SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA

FACTORS AFFECTING ADHERENCE TO ANTI-RETROVIRAL THERAPY AMONG PERSONS LIVING WITH HIV/AIDS AT ST. MARTIN DE PORRES HOSPITAL- AGORMANYA

BY

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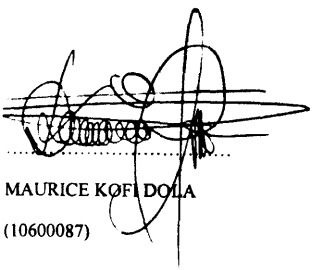
THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PUBLIC HEALTH DEGREE

JULY, 2017

DECLARATION

I do hereby declare that this study is the result of my own independent research and that no part of this study has been presented for the award of a degree at the university or elsewhere. All references to other works have been duly acknowledged.

Any shortcomings will be my sole responsibility.



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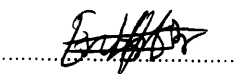

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DEDICATION

Unto Him that is able to do exceedingly above all human understanding be the Kingdom, the Power, the Honour and the Glory for ever and ever. This could not have been achieved without your love.

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ABSTRACT.

Introduction: The advent of anti-retroviral therapy (ART) has brought a lot of hope to many afflicted with HIV. With ARTs, HIV has moved from a stage of destructive illness to that of a chronic one. As a chronic illness, it requires a lifetime management on anti-retroviral therapy hence adherence to medications is therefore very important.

This study therefore was intended to find out the adherence level to anti-retroviral medications among persons living with HIV/AIDS at the St. Martin de Porres' hospital at Agormanya and to determine the various factors that affect it.

Methods: A cross-sectional study utilizing quantitative methods was done. A structured questionnaire partly adapting a standard validated one based on the Morisky 8-point Medication Adherence score was used. Data were collected through a face-to-face exit interview with the respondents. Two hundred and ten (210) respondents were selected by systematic random sampling. Pre-coded questionnaires were administered to collect data.

Frequency and analytical tables were drawn. The percentage adherence was calculated using the Morisky scale. Pearson's Chi square test and binary logistic regression models were used to analyse the association between adherence and the independent variables. Multiple logistic regression analysis was done to adjust for confounders.

RESULTS: The adherence calculated in this study was 72.6% using the Morisky Medication Adherence Scale (MMAS). On bivariate regression analysis the following factors showed statistical significance: cohabitation (OR 11.9, 95% CI 2.6 – 55.4; $p \leq 0.001$) side effects of the medications (OR 2.7, 95% CI 1..4 – 5.4; $p \leq 0.001$), privacy in the pharmacy (OR 0.2, ,95% CI 0.1 – 0.4; $p \leq 0.001$), privacy in the laboratory (OR 0.2, 95% CI 0.1 – 0..4; $p \leq 0.001$) and waiting for long hours (OR 0.4, 95% CI 0.2 – 0.8; $p \leq 0.001$).

After adjusting for all possible confounders, cohabitation (OR 11.9, 95% CI 2.6 – 55.4; $p \leq 0.001$) was the only factor that had statistical significance of all the factors studied.

CONCLUSION: The adherence in this study was found to be 72.6%. Cohabitation (OR 11.9, 95% CI 2.6 – 55.4; $p \leq 0.01$) is the only factor showed strong statistical significance.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ART	Anti-Retroviral Therapy
CD4	Cluster of Differentiation 4
DHMT	District Health Management Team
GAC	Ghana Aids Commission
GHS	Ghana Health Service
HAART	Highly Active Anti- Retroviral Therapy
HIV	Human Immune- Deficiency Virus
HSS	HIV Sentinel Survey
MOH	Ministry Of Health
MMAS	Morisky Medication Adherence Scale
MMAQ	Morisky Medication Adherence Questionnaire
NSP	National HIV/AIDS Strategic Policy
PLWHA	People Living With HIV/AIDS
PMAQ	Patient Medication Adherence Questionnaire
SSA	Sub-Saharan Africa
STI	Sexually Transmitted Infections
UNAIDS	Joint United Nations Programme On HIV/AIDS
WHO	World Health Organisation

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Since its discovery in 1981, the Human Immuno-Deficiency Virus, (HIV) the pathogen that causes the Acquired Immune Deficiency Syndrome, AIDS, has afflicted many people and swept across several countries of the globe. As a result of its heavy toll on the human race, in 1987 the World Health Organization described HIV/AIDS as "one of the most destructive pandemics in human history". By then it estimated that over 6800 people were infected daily worldwide and 5700 persons were dying daily from the virus (World Health Organization, 2015).

By December 2014, 36.9 million People were Living With HIV/AIDS (PLWHA) and an estimated 2 million people were newly infected daily and 12 million out of the world's population died daily from HIV and its related illnesses worldwide (World Health Organization, 2015).

The Sub-Saharan Africa (SSA) region was not spared of its share of the virus. It became home to 25.8 million Persons Living with HIV/AIDS by the end of 2014. Now, it still bears the greatest burden housing more than two-third (69%) of all people infected with this virus. Sub-Saharan Africa has an estimated 25.8 million PLWHA with women forming more than 50% of this number and 23 million of them are children. New infections in the region was 1.4 million accounting for 70% of the infection worldwide and AIDS related deaths were put at 790,000 (World Health Organization, 2015).

The Ghana Demographic and Health Survey (GDHS) 2014 report indicated that 2% of the adult population of Ghanaians in the 15-49 age brackets is HIV positive. Women have the highest prevalence of 2.8% and males form 1.1%. According to the report, incidence among women

among aged 15-49 was 38% and among men aged 15-49 was 49%("Ghana Demographic and Health Survey," 2014).

Several intensified interventions and responses to this threat posed to the world are now focusing on prevention of new infections and care of the infected.

The introduction of anti-retroviral therapy was a timely intervention and has come as a life saver. With such an intervention, this epidemic has transited a phase of fatal illness and entered a stage of chronic disease management. The main goal of the anti-retroviral therapy (ART) is to suppress viral replication on a lasting level. This is the very core and most important factor influencing long term prognosis. "So Anti-retroviral Therapy has dramatically slowed down the progression of HIV, reduced death from AIDS and transformed the infection from a fatal to a more manageable chronic illness" (Bangsberg, Hecht, Clague, et al., 2001).

In Ghana, Anti-retroviral therapy was introduced in 2003 and has been the major national HIV strategy as well as intervention. It continues to be a priority strategy in terms of treatment and a preventive intervention.

By the end of December 2014, there were 197 Anti-Retroviral Therapy (ART) centres spread across 145 out 216 districts in Ghana. The increasing number of PLWHA on ART yearly led to a projected decline in trend of AIDS fatalities as more and more PLWHA are put on ART. Since the commencement of the program in 2003, more than 95,000 PLWHA have been initiated on treatment (National AIDS/STI Control Programme, 2015).

Anti-retroviral therapy programme successes are evident the world over. The proportion of patients on treatment with at least 2 years of first line therapy are comparable in both developed and developing world and more than three-quarters of patients on anti-retroviral therapy after two years

of strict adherence were recognised as treatment successes with increased CD4 counts and reduced viral load (Cristina et al., 2009).

In a study in Kwa-Zulu Natal province of South Africa, there was a gain of 11.3 years revealed in adult life expectancy since the public sector ART programme was implemented (Bor et al., 2010).

"Hence with the introduction of anti- retroviral therapy, HIV/AIDS has undergone a rapid transformation from a terminal illness to a controllable chronic condition at least for those accessing treatment" (Russell, Seeley, Russell, & Seeley, 2009).

But the question is: should there be complacency? Is it sufficient by merely initiating all eligible HIV/AIDS patients on life-saving anti-retroviral medications? Chronic illnesses such as HIV/AIDS require life-long treatment. Adherence to therapy is very key and takes a centre stage in the clinical outcomes of HIV afflicted person on ART. So a great deal of attention must be paid to it for favourable outcomes (Russell, Seeley, & Whiteside, 2016) "HIV can be controlled if infected people adhere to 95% of their anti-retroviral regimen therapy for the rest of their life" (Paterson, Swindells, Mohr, Brester, & Vergis, 2000).

A consequence of the non-adherence to ART is that viral suppression fails, infected individuals rapidly progress to AIDS. There is also the development of opportunistic infections and drug resistant strains which require more expensive drugs and eventually death. This will pose a greater challenge for effective treatment (Bangsberg, Hecht, Clague, et al., 2001; Pujades-rodrı, Arnould, & Brinkhof, 2010).

1.2 Problem Statement

Anti-retroviral therapy has been incorporated into HIV/AIDS strategies and interventions in many countries. In Ghana, year by year, there is an increasing access to ART. But simply providing ART medicines and making it readily available to PLWHA freely or at a cost they can afford is not enough. The effectiveness of any ART programme is highly dependent on the level of adherence. Adherence is therefore required and must be strictly ensured for treatment success and good patient outcomes. Unlike other chronic illnesses, PLWHA must consume all doses of their medications at the required dosing frequency throughout their lifetime.

An adherence level $\geq$ 95% is required to ensure optimal viral suppression, improve CD4 levels to help improve immunity (Paterson et al., 2000). Strict adherence is therefore very pivotal and must be an integral component of any ART program if success is envisaged.

In Ghana, the rate of adherence ranges between 80.6- 87% which is in itself suboptimal (Ohene & Forson, 2009). Non-adherence has accounted for most treatment failures in many cases. (Ndubuka & Ehlers, 2011)

Studies on adherence identified many factors affecting it. Nachega et al, 2006 identified financial constraints, stigma and inadequate information on drugs as factors hindering adherence. The presence or otherwise absence of family support and religious beliefs also greatly influence adherence (Haynes, Mckibbon, & Kanani, 1996). Personal conviction on the part of the patient greatly impact adherence (Dew et al., 2007). The cost of medications is no more an obstacle to adherence but the overall cost of travel to and fro the healthcare facility and other related costs on the therapy altogether are an impediment to adherence (Weiser, Wolfe, Bangsberg, Thior, & Gilbert, 2003). The number and the frequency of dosing of the pills, and associated undesirable

effects of the pills constitute a burden to the patient hence bear a great influence on adherence ((Parienti, Bangsberg, Verdon, & Gardner, 2009).

