to adherence

Table 3.3 Variable table

Variable	Operational definitions of study variables	Scale of measurement	Instrument
Adherence to ART	Whether respondent has missed any dose of ART in the 7 days prior to the interview.	Nominal	Questionnaire
Level of education	The highest level of education the respondent has attained at the time of the study	Nominal	Questionnaire
Age	The age of the respondent at the time of the study	Numeric	Questionnaire
Employment	Practicing occupation as at the time of the study.	Nominal	Questionnaire
Marital status	Whether respondent is married, single, widowed, divorced, or cohabitating.	Nominal	Questionnaire
Gender	The respondent being male or female.	Nominal	Questionnaire
Knowledge on ART	Ability to indicate: how anti-retro-viral work, its contraindications, etc.	Ordinal	Questionnaire
Affordability of ART treatment	Ability to afford treatment related cost such as transportation, feeding etc.	Nominal	Questionnaire

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Variable	Operational definitions of study variables	Scale of measurement	Instrument
Patient –doctor relationship	The level of interaction between the respondent and the doctor during consultation.	Ordinal	Questionnaire
Waiting time	Total time the respondents spend at the ART clinic before leaving for home.	Numeric	Questionnaire

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3.4 Pretesting

The questionnaire was pretested at the Takoradi Government hospital to check for clarity, consistency and acceptability of the questions to the respondents. The pretesting also gave the research assistants a first-hand experience prior to the main study. Ten respondents were interviewed. Lessons learnt during the pretesting were discussed by both the research assistants and the principal investigator to help fine-tune the tools and clarify any issues. After pretesting, the necessary corrections were made and the questionnaires finalised for the actual field work.

3.5 Data processing and analysis

All questionnaires from the field were checked for completeness after data collection. They were then sorted, numbered and coded before the data was entered into Microsoft Excel 2013. The data was imported into SPSS for Windows (version 16.0) for data analysis. Association between the dependent and independent variables was assessed using Chi square(x^2) test. Logistic regression was used to determine the

simple relationship between the outcome variable and each independent variable. The strengths of the associations were determined with multiple logistic regression. Inference was made using a 95% confident interval with 5% error margin and a p-value < 0.05. P-values less than 0.05 were considered statistically significant. The results were presented in frequency, cross tabulation tables, bar charts and pie charts.

For the purpose of this study, knowledge was assessed in terms of: how ARVs work and their manner of use; whether the ARV users know that ARVs are not a cure and that they have to be taken for life; whether it is essential to take your ART and the effect of alcohol on ART. Patients' level of knowledge of ART was computed by respondents' total correct responses from the various questions posed to test for knowledge. Parents who scored 75% or more were considered as having excellent knowledge of ART, those who had 50- 74% were graded as having good knowledge of ART and below 50% was considered as having poor knowledge of ART. The same grading system was applied to the assessment of the level of patient -doctor relationship.

ARVs are now given free of charge in the public health sector to citizens who are eligible for treatment, once the person is registered with the National Health Insurance Scheme (NHIS). Patients who are not registered with the NHIS are however required to pay GHS 5 for a month supply of ART. Affordability to ART in this study therefore focused on other treatment-related costs such as transportation, expenditure on snacks and meals while waiting to be seen at the clinic, and increased spending on food as a result of being on the ARV.

In this study, adherence was defined as the use of ARVs at the right frequency of dosing, which was a two times a day dosing. Level of adherence was calculated as a percentage of the actual dose taken divided by dose that should have been taken in the previous seven days. Adherence level of ≥95% was considered as optimal adherence level and levels of < 95% as sub-optimal adherence. Optimal adherence level corresponded to a no dose miss in a 7-day period in a twice daily dosing regimen taken.

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3.6 Ethical Consideration

Ethical clearance for the study was sought from the Committee on Human Research, Publications and Ethics (CHRPE), the Institutional Review Board of the Kwame Nkrumah University of Science and Technology (KNUST) and the Komfo Anokye Teaching Hospital. Consent was sought from the Medical Superintendent of the Effia - Nkwanta Regional Hospital. The respondents were given consent forms to sign and were assured of confidentiality and anonymity. All their concerns and questions were answered before data collection began.

3.7 Basic Assumptions

The assumptions made during the study were:

1. The HIV patients attending ART clinic at ENRH were a representative sample of the HIV patients in the study area.

2. Respondents gave honest answers in a way not to distort results of the study.

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic characteristics

Table 4.1 shows the demographic characteristic of the respondents of the study. Of the 426 respondents surveyed for this study, 75.8% were females and the remainder males. The mean age of respondents was 39.3 years with a range of 18 to 66 years. The majority of the respondents were within the age range of 30 to 49 years. On the marital status of the respondents, most of them were married (45.3%) and had basic level education (58.5%). Most of the participants were gainfully employed (79.6%) and had two to four children (56.6%).