Health care facility factors have also been known to affect adherence. Drug adherence depends largely on the existing relationship between the patient and the health care provider. In a study in Tanzania reported that adherence was positively related to the level of mutuality trust between the patient and the healthcare provider(Nsanzimana et al., 2012).

All these factors affecting adherence take a prominent stage and are very much pronounced in poverty stricken regions where most of the PLWHA are concentrated.

Most studies conducted on adherence were all carried out in developed countries (Chesney, 2000a; Hirsch et al., 1998; Mills, Nachega, & Buchan, 2008; Rob Horne, Jane Clatworthy1, Rhian Parham1, 2001). There are few of such studies in Ghana. Most of the studies on adherence in Ghana were facility based (Obirikorang et al., 2013; (Ohene & Forson, 2009). A lot remains to be studied on adherence and there is yet to be a nationwide study on levels of adherence to anti-retroviral therapy in the country.

Agormanya - my study location - has the highest prevalence of HIV of 6.2% in Ghana (National AIDS/STI Control Programme, 2015). It is one of the first pilot centres for ART initiation when it commenced in 2003. Ever since, there has been a gradual increase in the number of PLWHAs enrolled into the programme yearly more especially over the last five years as indicated by the hospital's annual report of 2016. Little work has been done to assess the adherence levels and what factors contribute to it in this hospital.

This study therefore seeks to determine the level of adherence to ART among PLWHA and to identify the factors that affect it in this facility.

1.2.1 JUSTIFICATION FOR THE STUDY

In Ghana, a National HIV/AIDS Strategic document covering 2016-2020 has been developed and is being implemented towards the achievement of the HIV-related Sustainable Development Goals (SDGs). This is in line with the 90-90-90 fast tract that aims at ensuring that: 90% of PLWH know their HIV status. 90% of those tested positive are placed on sustainable anti-retroviral treatment and 90% of PLWH on sustained treatment should achieve 90% viral suppression (Ghana AIDS Commission, 2013). Also the UNAIDS agenda 2030 stipulates that: "by 2030, there should be 90% reduction in HIV related infections, 90% reduction in HIV stigmatization and discrimination and 90% reduction in AIDS related deaths"

Adherence must therefore be at the centre of these strategies. This study will therefore go a long way at identifying all factors influencing adherence among Clients on ART in this hospital. It is anticipated that the data collected will form the basis for decision making and for authorities to formulate new strategies and policies and adopt new interventions to address should there be issues of adherence.

Knowing the adherence level and understanding the factors that lead to it in any setting, is as important to the clinical and public health goal as the intervention. This information will be essential to inform the Anti-retroviral programme and will go a long to assist to maximize the success of treatment as well as the programme.

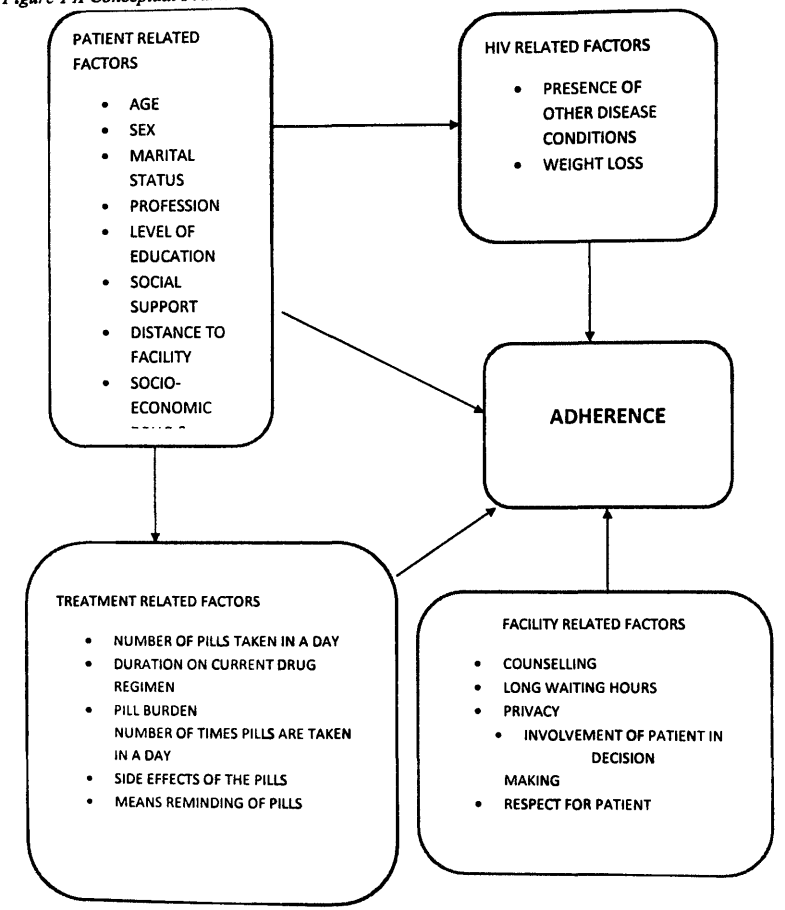
1.3 Research Questions

Pursuant to the discourse above, the research questions shall be:

- What is the level of adherence to Anti-Retroviral Therapy among PLWHA at the St. Martin de Porres' hospital in Agormanya?
- What key patient-related factors are playing a major role in adherence among the clients on ART?
- Does the infection or its treatment regimen have any bearing on the patients' adherence to ART?
- Does the health care provider or its systems play any key role with respect to adherence to ART among the patrons of the facility?

2.6.1 A Conceptual Framework Summarizing the Inter-Relationship among the Various Factors Affecting Adherence

Figure 1 A Conceptual Framework



The success of any Highly Active Anti-Retroviral Therapy (HAART) depends largely on a good level of adherence controlled by several factors. Hence before clients are put on ART, they must be willing and ready to adhere to the medications. This is very crucial for a successful outcome since daily medication intake for a lifetime for a chronic illness is a great challenge.

Adherence to HAART can be determined by four main factors namely the patient, the disease, the treatment and the health care provider/ healthcare facility related factors.

Patient factors such as age, educational level, income level, marital status, influence / support from relatives and friends, the cost of travel from home to the treatment centre and back home, the presence or otherwise of other co-morbid conditions such as diabetes, TB, drug and alcohol usage by the patient all bear considerably on adherence whether positively or negatively. The patient's perceived toxic effect of the therapy and the low or no knowledge of the pathology of the infection and its processes negatively impact adherence (Dew et al., 2007).

Treatment factors such as the number of pills consumed in a day coupled with the number of times taken in a day (the pill burden) can either positively or negatively impact adherence. Consuming two or more tablets at a time, two or more times in a day negatively impact adherence. On the other adherence is greatly enhanced with a pill once a day (Parienti et al., 2009).

Adherence is also negatively influenced if the patient's condition deteriorates or opportunistic infections such as TB, diabetes, hypertension set in. Over all adherence levels are negatively impacted with worsening condition of the patient more especially when weight loss set in.

The health care facility and provider have a lot of bearing on adherence. Stigmatization in the facility, worsening and unsympathetic attitude of staff, long waiting times of patients before being attended to and the lack of respect for the patient all adversely affect adherence. Counseling as a means of educating the patient with the sole aim of letting him/her to understand the disease-

causing process is a plus for adherence. By so doing, patients are able to stick strictly and religiously to their medications.

1.4 General Objective

The general objective of this study is to determine the level of adherence to ART and the factors that contribute to adherence among PLWHA at the St. Martin de Pores'' Hospital in Agormanya.

1.5 Specific Objectives

The specific objectives of the study are:

1. To determine the patient- related factors that contribute to adherence among the clients on ART at the hospital.
2. To determine the treatment related factors associated with adherence among PLWHA on ART at the hospital.
3. To determine the disease related factors associated with to adherence among the clients on ART at the hospital.
4. To determine the facility related factors that also contribute to adherence among the patients on ART at the hospital.

CHAPTER TWO

LITERATURE REVIEW

2.1 Burden of HIV

Worldwide there are 36.9 million people living with HIV/AIDS with 1.2 million new infections yearly and an estimated 1.2 million people dying yearly from HIV related illnesses by the end of 2014 (World Health Organization, 2015).

The impact in Sub-Saharan Africa (SSA) is still the greatest worldwide. 69% of all people infected with HIV are in Sub-Saharan Africa with 25.8 million estimated. Women constitute more than 50% of this number and 23 million are children. Estimated new infections in Sub-Saharan Africa was 1.4 million (70%) of new infection worldwide. AIDS related deaths were estimated at 790,000 by December 2014 statistics (World Health Organization, 2015).

Ghana reported its first cases in 1986. They were 42. By the end of 2014, 2.0 % of adult Ghanaian population were HIV positive with females (2.8%) having a higher prevalence than males (1.1%) (Ghana AIDS Commission, 2016). Currently the national prevalence has stabilized at 1.5% declining from 2.7% in (NACP, 2015).

The burden of HIV has negatively impacted life expectancy and health. It remains a threat to the economy of several countries more especially in Sub-Saharan Africa.

HIV/AIDS continues to pose a developmental challenge of immense proportions globally to the human species in contemporary times. Its impact on national developmental drives and household economies has worsened the already existing challenges of poverty and inequality. Louwenson and Whiteside have summarised the devastating effects of HIV/AIDS and the threats posed to poverty reduction in a paper prepared for the United Nations Development Programme (UNDP): "The

devastation caused by HIV/AIDS is unique because it is depriving families, communities and entire nations of their young and most productive people. The epidemic is deepening poverty, reversing human developmental achievements, worsening gender inequalities, eroding the ability of governments to maintain essential services, reducing labour productivity and supply, and putting a brake on economic growth. The worsening conditions in turn make people and households even more at risk of, or vulnerable to, the epidemic, and sabotages global and national efforts to improve access to treatment and care. This cycle must be broken to ensure a sustainable solution to the HIV/AIDS crisis. Although intensifying responses to the epidemic have focused on prevention and care, these have tended to ignore the broader picture of the implications for development and poverty reduction" ((Klerk et al., 2004)).

Anti-retroviral therapy was introduced and became a life saver. Key to a successful ART is adherence. A good adherence level gives the best viral suppression and improves the quality of life of the patient

2.2 Definition of Adherence

There is no standard or universal definition for adherence. Initially, the commonly and widely used term seen in literature was compliance. The first definition of compliance was that given by Sacket (1976). He defined compliance as "the degree of concurrence between the client behaviour (taking medicine, sticking to a diet, changing lifestyle) and the prescription given by the physician or healthcare worker."

But this definition sparked a lot of controversy. Many authors argued that the term "compliance" itself implies submissiveness on the part of the patient i.e. the patient must obediently follow instructions of the health care worker. By this, the patient is entirely passive and must follow the instructions without asking a question (Hirsch et al., 1998).

In order to comprehensively involve the patient in the treatment regimen and for him to fully collaborate with the health care worker, the term adherence replaced the word "compliance" (Brawley & Culos-reed, 2000).

Several authors have attempted to define adherence based on certain specific criteria and considerations.

(Orrell, Bangsberg, Badri, & Wood, 2003) defined adherence as "the extent to which a patient takes medication in the way intended by a health care provider". (Campbell et al., 2012) also defined medication adherence as "the ability of the person living with HIV/AIDS to be involved in choosing, starting, managing, and maintaining a given therapeutic combination of medication regimen to control viral (HIV) replication and improve immune function." (Tyndall et al., 2007) also defined adherence as "the effective use of drugs as prescribed by the health care practitioner". He directly related it to the patient's own acceptance of the disease and the socio-cultural setting. WHO in 2003, defined adherence as: "the extent to which the person's behaviour (including medication taking) corresponds with agreed recommendations from a health care provider".

From the various definitions given so far, it can be deduced that effective adherence requires collaboration between the patient and the health care provider. It involves the smooth interplay between the patient and the provider. The patient must be actively involved and should be the epicentre in all stages of the process. Health care professionals must communicate effectively with patients on the medications and all factors associated with it. The patient on the other hand, must understand and effectively comply with the given directives. Anti-Retroviral therapy requires a lifetime commitment. All patients must therefore be well educated. All possible barriers to adherence must be well discussed with the patient before starting therapy.

Some studies go further to classify adherence as Primary or secondary. It is termed primary adherence when it is related to initiation of therapy and refilling of medications (Tyndall et al.,

2007). Here the frequency with which the patient comes to fill prescriptions when new medications are started is taken into consideration. On the other hand, secondary adherence relates to how the patient takes the medications when they are filled. Clinical and financial outcomes of the health system are dependent upon secondary adherence (Campbell et al., 2012).

Generally, adherence is a pivotal part of patient care and very indispensable for achieving good clinical outcomes (World Health Organization, 2003) more especially when the disease is a chronic one. As the WHO, 2003 paper put it: "Increasing the effectiveness of adherence intervention therefore has a greater impact on the health of the population than any improvement in the specific medical treatment."

2.2 Optimal Adherence Rate

Studies by (Holzemer, 1999; Paterson et al., 2000) suggest that an adherence level of 80% with Highly Active Anti- Retroviral Therapy (HAART) may be adequate enough to avoid the development of resistance to the medications in HIV/AIDS clients. However to ensure sustained viral suppression, achieve an increase in CD4 count and to prevent viral replication, a minimum of 95% adherence to therapy is required (Chesney, 2000a; Paterson et al., 2000).

2.3 Adherence versus Non-Adherence

The benefits of adherence to anti-retroviral therapy include dramatically delaying the progression of the HIV infection and reducing AIDS and related illnesses mortalities. Non-adherence, on the other hand, has serious consequences some of which include failure of viral suppression, rapid progression of the disease and development of resistant strains. Non-adherence to therapy is a significant challenge particularly when HIV/AIDS is chronic and the treatment modalities employed are life-long. It undermines the efficient distribution of resources. It leads to huge

expenditure by donor organisations such as the Global Fund and the World Bank. Non-adherence has a negative impact on the effectiveness of therapeutic intervention in HIV/AIDS management and contributes to disease progression (Weiser et al., 2003).

There were serious concerns about non-adherence in Sub-Saharan Africa and these served as very important considerations in expanding access to anti-retroviral programmes (Caudarella et al., 2017; P. Farmer et al., 2001)

2.4 Measurement of Adherence

Measuring adherence is so important to both researchers and clinicians (K. C. Farmer, 1999) as its inaccurate estimation can have several repercussions which are both costly and potentially dangerous. An inaccurate estimation of adherence means treatments which are effective may be otherwise judged as ineffective. Expensive medical diagnostic procedures may be ordered or performed on the patient and the patient's treatment regimen may be unduly and unnecessarily intensified (Tyndall et al., 2007).

There have been numerous studies on how to accurately measure adherence. Different tools have been designed and validated but none of them is taken as the gold standard (K. C. Farmer, 1999). Generally it is agreed that an ideal adherence measurement tool employed should be: non-invasive, at a low cost, simple to use, sensitive, specific, highly reliable and flexible (Dew et al., 2007; Serrano, The, Journal, Winter, & Serrano, 2016). As at now, there is no single tool for measuring adherence has all the individual attributes. So the goal of the study and the resources available for the study are preferable.

Adherence can be measured using any of these methods: Directly Observed Therapy (Mckeown et al., 1996), keeping up clinical appointments and Self-reporting 1-4 days. Studies that ask about doses of the drug missed within the last 1 – 4 days have more validity and more reliability than

those that ask respondents to remember a week or more ago (Marseille, Hofmann, & Kahn, 2002)(American Public Health Association publication, 2007).

Other methods of determining adherence include: Pill counts, Pharmacy reports, Medications Electronic monitoring (MEM), Blood drug concentration and Biomedical markers such as CD4 Counts and viral level. These measurements are either objective or subjective. It is termed subjective if they require the provider's or the patient's evaluation of the medication taking behaviour. In this case, self-reporting or the health care professional assessment such as pharmacy reports are examples (Paterson et al., 2000). A common limitation to self- reporting is the under-reporting of non-adherence by patients in order to avoid disapproval or not to incur the wrath of the health care professional. Objective methods on the other hand include: pill counts, electronic monitoring, secondary data base analysis, blood drug/ metabolite concentration and biochemical measures. Objective methods of assessment of adherence are an improvement over the subjective ones but each has its advantages and disadvantages and limitations

Adherence measurement methods have also been categorized as direct or indirect. Direct measurement - as the name implies – involves determining the concentration of the drug metabolite in body fluids such as blood, urine etc. They are the most accurate and provide the true and real evidence that the patient has taken the medications. Its limitations are that they are very expensive and require technical expertise.

Currently, there is no adherence measurement tool has all the qualities listed above (Dew et al., 2007). A combination of methods can be used to improve the accuracy of the results but self-reports have a very good predictive power and are more useful in resource limited clinical settings. In a study, (Hirsch et al., 1998; Pujades-rodri et al., 2010) a combination of pill count, self-report and electronic monitoring have the strongest predictive power of adherence than when each measure was used separately.

2.5 Morisky Medication Adherence Scale (MMAS)

This is a self-reported type of medication adherence measurement. The new model (the one used in this study) has eight items. It was developed as an improvement over the previous validated four-item scale. It was supplemented with additional items in order to better include and capture the barriers affecting adherence behaviour. Each item on the 8 scale measures a specific medication-taking behaviour and not the adherence determining behaviour. The reliability of the new scale is higher than the 4-item scale (α= 0.83 vs 0. 61). It is scored from zero to eight and has been dichotomized into two levels of adherence to make easy its use in clinical practice: High adherence is a score of 7 or more and a score less than 7 constitute low adherence. The score is valid if the patient answers at least six out of the eight questions.

2.6 Adherence Levels to ART in Sub-Saharan Africa

Previously it was predicted that adherence to Anti-Retroviral therapy in Sub-Saharan Africa would be low because of poverty, deprivation and social advantage, the complex nature of the treatment and poor infrastructure (Marseille, Hofmann, & Kahn, 2002). Contrary to that, many studies have proved that adherence to Anti-Retroviral therapy in Sub Saharan Africa is higher than previously thought (Boskabady, Azdaki, & Ataran, 2005; Mills et al., 2008; Vreeman, Wiehe, Ayaya, Musick, & Nyandiko, 2008). Between 2003 and 2006, adherence to Anti-Retroviral Therapy was better in Africa than in North-America. Studies have found adherence levels of 55% in North- America as against levels of 77% in Africa (Mills et al., 2008).

Studies in Africa have shown a wide range of levels of adherence from 54% to 98% (Weiser et al., 2003) depending on the measure used. La Cote- d'Ivoire reported a considerable number (74.3%) of respondents had adherence levels higher than 95%.(Alary, 2007; Vreeman et al., 2008) in South Africa reported adherence levels of 93.5% among patients on Anti-Retroviral Therapy and concluded that adherence constitute no barrier to successful Anti-Retroviral Therapy there. In

Nigeria, in the Niger Delta, (Idigbe et al., 2005) found adherence level of 85% and in Ghana, adherence levels Anti-Retroviral Therapy in the general population were found to range between 80.6- 87.3% (Ohene & Forson, 2009).

2.7 FACTORS AFFECTING AHERENCE

Many factors play an important role in adopting and maintaining adherence behaviour. According to WHO (2003), causes of non-adherence or poor adherence are multi- factorial. These are classified broadly into five (5) categories: Socio-economic, treatment related, Patient related, the disease condition related, the health system / Health care team related factor.

2.7.1 Patient related factors

Age, gender, race, socio-economic status, educational level and religious beliefs have a bearing on adherence (Campbell et al., 2012; Nuwagaba-biribonwoha et al., n.d.; Wasti, Simkhada, Randall, Freeman, & Teijlingen, 2012).