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Table 4.1 Distribution of Demographic Characteristics of Respondents

Variable	Frequency(n=426)	Percentage (%)
Gender		
Female	323	75.8
Male	103	24.2
Age Ranges		
<20	5	1.2
20-29	43	10.1
30-39	137	32.2
40-49	153	35.9
50-59	68	15.9
60-69	20	4.7
Marital Status		
Married	193	45.3
Single	78	18.3
Divorced	67	15.8
Widowed	47	11.0
Cohabitating	41	9.6
Education Background		
None	67	15.7
Primary	103	24.2
JHS / MSLC	146	34.3
Secondary	92	21.6
Tertiary	18	4.2
Employment Status		
Unemployed	87	20.4
Employed	339	79.6

Source: Field Survey, 2014.

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4.2 Univariate analysis

In the univariate analysis, age, marital status and employment status had association with adherence (p-value=0.009, 0.003 and 0.0001 respectively) (Table 4.2). Patients between the ages of 30 – 49 years were more likely to miss their dose of ART than the other age groups (OR=1.21).

The analysis also showed an association between longer time (>3hours) spent at the clinic, missed clinic appointment, forgetfulness and being away from home with

adherence (p – value of 0.0001, 0.0001, 0.0001and 0.0001 respectively) (See Table 4.2).

Table 4.2 Univariate analysis of factors associated with levels of adherence to ART

Variable	Missed dose		Unadjusted	
	Yes (n=141) (sub-optimal)	No (n=285) (optimal)	OR (95% CI)	P-value
Age (years)				
18-29	14 (3.2)	15 (3.6)	1.00	
30-49	87 (20.5)	192 (45.1)	1.21 (0.76-1.48)	0.009
≥50	41 (9.5)	77 (18.1)	0.64 (0.62-0.73)	0.0001
Education	112 (26.3)	245 (57.5)	0.94 (0.97-1.02)	0.67
Marital status	61 (14.3)	127 (30.0)	1.73 (1.54-1.95)	0.003
Employment	108 (25.4)	232 (54.3)	0.71 (0.70-0.82)	0 0001
Waiting time				
≤1hr	13 (3.0)	24 (5.7)	1.00	
1-3hr	26 (6.1)	72 (17.0)	1.08 (0.96-1.21)	0.209
>3hr	102 (24.0)	189 (44.1)	1.54 (1.42-1.68)	0.0001
Main Reasons				
Forgetfulness	67 (15.8)	139 (32.7)	6.17 (4.06-9.38)	0.0001
Away from home	3 (10.1)	87 (20.4)	5.78 (3.89-8.58)	0.0001
Missed appointment	60 (14.0)	98 (23.1)	1.38 (1.29-1.47)	0.0001

Field Survey, 2014.

4.3 Multivariate analysis

Variables that were found to have an association with adherence in the univariate analysis, were subjected to further analysis with multiple logistic regression. None of the demographic characteristics were significantly associated with adherence in the multivariate analysis. Also longer time (>3hours) spent at the clinic showed no association with adherence with a p – value of 0.290. (See Table 4.3).

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Missed clinic appointment, forgetfulness and being away from home were significantly associated with adherence. Patients who missed clinic appointment as well as those with reasons of forgetfulness and being away from home were more likely to miss their dose of ART (Adjusted OR=1.78; 5.76; 5.49 respectively) (See Table 4.3).

Table 4.3 Multivariate analysis of factors associated with missed dose of ART

Variable	Adjusted OR (95% CI)	P-value
Missed clinic appointment	1.78 (1.65-1.91)	0.0001
Forgetfulness	5.76 (3.89-8.59)	0.0001
Away from home	5.49 (3.76-8.02)	0.0001
Waiting time (>3hrs)	0.94 (0.83-1.06)	0.290
Marital Status	0.97 (0.95-0.99)	0.070
Employment	0.78 (0.72-0.84)	0.390
Age (30-49yrs)	0.87(0.76-1.00)	0.060

Field Survey, 2014.

4.4 Level of knowledge on ART

Analysis of the data collected revealed that 64.8% of the respondents had excellent knowledge of ART while 22.8% had moderate level of knowledge and 13.2% had poor knowledge on the subject (Figure 4.1). On the individual component score, most of the respondents knew it was essential for them to take their ART (99.1%). Less than half of them were however unaware that not adhering to the highly active antiretroviral therapy (HAART) can lead to development of resistant strains of the virus (47.9%). Also just about half of the respondent knew that the effectiveness of ART will be reduced when they are taken alongside alcohol (Table 4.4).