AGE: Except for the very elderly and the very ill, adherence increases with increasing age ((P. Farmer et al., 2001). Another study on drug use in the elderly issues of non-compliance also confirmed this assertion (Wasti et al., 2012). A study in La Cote d'Ivoire also came out that young men aged less than 35 years were non-adherent compared to the older ones (Alary, 2007).

SEX: Although it generally believed women are able to care for their health needs better than men that is why they live longer than men, a study in Philadelphia came out that women had the worse adherence. The study attributes this to the fact women have a higher incidence of depression. Hence men were more positively adherent than women(Klerk et al., 2004; Mitiku, Abdosh, & Teklemariam, 2013).

EDUCATION: Low level of education correlates with low levels of adherence (Kalichman, Ramachandran, & Catz, 1999; Nuwagaba-biribonwoha et al., n.d.). The highly educated a patient is, the more he understands the disease causing and the disease progression process, hence the higher the adherence level (Kalichman et al., 1999).

FINANCIAL CONSTRAINTS: (Weiser et al., 2003) reported from a study the following findings: "70% of patients claimed that the cost of anti- retroviral medications posed a problem to them. 44% of them believed that the cost impeded their adherence to therapy. 55% of healthcare providers believed that finances are key to adherence." (Weiser et al, 2003). The overall cost of medications and clinic visits are very important to adherence more especially in Africa where there are fewer or no medical insurance or disability pension schemes (Caudarella et al., 2017). Even though in Africa, ARTs are either offered free of charge or highly subsidized for a relatively low cost, the financial demands of the therapy are a great barrier to therapy (Weiser et al., 2003).

SOCIAL SUPPORT: A 1997 study by Williams Friedland found out that living without any social support or living alone negatively impact adherence. However, having a partner, or strong social interaction, strong family support and peer interaction are associated with high adherence levels (White et al., 2008). Hence the presence or otherwise of strong family ties has a greater bearing on adherence.

PATIENT'S BELIEFS: Self- conviction about the illness, the patient's own psychological states, and religious beliefs greatly impact and affect the motivation to take the medications hence adherence (Haynes et al., 1996). Non-adherence is also strongly linked to a lack of conviction on the part of the patient on the need for Therapy. In the Dutch Cohort ATHENA, Patients who were not fully convinced that they needed to follow the regimen requirements have a significantly higher likelihood to be non-adherent (De Boer Van de Kolk M et al., 2008). The patient's own understanding of the disease condition has a greater bearing on his ability to adhere to medications

(Nuwagaba-biribonwoha et al., n.d.; Rob Horne, Jane Clatworthy1, Rhian Parham1, 2001). Haynes RB in 2005 also deduced that religious beliefs influence and adherence.

DRUG AND ALCOHOL impair judgement and the ability for a patient to adopt and maintain routine or regular schedule of medication use. Drug and alcohol abuse also affect an individual's ability to remember medication schedules hence a negative impact on adherence. Roberts, 2000 in his study also reported that forgetfulness, social influence and the patient's psycho-social factors such as stress, anger, fatigue and lack of sleep negatively affect adherence (Barroso, Leblanc, & Flores, 2017).

Results from the French Cohort APROCO relates other patient psycho-social factors such as the state of mental health, socio-cultural norms to influence adherence ((White et al., 2008). Depression and anxiety are both indicators of suboptimal adherence levels (Hirsch et al., 1998).

2.7.2 Treatment related factors

PILLS: Adherence is greatly affected depending on the daily pill burden, the dosage regimen, and therapeutic complexities (Nuwagaba-biribonwoha et al., n.d.; William, Sheri, Leiter, Steward, & Dph, 2008). The number of pills taken and the number of times in a day they must be taken are common barriers to adherence. To test that theory, (Parienti et al., 2009) in a meta-analysis, evaluated adherence rates seen with once-daily versus twice-daily medication regimens. Overall, once-daily dosing regimens resulted in a marked improvement in the proportion of patients who had undetectable viral load. In particular, treatment-naive patients on once-daily dosing regimens had a better adherence rate than those on other regimens. They also deduced that: "each time a regimen is changed, review of the new dosing schedule and its integration into the patient's daily routine should be discussed." Large capsules or tablet size, high pill load and dosing frequency

negatively affect adherence ((Bangsberg, Hecht, Charlebois, Chesney, & Moss, 2001; Klerk et al., 2004). Simple regimen enhances adherence especially when it is incorporated into the patient's life so that he easily adapts to it (Erah & Arute, 2008).

Other instructions e.g. Food, the severity of side effects and other undesirable effects also greatly influence adherence. (Bangsberg, Hecht, Clague, et al., 2001; Chesney, 2000a) deduced from their study that: "Simplifying regimen can easily fit into a patient's daily lifestyle and enhance adherence.

2.7.3 Health Care Facility related factors

Patients want trust, confidentiality, and to be treated with respect. Before initiating therapy, it is very crucial and critical that patients understand the disease progression of the HIV/AIDS, how the medications work to bring the virus to undetectable levels in the blood, the possible side-effects of ARVs, and the need to incorporate pill-taking into a daily life schedule. This must be done before treatment options are decided upon. This is achieved through counseling. Based on a good information and patient's participation in decision making, a good patient provider relationship is established and this enhances adherence (Hirsch et al., 1998; Marseille, Hofmann, & Wilson, 2002). Not having enough time for patients affected care hence negatively impacted on adherence (Tyndall et al., 2007; Weiser et al., 2003).

It is the responsibility of the healthcare provider to discuss all treatment possibilities and alternatives. They must outline the benefits of a particular regimen; discuss the potential side-effects and strategies to be adopted to cope with the undesirable effects. Health care professionals must assist the patient to devise ways to inculcate medication taking into their daily work or activity schedules. Jointly with the patient, they must decide what course of therapy patient would

follow through an informed consent process. By so doing, patients build trust in the health system and adherence improves. A Tanzanian study concluded that adherence was positively related to the level of trust the patient builds in his health care provider (Orrell et al., 2003). Similar findings were made in a related study in Rwanda (Nsanzimana et al., 2012).

CHAPTER THREE

METHODOLOGY

3.1 Study Design

This was a facility- based cross- sectional study that utilized quantitative approach.

3.2 Study Area

This was carried out at the St. Martin de Porres' hospital at Agormanya in the Lower Manya Krobo Municipality, one of the 17 districts in the Eastern Region. The district lies in the Southeastern part of the Eastern Region and covers a total area of 1476 sq.km. Odumase is the Municipal capital and about 80 km from Accra. It is bounded North-East Kwahu North district; North-West by Fanteakwa District; East: Asuogyaman District and the Volta Lake. Its Western boundaries are the Yilo Krobo District and South Tongu District borders it in the southern direction.

St. Martin de Porres is a catholic hospital established in 1946 as a maternity home and upgraded to a hospital status by the ministry of Health in 1997.

The hospital provides various services in and outpatient services. The outpatient department provides services in general medicine, surgery, obstetrics & gynaecology, maternal & child health, dental and mental health, eye care, and a pharmacy. The OPD is also equipped with diagnostic services such as X- ray, ultrasonography, and laboratory services. Other services provided at the OPD including DOT (for TB), ART, elimination of Mother to Child Transmission (EMTCT), general counseling and testing on daily basis.

This facility is one of the two pilot centres where ART program commenced in 2003. This year there are 432 clients on ART at the hospital. The inpatient department has seven wards with a bed capacity of eighty-nine (89) beds.

In terms of the human resource, the hospital is well equipped with a 119 strong work force made up of two (2) doctors, four (4) physician assistants, two (2) anaethesiologists, one pharmacist, four (4) pharmacy technicians, three (3) biomedical scientists, two (2) lab technicians, two (2) lab assistants, one radiographer, thirteen (13) midwives, thirty-four (34) registered nurses, thirteen (13) enrolled nurses, one community health nurse, one nutrition officer. The administrative staff is made up of one health service administrator, one accountant, one internal auditor, one accounting officer. Others include four (4) drivers, four (4) mortuary attendants and eight (8) orderlies.

3.4 Sampling

3.4.1 Study Population

The study population comprised of all persons tested HIV positive and on anti-retroviral therapy at the St. Martin de Porres' Hospital in Agormanya.

3.4.2. Sample size

Ohene & Forson, in their study in 2009, estimated an adherence to ART is up to 87%.Using a confidence interval of 95% and a margin of error of 5%, the sample size was determined using the Cochran formula $N = z^2pq/d^2$. Substituting the figures into the formula, the minimum sample size of 173 was obtained but assuming a 10% non-response rate the working sample size was calculated to be 190.

3.4.3 Sampling Method

The systematic random sampling method was used to select the respondents. The first participant to be included in the study on a given day was randomly selected by the record staff of the hospital on duty. The selection was done among the first three clients who report early for ART refill on the given day. They usually reported first to the record unit for registration and for picking their folders. From this first client selected randomly, every third client that report to the record unit for ART refills was to be selected on a first come first selected basis. The same procedure was repeated daily until all the sample size was obtained. Form the hospital records, the total number of clients enrolled on ART for the year was 432 and between 25- 30 report daily for drug refills. They were booked once a month for medication refills.

Using the procedure above, up to seven (7) respondents were interviewed daily provided they satisfied the inclusion/exclusion criteria below:

3.4.3.1 Inclusion Criteria

- Patient was 18 years and above diagnosed HIV positive.
- Patient was on ART for six months or more.
- Patient was on current regimen of ART for more than one month.
- Patient gave consent to participate in the study.

3.4.3.2 Exclusion Criteria

- Patient was too ill or too weak to participate in such a survey.
- Patient was on second line treatment regimen after treatment failure.
- Patient was on a short course ART for Post Exposure Prophylaxis for prevention of vertical transmission.

3.5 Variables

- The outcome variable is adherence. This was measured by scoring the responses to the Morisky medication adherence questions.
- The independent variables were the individual factors which affect adherence to anti retro-viral therapy classified into four categories:
    - Patient related factors: age, sex, marital status, educational status, socio-economic status, religious beliefs.
    - Disease related factors: presence of other disease condition, weight loss.
    - Treatment related factors: number of pills taken in a day, number of times the pills are taken in a day, the duration of the current regimen, the side effects of the pills and the means of reminding the patient of the pills.
    - Facility related or provider related factors: counselling, long waiting times, privacy, involvement of the patient in decision making, respect for the patient and discrimination.

The independent variables are summarized in the tabulation below:

Table 3.1 Definitions of the various factors affecting adherence

Independent Variables	Operational Definition	Scale of Measurement
Age	Age at Last Birthday	Discrete Numerical
Gender	Male or Female	Nominal Categorical
Educational level	None, Primary, Secondary Tertiary, Vocational/technical	Ordinal categorical
Profession	Actual work done on daily basis	Nominal categorical
Distance to Facility	Distance from home to facility (in approximate km)	continuous numerical
Religion	Christian, Moslem, Traditionalist Atheist, none	Nominal categorical
Pill burden	Number of pills taken at a time	Discrete numerical
Frequency of dosing	Number of times ART is taken per day	Discrete numerical
Side effects	Unpleasant symptom associated with drug	Nominal

	intake	categorical
Presence of other disease conditions	Other illnesses in patients who receiving ART	Nominal Categorical
Waiting time	Time spent from entry into hospital to departure	continuous numerical
Alcohol	Drinking alcohol	Ordinal Categorical
Discrimination	Patients perceived friendliness or unfriendliness of Health worker	Nominal Categorical
Duration of therapy	Time ART started till today	continuous numerical
Side effects	Undesirable effects experienced by the patients as a result of taking the medications	Nominal categories
Privacy	Client to say how well his treatment is kept confidential in the facility	nominal categorical

3.6 Data collection instrument

A structured questionnaire made up of three parts was used. Part one collected the socio-demographic characteristics of the respondents. Parts two was the Morisky Medication Adherence

Questionnaire (MAQ). This was a self-reported medication adherence questionnaire developed by Morisky et al in 2008. It had 8 items out of which seven were Yes/No responses and the last item was a response focusing on medication taking behaviour especially medication underuse such as forgetfulness. By this, barriers to adherence can be identified more clearly. Each item on the questionnaire was scored. The total score ranged from a minimum of 0 to a maximum of 8. The total score was dichotomized. Adherence was a score greater than or equal to 7 whilst non-adherence was a total score less than or equal to 6. The score was valid if respondents answered at least six questions.

The part three of the questionnaire was dedicated to questions on all the factors affecting adherence under the study with reference to the conceptual framework.

3.6.1 Permission to proceed

- Ethical approval for this study was given by the Ghana Health Service Ethical Review Committee.
- The Eastern Regional Health Administration and the hospital management also gave permissions independently.
- All respondents individually consented to the study before taking part in the study. They were re-assured of confidentiality, data safety, and appropriate data usage. Participation was entirely voluntary and their decision not to participate did not affect their care at the hospital.

3.6.2 Training of interviewers

Two research assistants were engaged in this study. They had a minimum qualification of Senior School Leaving Certificate (SSCE). They assisted in administering the questionnaires only. They were given a day's intensive training on the techniques of questionnaire administration for quantitative data collection and on the ethical guidelines.

3.6.3 Pre-testing and review of instrument

The questionnaire was pre-tested at the Trust Hospital, Osu in Accra. Ten respondents from this ART centre took part. Data from the pre-tested questionnaires were not included in the results of this study but the comments were thoroughly discussed.

The questionnaire was then reviewed and finally checked for correctness.

3.6.4 Data Collection

Data was collected through the administration of the questionnaire in a face-to-face interview done by the principal investigator and the two research assistants who were not staff of the hospital. This ensured that respondents were free from any judgement by staff on subsequent visits.

Privacy was paramount to ensure the respondents expressed themselves well and freely. After consenting to participate in the study, he was accompanied to a room specially prepared for the interview. This was arranged with the hospital authorities. This room was used for the interviews throughout the entire period of the data collection process. The room was well lit and well aerated, furnished with two chairs and a table, devoid of other human interference.

In addition to the room, the hospital is endowed with a large compound with a lot of trees. An isolated place under the shade of trees furnished with chairs was also for the interviews by the other assistants. The interview points were far off each other such that no one heard each other's conversation and was devoid of human interferences. Everything possible was done to ensure the respondents were at ease to express their opinions freely well.

The interviews were conducted after they have been attended to and were on their way out of the hospital. Each interview session lasted at most twenty (20) minutes.

Data was collected over four (4) weeks and the sample size was obtained.

3.6.5 Quality Control

Sufficient measures and arrangements were in place to ensure that the data collected were valid and accurate. The research assistants were taken through a day's intensive training on quantitative data collection technique and how to conform to the ethical guidelines. They were assessed by using them to administer the pre-testing questionnaires. Anyone found to perform below average was expected to be dropped but the initial two recruited were successful.

After pre-testing, the questionnaire was cross-checked and edited to remove repetitions, ambiguities, and items not applicable. The questionnaire was also checked for completeness after filling. All data were entered on the same day and frequencies were run to check for consistency.

3.7 Data Processing and Analysis

Presentation of the data was in the form of charts, and tables. Then descriptive analysis of the demographic characteristics was done. The percentage adherence was calculated by scoring patients responses. The association between adherence and the factors influencing it was determined through the chi square test. Bivariate analysis of categorical predictors associated with adherence

was assessed with binary logistic regression. The Multivariable analysis of factors associated with the outcome variable, adherence, was based on the multiple logistic regression analysis.

The entire statistical analysis was done with the help of the statistical software, STATA version 14.0.

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic Characteristics

Two hundred and ten (210) questionnaires were administered. After thoroughly cleaning the data of incomplete questionnaires, one hundred and ninety (190) were fit for analysis hence the results below were based on the 190 participants.

The mean age of respondents was 47. 0 ± 12.5 years. The youngest respondent was eighteen (18) years while the oldest was eighty-five (85) years old. The average age for the male participants was 50.5 ±2.0 years and the average age of the females was 46.0± 1.0 years. Majority of respondents, 29% (55/90) are in the 38 – 47 age group.

Of the 190 respondents 75.8% (144/190) are females, 30% (57/190) are married and 13.2% (25/190) are single implying that as many as 86.8% (165/190) have ever been in a relationship i.e. either married, co-habited, widowed or divorced.

84.3 % (180/190) of the participants profess the Christian faith. In terms of education, 20.5% (39/190) of the respondents have no formal education and as many as 50.1% (97/190) had primary education and only 1.6% (3/190) attained the tertiary education level.

12.1% (23/190) of the respondents are unemployed whilst 67.5 % (128/190) are self-employed as traders and artisans like dress makers, hair dressers, masons.

Majority of the respondents, 65.8% (125/190) are Krobos whilst Hausa and people from the Northern tribes form the least proportions, 4.7% (9/190).

The table below is a summary of the socio-demographic characteristics of the 190 respondents.

Figure 2 Socio-demographic characteristics of respondents

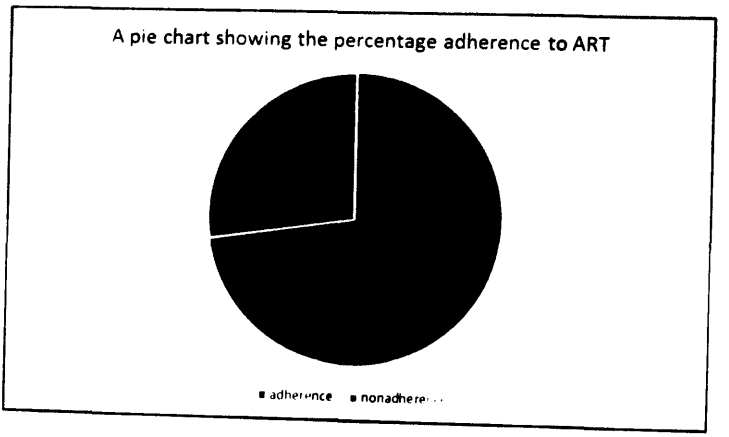
Characteristics	Adherence N=138(72.63%)	Non-adherence 52(27.37%)	P value
Age(years)			0.8
18-27	6(4.3)	3(5.8)	
28-37	26(18.8)	10(19.2)	
38-47	40(29.0)	15(28.9)	
48-57	36(26.1)	14(26.9)	
58-67	21(15.2)	7(13.5)	
68-77	9(6.5)	2(3.9)	
78-87	0(0.0)	1(1.9)	
Sex			0.9
Male	33(23.9)	13(25.0)	
Female	105(76.1)	39(75.0)	
Marital status			0.02*
Single	13(9.4)	12(23.1)	
Married	40(29.0)	17(32.7)	
Divorced	22(15.9)	10(19.2)	
Widowed	33(23.9)	10(19.2)	
Co-habiting	30(21.7)	3(5.8)	
Religious Background			0.1
Christian	133(96.1)	47(90.4)	
Moslem	5(3.6)	3(5.8)	
Traditionalist	0(0.0)	2(3.9)	
Educational background			0.2
No formal Education	28(20.3)	11(2.2)	
Primary	71(51.5)	26(50.0)	
Secondary	23(16.7)	12(23.1)	
Tertiary	1(0.7)	2(3.9)	
Vocational	2(1.5)	1(1.9)	
Technical	13(9.4)	0(0.0)	
Profession			0.9
Unemployed	18(13.0)	5(9.6)	
Student	6(4.4)	2(3.9)	
self-employed	93(67.4)	35(67.3)	
Trader	10(7.4)	6(11.5)	
Professional/Artisan	6(4.4)	3(5.8)	
Public Servant	5(3.7)	1(1.9)	

Table 4.1 B: Socio-demographic characteristics of respondents

Characteristics	Adherence N=138(72.63%)	Non-adherence 52(27.37%)	P value
Tribe			1
Krobo	90(65.2)	35(67.3)	
Ewe	24(17.4)	10(19.2)	
Akan	17(12.3)	5(9.6)	
Hausa	4(2.9)	1(1.9)	
Northern origin	3(2.2)	1(1.9)	

4.2 Adherence level

Figure 3 a pie chart showing the percentage adherence to ART



After scoring the questionnaires, the percentage adherence was calculated to be 72.6% (138/190).