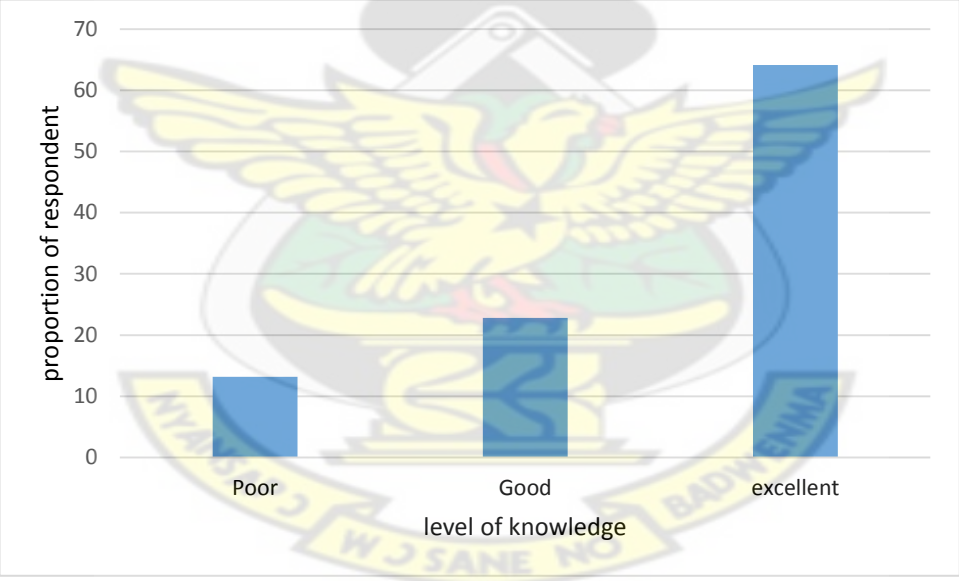

Figure 4.1 Respondents' level of knowledge on ART

Table 4.4 Respondents knowledge on ART

Variable	Frequency(n=426)	Percentage (%)
The use of ART	388	91.1
A healthy and productive life once you are put on ART	417	97.9
Sticking to ART prescription	422	99.1
Effect of Alcohol on ART	231	54.2
ART the only effective treatment available to manage HIV	389	91.3
Development of Resistance	204	47.9

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4.5 Socio-cultural Factors

Most of the respondents interviewed (89.0%) had disclosed their HIV status to either family or friends. The majority attested to having treatment support from family and friends (80.1%). Alcohol consumption, feeling of discrimination and depression were reported by 15.7, 9.9 and 32.4% of respondents respectively. However, 32.4% of respondents reported feeling depressed. The average ART experience among participants was 3.03 years ranging from 6 months to 15 years. Most of the respondents had taken ART for 1 to 3 years and majority of the respondents considered the cost of ART treatment to be affordable (Table 4.5).

Table 4.5 Socio Cultural Factors of HIV Status and ART Treatment

Variable	Frequency (n=426)	Percentage (%)
Disclosure to Family and Friends	379	89.0
Treatment Support	341	80.1
Alcohol Intake	67	15.7
Feelings of Depression	138	32.4
Feelings of Discrimination	42	9.9
Affordability of ART Treatment		
No	40	9.4
Yes	386	90.6

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4.6 The patient-doctor relationship

In general, the patient-doctor relationship as described by HIV patients on ART therapy among the study population was rated very high. Majority of patients (94.4%) said their healthcare providers listen carefully to what they say and explain issues carefully to them. For most of them, their doctors were approachable (91.8%), friendly (96.2%) and offered them opportunity to ask questions about their treatment (90.6%) (Table 4.6).

Table 4.6 Doctor-patient relationship

Variable	Frequency (n=426)	Percentage %)
Does your doctor listens carefully to what you have to say?		
No	3	0.7
Sometime	21	4.9
Yes	402	94.4
Does your doctor explain things carefully to you?		
No	2	0.5
Sometime	22	5.2
Yes	402	94.4
Is your doctor easily approachable		
No	10	2.4
Sometime	25	5.9
Yes	391	91.8
Does your doctor give you the chance to ask questions about your treatment		
No	8	1.9
Sometime	32	7.5
Yes	386	90.6
Does your doctor treats you in a friendly manner		
No	5	1.2
Sometime	11	2.6
Yes	410	96.2

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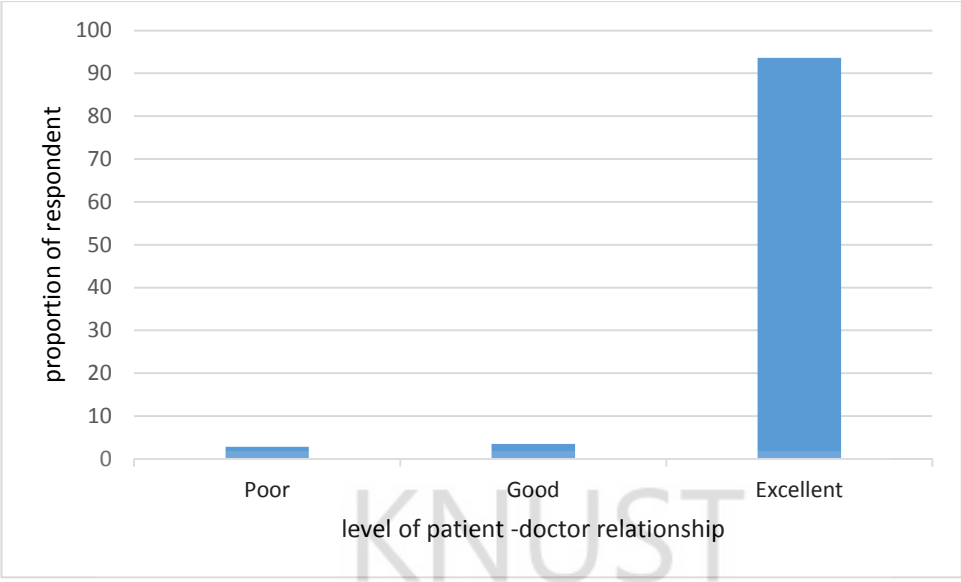