The adherence calculated in a similar study in the country was 87% (Ohene & Forson, 2009). When sample test of proportions was used to compare the adherence in this study to 87%. The results of adherence was 0.7 (95% CI: 0.7 – 0.8; $p \leq 0.01$).

Figure 4 Bivariate analysis of adherence and patient socio-demographic characteristics

Characteristics	Adherence N=138(72.63%)	Non-adherence 52(27.37%)	Crude OR (95%CI)	P value
Age(years)			1.0	
18-27	6(4.4)	3(5.8)		
28-37	26(18.8)	10(19.2)		
38-47	40(29)	15(28.9)		
48-57	36(26.1)	14(26.9)		
58-67	21(15.2)	7(13.5)		
68-77	9(6.5)	2(3.9)		
78-87	0(0.0)	1(1.9)		
Sex				
Male	33(23.9)	13(25.0)	Reference	
female	105(76.1)	39(75.0)	1.1(0.1-2.2)	0.8
Tribe				
			Reference	
Krobo	90(65.2)	35(67.3)		
Ewe	24(17.4)	10(19.2)	0.9(0.4-2.2)	0.9
Akan	17(12.3)	5(9.6)	1.3(0.5-3.9)	0.6
Hausa	4(2.9)	1(1.9)	1.6(0.17-14.4)	0.7
Nothern Origin	3(2.2)	1(1.9)	1.8(0.12-11.6)	0.9
Religion				
Christian	133(96.4)	47(90.4)	Reference	
Muslim	5(3.6)	3(5.8)	0.6(0.1 - 2.6)	0.5
Traditional	0(0.0)	2(3.9)	1.0	-
Marital status				
Single	13(9.4)	12(23.1)	Reference	
Married	40(29.0)	17(32.7)	2.8(0.8-5.7)	0.1
Divorced	22(15.9)	10(19.2)	2.0(0.7-6.0)	0.2
widowed	33(23.9)	10(19.2)	3.1(1.1-8.8)	0.04*
Co-habiting	30(21.7)	3(5.8)	9.2(2.2-38.3)	≤ 0.001*

Table 4.2b Bivariate analysis of adherence and patient socio-demographic characteristics

Characteristics	Adherence N=138(72.63%)	Non-adherence 52(27.37%)	Crude OR (95%CI)	P value
Educational level				
No formal education	28(20.3)	11(2.2)	Reference	
Primary	71(51.5)	26(50.0)	1.1(0.5-2.5)	0.9
Secondary	23(16.7)	12(23.1)	0.8(0.3-2.0)	0.6
Tertiary	1(0.7)	2(3.9)	0.2(0.2-2.4)	0.2
Vocational	2(1.5)	1(1.9)	0.8(0.1-9.6)	0.9
Technical	13(9.4)	0(0.0)	1.0	-
Profession				
unemployed	18(13.0)	5(9.6)	Reference	
student	6(4.4)	2(3.9)	0.8(0.1-5.5)	0.9
self-employed	93(67.4)	35(67.3)	0.7(0.3-2.1)	0.6
Trader	10(7.4)	6(11.5)	0.6(.03-1.3)	0.2
Professional/Artisan	6(4.4)	3(5.8)	0.6(0.1-3.1)	0.8
Public Servant	5(3.6)	1(1.9)	1.4(0.1 - 0.8)	0.01

*p value <0.05 (significant at 95% confidence interval)

OR = Odd's Ratio CI = Confidence Interval

On the bivariate analysis of adherence with the respondent's-demographic characteristics, the only characteristic that showed a significant association with adherence is the marital status, with the respondents who are widowed having a crude Odd's ratio of 3.05 (95% CI 1.1 – 8.8; p = 0.04) and co-habiting crude Odd's ratio 9.23, 95% CI 2.2; p <0.01).

4.3 Factors affecting adherence

4.3.1 Patients related factors

85.5% (118/138) of the respondents who are adherent, have been diagnosed HIV positive for more than one year (OR 1.1, 95% CI 0.4 -2.6; p=0.9) and the same percentage have been on anti-retroviral therapy for more than one year (OR 0.6, 95% CI 0.3 – 1.4; p=0.3). 95.7% (131/1138) do not pay any money for the medications (OR 0.4, 95% CI 0.5- 3.7; p=0.4). 57.1% (4/7) of the participants who pay money for medication do not have enough money to pay for their medications.

58% (80/138) of the adherent respondents have financial support (OR 0.6, 95% CI 0.3 – 1.2; p = 0.2) from either their partners 82.5% (66/80) or families 17.5 % (14/80).

88.4% (122/138) do not consider distance as a hindrance to coming for their medications each month and only 35.7% (5/16) of those who see the distance to the facility as a hindrance, the lorry fare was ascribed as the main reason for the hindrance. (OR 0.4, 95% CI 0.8 – 5.6; p=0.3).

58.0% (80/138) of the adherent respondents agreed to having other forms of support aside the financial support from either their families 53.8% (43/80) or their partners 45%(36/80); OR 0.6, 95% CI0.3 – 1.2; p=0.1).

Out of the 138 adherent respondents, 99.3% (137/138) do not consider their religious beliefs as a hindrance to taking anti-retroviral medications (OR 8.4, 95% CI p=0.1). 91.3% (126/138) do not drink alcohol (OR 2.2 95% CI 0.9 – 5.6; p=0.1) and as many as 96.4% (133/138) do not smoke (OR 0.5, 95% CI 0.1 – 4.6; p=0.6).

The findings are summarized in the table below:

Figure 5 Bivariate analysis of adherence and patient related characteristics

Characteristics	Adherence N=138(72.63%)	Non-adherence 52(27.37%)	Crude OR (95%CI)	P value
Duration since diagnosis				
≤1 year	20(14.5)	8(14.4)	1	
> 1year	118(85.5)	44(84.6)	1.1(0.4-2.6)	0.9
Length of time on ART				
≤1 year	20(14.5)	8(14.4)	1	
> 1year	118(85.5)	44(84.6)	0.6(0.28-1.4)	0.3
Payment for anti-Retroviral medications				
Yes	6(4.4)	1(1.9)	1	
No	132(95.7)	51(98.1)	0.4(0.5-3.7)	0.4
Financial support				
No	58(42.0)	16(30.8)	1	
Yes	80(58.0)	36(69.2)	0.6(0.3-1.2)	0.2
Distance as hindrance				
Yes	16(11.6)	10(19.2)	1	
No	122(88.4)	42(80.8)	1.8(0.76-4.3)	0.2
Alcohol Drinking				
Yes	12(8.7)	9(17.3)	1	
No	126(91.3)	43(82.7)	2.2(0.9-5.6)	0.1
Smoking				
Yes	5(3.6)	1(1.9)	1	
No	133(96.4)	51(98.1)	0.5(0.1-4.6)	0.6
Religious Belief as hindrance				
Yes	1(0.7)	3(5.8)	1	
No	137(99.3)	137(94.3)	8.4(0.9-82.5)	0.1

OR = Odd's Ratio

From the table above it can be deduced that this study produced no significant statistical association between and the named patient related factors.

4.3.2 HIV and treatment related factors

Of the 138 respondents who were adherent, 85.5 % (118/138) have no other illness (es) (OR 0.9, 95% CI 0.4 – 2.3; p = 0.9) and 94.2% (130/138) of them have not lost weight considerably ever since they were diagnosed HIV positive (OR 0.7, 95% CI 0.13 – 3.17; p = 0.6.). 50. 7% ((70/138) of them took more than one pill per day. (OR 1.4, 95% CI 0.8 – 2.7; p=0.3). 93.5% (129/138) of the participants claimed the number of pills per day constituted a border to them (OR 2.2, 95% CI 0.8-6.3; p=0.1).

77.5 %(107/138) have no side effects of the medications (OR 2.7, 95% CI 1.4 – 5.4; $p \leq 0.00$) and 78.1% (25/31) of those who had side effects claimed the side effects prevented them from taking the medications (OR 5.9, 95% CI 0.7-51.7; p-0.1).

As many as 71.7% (99/138) of participants had means of reminding them to take the medications (OR 1.6, 95% CI 0.8 – 3.1; p=0.2).

The table below summarizes the findings of this section:

Figure 6 Bivariate analysis of adherence and HIV/ Treatment related factors

Characteristics	Adherence N=138(72.63%)	Non-adherence 52(27.37%)	Crude OR (95%CI)	P value
Other illness (es)				
Yes	20(14.5)	7(13.5)	1	
No	118(85.5)	45(86.5)	0.9(0.4-2.3)	0.9
Weight loss				
Yes	8(5.8)	2(3.9)	1	
No	130(94.2)	50(96.1)	0.7(0.1-3.2)	0.6
Number of pills taken in a day				
More than 1	70(50.7)	31(59.6)	1	
1	68(49.2)	21(40.4)	1.4(0.8-2.7)	0.3
Number of pills as a border				
Yes	129(93.5)	7(13.5)	1	
No	9(6.5)	45(86.5)	2.2(0.8-6.3)	0.1
Number of times ART is taken daily				
More than once	94(68.1)	41(78.9)	1	
Once	44(31.9)	11(21.1)	1.8(0.8-3.7)	0.2
Side effect (s) of medications				
Yes	31(22.5)		1	
No	107(77.5)		2.8(1.4-5.4)	≤ 0.001*
Means of reminding of the pills taking time				
No	39(28.3)	20(38.5)	1	
Yes	99(71.7)	32(61.5)	1.6(0.8-3.1)	0.2

*p value <0.05 (significant at 95% confidence interval)

OR = Odd's Ratio

The statistically significant treatment factor enhancing adherence deduced from this study is the 'no side effect' of the medications. (OR 2.8, 95% CI 1.4 – 5.4; $p \leq 0.001$)

4.3.3 Health Facility related factors

Of the 138 respondents who are adherent, 85.5% (118/138) have had counseling before being initiated on anti-retroviral therapy. 96.4% (133/138) claim they were treated with respect at the facility anytime they visited for medication refills or for treatment of any other illnesses (OR 1.6, 95% CI 0.4 – 7.1; p=0.5).

98.6% (136/138) assert that they were given the opportunity to ask questions bordering them (OR 2.7, 95% CI 3.7- 19.8; p=0.3) and 97.8 % (135/138) had their concerns addressed most of the time (OR 2.8, 95% CI0.5 – 14.1; p=0.2)

98.5% (136/138) of the adherent participants had confidence in the health facility and as many as 73.2% (101/138) claim they did not feel discriminated against anytime they visit the facility (OR 0.5, 95% CI 0.2 – 1.2; p=0.1).

Whilst 80.4% (111/138) claimed to have privacy in the consulting room (OR 0.5, 95% CI 0.2 – 1.4; p=0.2), only 22.5% (31/138) had privacy in the pharmacy (OR 0.3, 95% CI 0.1 – 0.4; $p \leq 0.001$) and 24.6% (34/138) had privacy in the laboratory (OR 0.0, 95% CI 0.1 – 0.0; $p \leq 0.001$).

82.6% (114/138) out of the 138 adherent respondents had to wait for long hours to be attended to anytime they visit the hospital for medication refills (OR 0.4, 95% CI 0.2 – 0.8; p=0.01). 94.2% (130/138) were not involved in the decision making as to what type of anti- retroviral medications they should be put on (OR 0.58, 95% CI 0.2 – 1.9; p=0.4).

The summation of the health facility related data is in the table below:

Figure 7 Bivariate analysis of adherence and facility related factors

Factors	Adherence N=138(72.63%)	Non-adherence 52(27.37%)	Crude OR (95%CI)	P value
Counselling before initiating therapy				
Yes	118(86.0)	52(100.0)	1	
No	20(14.5)	0(0.0)	1	
Respect for respondent at the Facility				
No	5(3.2)	3(5.8)	1	
Yes	133(96.4)	49(94.2)	1.63(0.4-7.1)	0.5
Opportunity to ask questions				
No	2(1.5)	2(3.9)	1	
Yes	136(98.5)	50(96.1)	2.72(3.7-19.8)	0.3
Concerns addressed whenever the need arose				
No	3(2.2)	3(5.8)	1	
Yes	135(97.8)	49(94.2)	2.76(0.5-14.1)	0.2
Confidence in the health Facility				
No	2(1.5)	2(3.9)	1	
Yes	136(98.5)	50(96.1)	2.72(0.4-19.8)	0.3
Discrimination against respondent at the facility				
Yes	37(26.8)	8(15.4)	1	
No	101(73.2)	44(84.6)	0.50(0.2-1.2)	0.1
Privacy in the consulting room				
No	27(19.6)	6(11.5)	1	
Yes	111(80.4)	46(88.5)	0.54(0.2-1.4)	0.2
Privacy in the in the pharmacy				
No	107(77.5)	21(40.4)	1	
Yes	31(22.5)	31(61.5)	0.20(0.10-0.4)	≤ 0.001*

Table 4.4 B: Bivariate analysis of adherence and facility related factors

Factors	Adherence N=138(72.63%)	Non-adherence 52(27.37%)	Crude OR (95%CI)	P value
Privacy in the laboratory				
No	104(75.4)	20(38.4)	1	
Yes	34(24.6)	32(34.6)	0.0(0.1-0.4)	**≤ 0.001***
Long waiting hours				
Yes	114(82.6)	34(65.4)	1	
No	24(17.4)	18(34.6)	0.4(0.2-0.8)	**0.01***
Involvement in decision making				
No	130(94.2)	47(90.4)	1	
Yes	8(5.8)	5(9.6)	0.58(0.2-1.9)	0.4

*p value <0.05 (significant at 95% confidence interval)

OR = Odd's Ratio

From the results above, three facility-related factors showed significant statistical association with adherence. These are: Privacy in the pharmacy (OR 0.2, 95% CI 0.1- 0.4; $p \leq 0.001$), Privacy in the laboratory (OR 0.20, 95% CI 0.1 – 0.4; $p \leq 0.001$) and Long waiting hours (OR 0.40, 95% CI 0.2 – 0.8, $p = 0.01$).

Figure 8 Results of the multiple logistic regression analysis of adherence and the significant factors

Factors	Adherence N=138(72.63%)	Non-adherence 52(27.37%)	Crude OR (95%CI)	P value	Adjusted OR (95%CI)	P value
Marital status						
Single	13(9.4)	12(23.1)	1		1	
Married	40(29.0)	17(32.7)	2.17(0.8-5.7)	0.1	2.6(0.9-7.6)	0.1
Divorced	22(16.0)	10(19.2)	2.03(0.7-6.0)	0.2	2.5(0.7-8.3)	0.2
widowed	33(24.0)	10(19.2)	3.05(1.1-8.8)	0.04	2.7(0.8-8.5)	0.1
Co-habiting	30(21.7)	3(5.8)	9.2(2.2-38.3)	≤0.01*	11.9(2.6-55.2)	<0.01*
Side effect (s) of medications						
Yes	31(22.5)	23(44.2)	1		1	
No	107(77.5)	29(55.8)	2.7(1.4-5.34)	≤0.01*	1.4(0.6-3.2)	0.5
Privacy in the in the pharmacy						
No	107(77.5)	21(40.4)	1		1	
Yes	31(22.5)	31(61.5)	0.2(0.1-0.4)	≤0.01*	0.3(0.1-1.1)	0.1
Privacy in the laboratory						
No	104(75.4)	20(38.4)	1		1	
Yes	34(24.6)	32(34.6)	0.0(0.1-0.04)	≤0.01*	0.6(0.2-2.1)	0.4
Long waiting hours						
Yes	114(82.6)	34(65.4)	1		1	
No	24(17.4)	18(34.6)	0.40(0.2-0.8)	0.01*	1.1(0.4-2.7)	0.9

Putting all the statistically significant factors in a multiple logistic regression, out of the 138 respondents who adhered to the ART, 21.7% (30/138) who co-habited showed a significant adjusted Odd's ratio of 11.9 (95% CI 2.6 – 55.2; p ≤0.01

CHAPTER FIVE

5.0 DISCUSSIONS

More women were enrolled into the anti-retroviral therapy programme at the facility and the sampling reflected this. 72.8% of the respondents in this study were women.

The average age of respondent 47.1 ± 12.54 is also consistent with the findings of the National HIV Sentinel Survey 2016 report.

The adherence level calculated from this study is 72.7%. This falls below the optimal level of ≥ 95% by ("2007 AIDS epidemic update," 2007; Paterson et al., 2000)). This is also below level from similar studies in Ghana which ranges between 80.6 and 87.3% (Ohene & Forson, 2009). Compared to other similar studies in Africa, this recorded adherence level is higher than the recorded level 54% in a Botswanan study (Weiser et al., 2003) and higher than 67% levels recorded in Zambia (Dew et al., 2007) on ART patients. It however falls within the general range of adherence on the African continent of 54% to 98% (Weiser et al., 2003).

To achieve increase CD4 count, maximise viral suppression and to reduce mortality and drug resistance, an optimal adherence level ≥ 95% (Paterson et al., 2000) was required hence levels below are considered as suboptimal.

The percentage adherence also depends on the methods used. Whilst many of the studies used the pill count over three months, patients' self-report using visual analogue and a seven-day recall, other studies used the combination of self-report, pill identification. Here the method used was the Morisky Medication Adherence Scale. It is a highly sensitive scale and might underestimate the percentage compared to the other methods in literature. As Morisky himself put it: *"self-report measure lacks adequate reliability and strong evidence of validity*". This could be explained by

"too many researchers have simply constructed their own adherence measure or modified the existing ones failing to apply even rudimentary technique of psychometric analysis and measurement development."

There are variations in adherence levels depending on the method used for instance in Nigeria a self-report method reported an adherence of 44% (Bangsberg, Hecht, Charlebois, et al., 2001), using self-report whilst another study reported an adherence between 58-60% using a combination of self-report and pill count.

Even though studies by Murphy et al., 2000 reported age, gender, race, educational status and religious beliefs have a bearing on adherence, only marital status showed a positive correlation with adherence in this study. Being married or in a form of marital relationship is positively related to adherence as the partner can be a source of support be it financial or moral in taking the medications. The partner may be a means of reminding the patient of the medication taking times.

In this study, Sex was not correlated with adherence. This is consistent with the findings of Turner et al., 2003 in the study in Philadelphia and reported the negative relationship of sex with adherence with the reason that more depression and depressive illnesses are commoner in women than in men. This study has a high preponderance of women respondents. This could be the reason behind the findings.

Adherence in this study was not correlated with educational status (OR 1.16, p= 0.29). This is in conformity with (Kalichman et al., 1999)who reported that higher level of education correlates with low levels of adherence. 20.3% (28/138) of respondents had no formal education and as many as 51.5 % (71/138) had primary education with only 0.7% (1/138) who had tertiary level education are adherent. Therefore, with a proportionately high percentage of the adherent participants having no or primary education, low levels of adherence are expected.

Most patient related factors did not have any statistical significance with adherence. Payment for the medications did not correlate positively with adherence. This is in sharp contrast with literature. The cost of medication is key to adherence (Nuwagaba-biribonwoha et al., n.d.) but in Africa, the cost of anti- retroviral medications is highly subsidized at a relatively low cost all can afford or either offered free of cost (Weiser et al., 2003)). In this study centre, as many as 183 out of the 190 respondents assert that they do not pay any for the medication but this seems to have no bearing on adherence.