Figure 4.2 Level of patient-doctor relationship

4.7 Institutional barriers to ART adherence among HIV patients on ART therapy

Most of the patients (29.3%) on ART treatment spend over three hours at the clinic before receiving their supply of antiretroviral therapy. For most of the patients (94.4%), ART supplies had been adequate and felt their privacy was protected during consultation and counselling (96.2%).

Table 4.7 Institutional barriers to ART adherence

Parameter	Frequency	Percentage
Adequate supply of ART		
Yes	402	94.37
No	24	5.6
Privacy during consultation and counselling		
No	9	2.1
Sometime	7	1.6
Yes	410	96.2

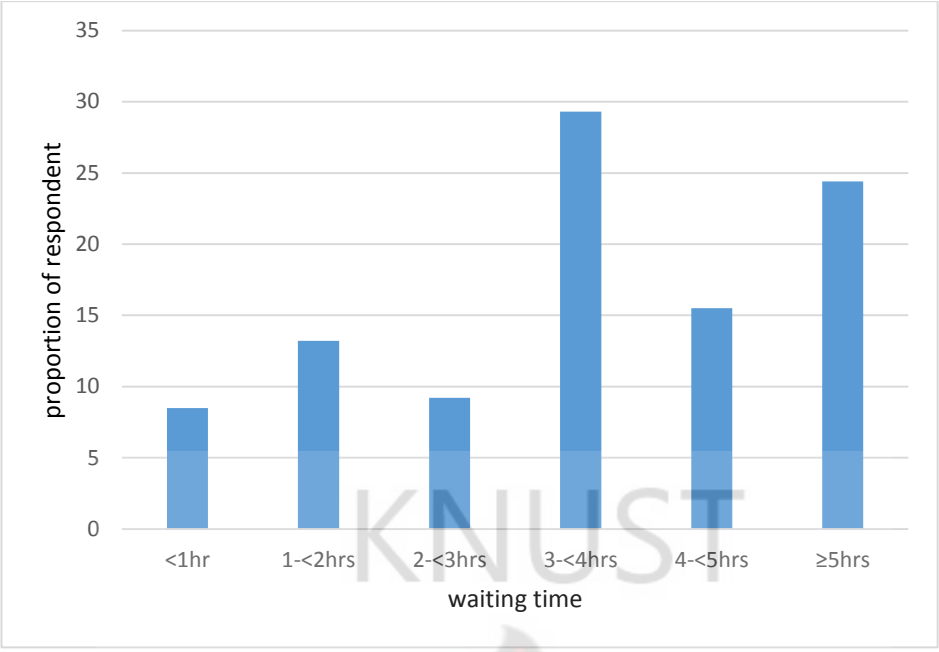

Figure 4.3 Respondents' ART clinic waiting time

4.8 Adherence to ART

Of the respondents interviewed, 33.1% of the number had missed at least one of their dose of ART in the last seven days preceding the day of the interview. More than a third of the patients had missed at least one clinic appointment in the last six months. Most of the respondents (88.7%) attended adherence counselling with a treatment supporter before beginning the ART (Table 4.8). With the exception of 17 patients (4%) all other participants said they use prompters to remind them to take their drugs. The most popular prompter item used by patients was a clock (47.9%), followed by phones (25.6%) and treatment supporters (15.7%). The main reasons attributed to ART missed dosage were forgetfulness (49.5%) and being away from home (29.8%) (Figure 4.4).

Table 4.8 Adherence to ART

Variable	Frequency (n=426)	Percentage (%)
Attended adherence counselling before treatment	378	88.7
Missed clinic appointment within the last 6 months	159	37.3
Things used to remember to take drug		
Clock	204	47.9
Phone	109	25.6
Treatment supporter	67	15.7
Placed ART at strategic place	22	5.2
None	17	4.0
Radio	7	1.6
Number of times doses were missed within the last 7 days		
One Time	70	16.4
Two Times	31	7.3
Three Times	13	3.1
Four Times	21	4.9
Six Times	5	1.2
Ten Times	2	0.5

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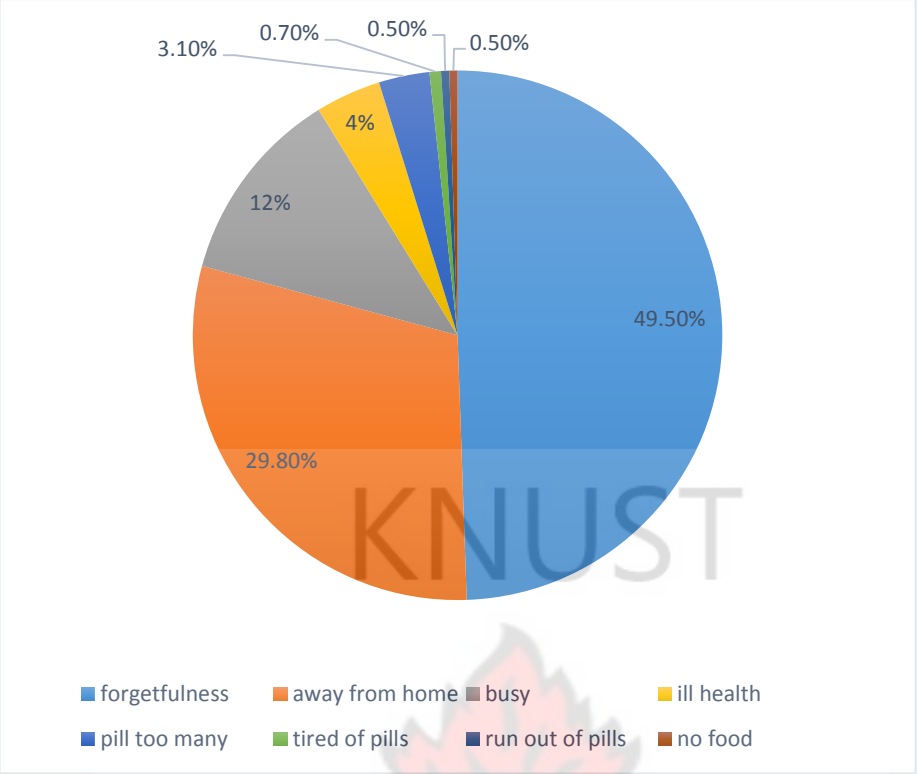

Figure 4.4 Reasons for missing doses of ART

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CHAPTER 5

5.0 DISCUSSION

5.1 Introduction

Successful long-term treatment of HIV/AIDS requires at least 95% adherence to HAART in order to prevent emergence of drug-resistant HIV variants that lead to regimen failure and limit options for future therapy (Chesney, 2003). With increasing access to antiretroviral drugs in Ghana, there is growing concern about the level of adherence to ART, due to likely emergence of drug resistant strains of the virus. To guarantee the long term success of ART programs, there is the need to ensure that optimum levels of adherence are observed by patients. There was therefore the need to determine factors that prevent optimal adherence to ART.

The key findings of the study are as follows:

1. Barriers to adherence were found to be missed clinic appointment, forgetfulness and being away from home.
2. The optimal adherence rate using patients' self–report was 67%.
3. Thirty seven (37%) of the respondents had missed at least one clinic appointment in the last six months.

The discussion of these findings, their implications and the limitations of this study form the basis of this chapter.

5.2 Demographic characteristics

The majority of respondents in this study were females and accounted for 75.8% of the study population. This pattern is in agreement with current ART enrolment in Ghana where more women are infected with HIV and are on ART than men (NACP,

2012). Majority of the respondent were married and recorded higher frequency for optimal adherence. Married people may have the advantage of emotional support from their partners in the form of encouragement, reassurance and motivation to help them faithfully take their ARV. Most of the participants of the study were gainfully employed. These may be better positioned to afford ART related costs such as transportation and food better and achieve optimal adherence better than those who are unemployed.

The study did not show any association between age, marital status, employment status, educational status and adherence in this study. Similar observations were made by Weiser *et al.* (2003) and Talam *et al.* (2008).

5.3 Level of Knowledge of ART

The respondents demonstrated high level knowledge of ART and how it works. This may be due to the pre-treatment adherence counselling session that patients go through before ART treatment is commenced. However, though they demonstrated high level knowledge of ART treatment and how the drugs work, it was worrying that more than half of them were unaware that failing to adhere to the highly active antiretroviral can lead to resistant strains of the virus. This could explain the reason for the high sub-optimal adherence level observed in this study (33%).

Olowookere *et al.* (2012) found that patients with good knowledge about HIV/AIDS and ART and a positive attitude towards the disease tend to be more adherent to ART than those with poor knowledge. Boateng *et al.* (2013) also found that patients with inadequate knowledge of HIV and ART were more likely to miss clinic appointments and consequently be non-adherent.

It is therefore important to emphasize the effects of sub-optimal adherence to ART during pre-treatment counseling and follow-up visits. Again, continuous patient education on the importance of adherence and the consequence of non-adherence must be undertaken by ART clinics. Information, education and communication (IEC) materials such as posters and leaflets could be given to patients to encourage adherence. Nsimba *et al*. (2010) suggested that the content of these materials should emphasize the need for patients on ART to be given support to achieve optimally adherence. Gusdal *et al*. (2011) also proposed the training of more peer educators and counsellors to promote patient adherence to ART.

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5.4 Socio-cultural Factors

Disclosure of HIV status was found to be very high (89.0%) as most respondents had disclosed their status to family and friends and the majority attested to receiving treatment/social support. This finding may be due to the fact that the guidelines for ART use in Ghana recommend patient disclosure of their HIV status to a confidant who acts as an adherence monitor (treatment supporters). The confidant could be a family member or a friend and is supposed to support the patient throughout the treatment period. The level of social / treatment support observed in this study (80%) was similar to that reported in a study conducted in Ethiopia in which 78% of participants received support from family and friends (Ambebir *et al*., 2008).

The healthcare team made up of doctors, nurses, pharmacists, psychologist and social workers need to form a trusting relationship with their patients. They need to empathise and maintain confidentiality with them. Such a relationship will encourage

patients to confide in the healthcare team. Again, it has been suggested that adherence should be assessed at every follow-up visit so that patients with adherence problems such as non-disclosure can be targeted and managed individually (Chesney, 2000). Alagaw *et al*. (2003) also recommended the need for HIV/AIDS counsellors to screen for depression and provide treatment when appropriate, directly or in collaboration with mental health professionals.

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5.5 The patient-doctor relationship as described by HIV patients on ART therapy

There was a positive interpersonal relationship between the respondents and their doctors. Their doctors were friendly, easily approachable, explained things carefully to them and gave them opportunity to ask questions about their treatment. This finding is in agreement with the study of Schneider *et al.* (2004) where better physician–patient relationship was observed. They emphasised the importance of quality interpersonal relationship between the patient and the health professionals as a potential intervention to improve adherence. Roberts (2002) also made a similar observation that quality physician-patient relationships promotes adherence while lesser quality relationships impede adherence to ART.

5.6 Institutional barriers to ART adherence among HIV patients on ART therapy

Most of the respondents (29.3%) spent over three hours at the ART clinic before they received their supply of ART. Long waiting time has been cited to be a challenge to adherence to ART (Hardon *et al*., 2007). Patients who are dissatisfied with the long

waiting time spent at the ART clinic may not be punctual at the next clinic appointment. To curtail this problem, extra staff are needed at the clinic to attend to the large numbers of patients who come to the clinic. This will reduce the long waiting times spent by the patients before receiving their ARVs.

Most of the respondents felt their privacy was protected during consultation and counselling. This may be due to the fact that the hospital has a well-furnished ART centre with adequate rooms for HIV and ART counselling and consultation.

Most patients considered their ART supplies to be adequate. This was not surprising since the health care supply chain system in Ghana is effective and works to avoid shortage of ARVs at the ART centres.

5.7 Adherence characteristics of HIV patients

Sixty seven percent of the respondents were optimally adherent in the seven days preceding the interview. This finding is consistent with the findings of other studies where adherence rates of 63.1% and 62.9% were reported respectively (Bonolo *et al*., 2005; Chi *et al*., 2009). The 67% optimal adherence rate recorded in this study calls for critical attention to be paid to patient-related factors such as forgetfulness, being away from home, being busy and missing clinic appointment in order to ensure maximum benefit from ART.

The main reasons for missing a dose of ART by participants of this study were forgetfulness, being away from home and being busy. Other researchers have also reported forgetfulness, being away from home and busy schedules as the main reasons why patients miss their dose of ART (Ambebir *et al*., 2008; Bhat *et al*., 2010;

Chesney, 2000; Markos *et al*., 2009; Potchoo *et al.*, 2010; Turner, 2002). The study found an association between forgetfulness and being away from home and adherence (Talam *et al*., 2008; Fong *et al*., 2003). Patients should be supported and encouraged to use aids such as alarms on mobile phones or popular radio programmes as reminders to help them take their pills on time. An activity in the patients' daily schedule which can serve as a prompter can also be identified. Also, it will be beneficial to discuss and identify potential barriers to adherence with patients before ART is started. For instance, those with busy schedules, and depressive mood can be singled out for individual management. Some studies have indicated that use of mobile text messages by ART staff to patients can be an effective tool to improve ART adherence (Lester *et al*., 2010; Horvath *et al*., 2012; Pop-Eleches *et al*., 2011).

The study found a significant association between missing clinic appointment and missed dose. Some studies similarly found an association between missed clinic appointment and adherence (Bajunirwe *et al*., 2009; Fong *et al*., 2003; Nemes *et al*., 2004). Measures such as running the ART clinic throughout the week so that patients can conveniently choose a day to attend clinic and early morning sessions which will permit workers to attend before leaving for their offices can improve the situation.

5.8 Limitations

This study employed the patient self-report method of measuring adherence. This method may be subject to recall bias, social desirability and overestimation of adherence by patients (Chesney, 2000). Also, the study used structured questionnaires which limited the possibility of in-depth understanding of the subject under study since there were fixed responses to the questions.

The generalizability of these results may be questioned due to the fact that the study was carried out at a single centre in the Sekondi-Takoradi metropolis. However, the travel time of respondents indicate that patients from all over the metropolis were represented in the study.

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CHAPTER 6

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Findings from the study indicate that forgetfulness, being away from home and missing clinic appointment are barriers to optimal adherence. Thirty seven percent of the patients had missed at least one clinic appointment in the last six months. These patients may either be missing their doses of ART or may not be taking the ART at all. The optimal adherence level by self-report was 67%.

6.2 Recommendations

This study found forgetfulness, being away from home and missing clinic appointment to be barriers to ART optimal adherence. These findings have implications for the ENRH, Ghana Health Service (GHS) and the NACP. The following recommendations have been made based on the findings of this research:

To the Hospital (ART clinic):

1. Health education on adherence should be intensified at the adherence counselling session and the subsequent follow up visits. Patients should be educated on the need to adhere to the correct dosage regimens for the antiretrovirals to be efficacious. Information, education and communication (IEC) materials such as posters and leaflets can be given to educate the patients on the benefit of adherence and the effect of non-adherence.
2. Patients should be given specific appointment times rather than coming to join the queue. This will reduce the otherwise long waiting times they spend at the clinic. The management of the hospital are encouraged to organise the clinics throughout the week from Mondays to Fridays and the clinics should start

very early in the morning. This will spread attendance throughout the week, increase turn out rate, and enable staff handle smaller numbers of patient at a time.

3. Patients who miss appointment should be monitored and the reasons behind the missing investigated and appropriate support given.
4. Patients can be educated on the use of aids such as alarms on mobile phones or use popular radio programmes as a prompt to remind them to take their pills on time.
5. Patients should also be encouraged to carry their ART on them when they have to be away from home.

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To the National AIDS/STI Control Programme (NACP):

The NACP should financially support ART staff to use mobile text messages to remind patients to take their ART. This will be an effective tool to improve ART adherence.

6.3 Areas for Further Research

A qualitative study should be undertaken to get an in-depth understanding of the barriers to adherence. Also, further research should be undertaken using other methods of measuring adherence such as pill count, and biological markers like CD4 count or viral load to validate the self-reported adherence.

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APPENDICES

Appendix 1 Questionnaire

QUESTIONNAIRE

This is an MPH student at the Department of Community Health, School of Medical Sciences, KNUST. I am conducting a study on **'Barriers to antiretroviral therapy adherence among HIV positive adults in the Sekondi/Takoradi Metropolis'.** I would entreat respondents to cooperate and assist, in order to ensure the success of this study. Information provided will be kept strictly confidential. Thank you.

Code …… Date: / /

Please tick the appropriate response

Demographic information

1. Sex M ☐ F ☐

2. Age ……..(years)

3. What is your current marital status?

a) Married b) Single c) Divorced d) widowed e) Cohabitating

4. What is your level of education?

a) None b) Primary c) JHS / MSLC d) Secondary e) Tertiary

5. Which religion do you belong?

a) Christian b) Moslem c) Traditionalist d) others…….

6. Are you currently employed?

a) Yes b) No

7. How many children do you have? .....

Level of knowledge on ART

8. ART's are used to

a) cure HIV b) reduce pain c) reduce progression of HIV d) don't know

9. Can you enjoy a healthy and productive life once you are put on ART?

a) Yes b) No c) don't know

10. Is it essential to take your ART as prescribed by the doctor?

a) Yes b) No c) don't know

11. Will alcohol drinking impair the effectiveness of the ART?

a) Yes b) No c) don't know

12. Is ART the only effective treatment available to manage HIV?

a) Yes b) No c) don't know

13. What do you think will happen to the HIV virus if you do not take your ART appropriately?

a) Become resistant b) die c) Reduce in number d) Increase in number e) don't know

14. How long have you been taking ART?

a) …….. (yrs) b) don't know

Socio-cultural factors

15. Have you disclosed your HIV status to any family member or friend?

a) Yes b) No

16. Do you have anyone to support you through your treatment?

a) Yes b) No

17. Do you drink alcohol?

a) Yes b) No

18. Do you feel depressed at times?

a) Yes b) No

19. Do you feel people treat you differently because of your HIV status?

a) Yes b) No c) don't know

20. Are you able to afford the cost of ART treatment?

a) Yes b) No c) sometimes

Patient - doctor relationship

21. Does the doctor listens carefully to what you have to say?

a) Yes b) No c) sometimes

22. Does the doctor explain things carefully to you?

a) Yes b) No c) sometimes

23. Is the doctor is easily approachable?

a) Yes b) No c) sometimes

24. Does the doctor give you the chance to ask questions about your treatment?

a) Yes b) No c) sometimes

25. Does the doctor treats you in a friendly manner?

a) Yes b) No c) sometimes

Institutional barriers to adherence

26. How long does it take you to travel from your house to the ART clinic? ….....

a) Less than 1hr b) 1-< 2hrs c) 2-<3hrs d) 3-<4hrs e) 4-<5hrs f) 5hrs and more

27. How long have you spent altogether at the clinic today? .....

a) Less than 1hr b) 1-<2hrs c) 2-<3hrs d) 3-<4hrs e) 4-<5hrs f) 5hrs and more

28. Do you get supply of ART anytime you attend clinic?

a) Yes b) No c) sometimes

29. Is privacy ensured during consultation and counseling?

a) Yes b) No c) sometimes

Estimating Adherence to ART

30. Do you sometimes miss the number of times or the exact time that you should take your ART?

a) Yes b) No

31. Why does this sometimes happen? I

a) Forgot b) busy c) ill d) pills too many e) away from home f) run out of pills g) no food h) tired of pills

32. How many times have you missed your dose of ART in the past 7 days?

a) 0 b) 1 c) 2 d) 3 e) 4 g) 5 h) 6 i) 7 j) 8 k) 9 l) 10

33. Do you have anything to help you remember to take your ART?

a) Yes b) No

34. What helps you remember to take your ART?

a) clock b)Treatment supporter c)Placed ART at strategic place d)phone e) radio f) none

35. Did you go through adherence counselling with a treatment supporter before starting treatment?

a) Yes b) No

36. Has respondent missed any clinic appointment within the previous 6 months? To be checked

a) Yes b) No

Appendix 2 Approval letter from hospital of study

In case of the reply the number and the date of this letter should be quoted.

My Ref No: EFH/G.53
Your Ref No:

TEL NO. 031-23151-4
FAX NO: 233-31-32068
E-mail: enrh@ghana.com

EFFIA NKWANTA REGIONAL HOSPITAL
Ghana Health Service
P.O. Box 229
Sekondi

2ND June 2014

THE HEAD OF DEPARTMENT
DEPARTMENT OF COMMUNITY HEALTH
SCHOOL OF MEDICAL SCIENCES
KNUST
KUMASI

KNUST

Dear Sir,

APPROVAL TO CONDUCT RESEARCH ON "BARRIERS OF ADHERENCE OF ANTI-RETROVIRAL THERAPY AMONG HIV POSITIVE PATIENTS IN THE SEKONDI/TAKORADI METROPOLIS'

I write to indicate approval for Ophelia Bentsi Sam MPH Student of your Department to conduct the above study at the Effia Nkwanta Regional Hospital if she obtains Ethical Approval from the committee on Human Research, Publication and Ethics of the School of Medical Sciences (KNUST) or from the Ghana Health Service Ethical Committee.

Thank you.

Yours sincerely,

DR. PAUL KWAW NTODI
(MEDICAL DIRECTOR)

Appendix 3 CHRPE Approval letter

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF MEDICAL SCIENCES / KOMFO ANOKYE TEACHING HOSPITAL
COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Our Ref: CHRPE/AP/335/14

29th September, 2014.

Miss Ophelia Bentsi Sam
Department of Community Health
School of Medical Sciences
KNUST-KUMASI.

KNUST

Dear Madam,

LETTER OF APPROVAL

Protocol Title *"Barriers to Adherence to Antiretroviral Therapy among HIV Positive Patients in the Sekondi/Takoradi Metropolis."*

Proposed Site: *Sekondi-Takoradi Metropolis.*

Sponsor: *Principal Investigator.*

Your submission to the Committee on Human Research, Publications and Ethics on the above named protocol refers.

The Committee reviewed the following documents:

- A notification letter of 2nd June, 2014 from the Effia Nkwanta Regional Hospital (study site) indicating approval for the conduct of the study in the Hospital.
- A Completed CHRPE Application Form.
- Participant Information Leaflet and Consent Form.
- Research Proposal.
- Questionnaire.

The Committee has considered the ethical merit of your submission and approved the protocol. The approval is for a fixed period of one year, renewable annually thereafter. The Committee may however, suspend or withdraw ethical approval at anytime if your study is found to contravene the approved protocol.

Data gathered for the study should be used for the approved purposes only. Permission should be sought from the Committee if any amendment to the protocol or use, other than submitted, is made of your research data.

The Committee should be notified of the actual start date of the project and would expect a report on your study, annually or at the close of the project, whichever one comes first. It should also be informed of any publication arising from the study.

Thank you Madam, for your application.

Yours faithfully,

Rev. Prof. John Appiah-Poku.
Honorary Secretary
For: CHAIRMAN