But the overall cost must factor in the cost of clinic visits. Respondents will have to pay lorry fares to commute to and fro their residence to the facility. Only 11.6% (26/138) of the adherent participant see distance as a hindrance to coming for the medications but this did not also impact positively on the adherence.

Financial and social support had no significant impact on adherence in this study. This is also contrary to findings in literature. Living without any social support or living alone negatively impact adherence (Weiser et al., 2003; William et al., 2008). On the other hand, having a stronger social interaction and strong family support are associated with high adherence levels (Orrell et al., 2003).

The religious beliefs showed no significant statistical association with adherence. This is also in sharp contrast findings in other studies. Haynes reported in two separate studies in 1996 and in 2005 that religious beliefs greatly impact and affect the motivation the motivation to take the medications hence adherence.

The presence of other illnesses, weight loss, the number of pills taken in a day and the number of times the pills in a taken in a day did not have statistical significance in this study. This is contrary to findings in similar studies. The daily pill burden is a common barrier to adherence (Parienti et al.,

2009). The side effects of the medications taken showed statistical significance consistent with other studies. Side effects, the severity of the side effects and other undesirable effects can impact adherence (Bangsberg, Hecht, Charlebois, et al., 2001; Chesney, 2000b)

Even though 71.7% (99/138) of the adherent respondents claim to have a means of reminding them of the medication taking, it was found not to be statistically significant.

This study found a statistical significance between adherence and privacy in the pharmacy (OR 0.2, 95% CI 0.1 -0.4; p ≤0.01), privacy in the laboratory (OR 0.0, 95% CI 0.1- 0.04; p ≤0.01) and waiting for long hours before being attended to (OR 0.4, 95% CI 0.2-0.8; p=0.01) at the health facility. These findings are very consistent with similar findings. Long waiting queues and not having enough time for patients affected care and negatively impacted adherence. Barroso et al., 2017; Nuwagaba-biribonwoha et al., n.d.) in their studies also reported the positive influence of confidentiality on adherence. Patients want confidentiality and want to be treated with respect. The more respect and confidentiality given a patient, the more trust the patient builds in the health facility and the more positive the influence on adherence.

Patients also build trust in the health care provider if they are taken through the disease-causing process (Kalichman et al., 1999).

Involving patients in the entire ART decision making process did not show any statistical significance in this study contrary to other similar studies. This is very paramount to adherence to anti-retroviral therapy. It is the outmost responsibility of the health care provider to discuss all treatment options, explain the requirements of each option, and discuss all the potential side-effects of each option and the remedies available should they occur. With this information at hand as a powerful tool, the patient together with his doctor, will make an informed choice as to the type of medication regimen he should be put on. This greatly enhance adherence. This was reported in a

Tanzanian study conducted by (Idigbe et al., 2005). Similar findings were made by (Nsanzimana et al., 2012) in a study in Rwanda in2012. The reasons behind the contrast in this study are unclear. This may require further studies with advanced statistics and other study designs.

Limitations

1. Recall and information biases have been identified as the main limitations identified in a quantitative method such as this. Therefore, to eliminate these biases and accurately measure the adherence, respondents were kept at ease in a very friendly atmosphere in order for them not to feel threatened in one way or the other when answering a question bordering on a non-adherent event. To minimize recall bias, the questionnaire itself was structured to recall events of the previous day as well as two weeks ago. Adherence is a behavioural event and patients may overestimate their adherence because of the fear of the repercussions of revealing to the interviewers that they had not achieved so to reduce this to the barest minimum, the trained assistants were entreated not to be judgemental but rather to be empathetic to the respondents. Enough reassurance was also given to the respondents.
2. The Morisky scale is valid if and only if respondents answer at least six out of the eight questions. This also places a limitation on the study. Respondents were hence encouraged to answer all the questions on this portion of the questionnaire. Questionnaires that had fewer than six responses were not used in the analysis.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

This study was conducted in one of the oldest ART centres in the country. The overall level of adherence calculated in this study sample was 72.6%. This is sub- optimal compared to similar studies conducted by Ohene and Forson who found adherence levels of 87.3%. This has a lot of implications for this centre where many have been on anti-retroviral therapy for more than 10 years.

Co-habiting is the only factor studied that showed strong statistical significance to adherence. All other socio-demographic, HIV and its treatment and the health care factors did not show any statistical impact on adherence however, factors such as religious belief as hindrance to taking anti-retroviral medications, financial support can be studied into further details as they have some level of bearing on adherence in this study

6.2 RECOMMENDATIONS

These are the recommendations deduced from this study

1. Cohabitation has a positive impact on adherence hence during counselling sessions before initiation of anti-retroviral therapy, Persons Living with HIV should be impressed upon or encouraged to either be in a marital relationship of a sort. Where they are single, as the case may, they must be encouraged to live with their families as the family support system can enhance their adherence through reminders to take their pills, financial and moral support.
2. The National AIDS/STI Control Programme or tertiary institutions or research institutions should conduct a research on adherence on nationwide scale in the major ART centres in the

country. It is only with a proper knowledge of the true adherence levels in the country that pragmatic steps can be taken to address it.

3. St. Martin's hospital authorities should work to improve upon the Privacy of all Persons Living with HIV/AIDS at the pharmacy and at the laboratory since stigmatization is still a problem everywhere. They are encouraged to put in place measures that will reduce their waiting time. This will go a long way at improve adherence to ART among all persons who patronize the facility's ART centre.

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APPENDICES

INFORMED CONSENT FORM

FACTORS AFFECTING ADHERENCE AMONG PEOPLE LIVING WITH HIV/AIDS ON ANTI-RETROVIRAL THERAPY AT ST. MARTIN DE PORRES HOSPITAL – AGORMANYA

Institutional Affiliation:

School of Public Health, College of Health Sciences. University of Ghana, Legon.

Telephone Number: 0244273484

Personal Introduction:

Hello. My name is Maurice Kofi Dola, a student from the department of epidemiology, School of Public health, University of Ghana.

I am conducting a study on the factors affecting adherence among PLWHA on ART at St. Martin de Porres Hospital in Agormanya. There are two research assistants with me to help me carry out this study. We will be having interview sessions with those who will be willing to partake in the study. This study is purely for academic purposes and a requirement for the award of Master of Public Health degree. I am under the supervision of Dr. Ernest Kenu of the Department of epidemiology, school of public health, University of Ghana, Legon. I would appreciate it if you would consent to taking part in this study.

Study Procedure, Benefits and Risk

If you agree to take part in this study, you will be required to fill a consent form before the interview begins. Interview sessions will last for about 30 minutes. You are at liberty to skip questions you wouldn't want to respond to. You can decide to stop responding to questions at any

point during the interview. You and other willing participants would not be exposed to any form of danger. I will always be available to assist if you need assistance. You will be required to provide some personal details about yourself and your experience with regards to the services provided in this facility. You are free to make any contributions that you feel will benefit this study. Your contributions will help improve on the quality of ART services in this hospital. Results and recommendations from this study will be made available to the facility and the Ghana Health Service.

Confidentiality

Your name and identity will not be needed for this study. All your responses will be coded and every detail of your information will be made confidential. The only people that may have access to the information you have provided will be members of the Ghana Health Service Ethical Review Committee, members of the University of Ghana and the research team. Questionnaires that have been administered will be kept under lock and key and only the principal researcher and his supervisor will have access to the key.

Processed and analysed data will be kept under lock and key for a minimum of three years after which it will be destroyed per research rules.

Right to Refuse

Participants have the right to refuse to partake in this study. Participation is not compulsory. You can decide to opt out of the study at any point in time. Your refusal to participate in this study will not cost you anything. However, I encourage you to actively participate in this study.

Before taking the Consent

Do you have any concerns about this study that you wish could be addressed?

Yes ☐

No ☐

If yes, please indicate your consent below.

.....

.....

Voluntary Consent

Please indicate below that you agree with the statement.

I have read the information given or the information has been read and duly explained to me. My concerns about this study have been duly addressed. I now voluntary agree to participate in this study knowing that I have the right to withdraw from the study at any time without it affecting my access to services in this hospital

....

(Name of Participant) (Signature) (Thumbprint) (Date)

I the undersigned agree that information concerning this study has been fully read and explained to the participant who voluntarily agreed to participate in this study.

....

(Name of Witness) (Signature) (Thumbprint) (Date)

Interviewer's Statement

I, the undersigned, have explained this consent to the participant in English/ Ga/ Twi/ Ewe. I ensured that she understands the purpose of this study, procedures to be followed as well as the risks and benefits of this study.

The participant has agreed to actively and fully participate in this study.

Name of Research Assistant.....

Signature .....

Date .....

Address .....

If you have any questions you may contact Maurice K. Dola on 0244273484 e-mail dondolaee@gmail.com or Ms. Hannah Frimpong on 0243235225 /0507041223

QUESTIONNAIRE

Questions	Code	Questions
Questionnaire code	QC	Interviewer code
Date		District

SECTION ONE: SOCIO-DEMOGRAPHIC DATA

	QUESTIONS	CODING CATEGORIES	SKIP TO	CODES
a.	What is your age? (Age as at last birthday)	.....		AGE
b.	Sex	Male.....1 Female.....2		SEX
c.	What is your marital status?	Single.....1 Married..... 2 Divorced.....3 Widowed.....4 Co-habiting..... 5		MRST
d.	What is your religious background?	Christian.....1 Moslem.....2 Traditionalist.....3 Atheist .....4 Other (pls specify) 5		RLGB
e.	What is the highest level of education you have reached?	None.....1 Primary.....2		EDUCATION

		Secondary……..... 3 Vocational/Technical……..4 Tertiary……5 Other……6		
	What work do you do?	Unemployed……..……..1 Student……2 Self-employed (Artisan/Trader.....3 Professional……..4 PublicServant……..5		PRFS
	What tribe do you belong to?	Krobo……...1 Ewe……..2 Akan……3 Hausa……4 Northern descent……..5		TRIBE

SECTION TWO: MORINSKY 8- POINT MEDICATION ADHERENCE QUESTIONNAIRE

	QUESTIONS	CODING CATEGORIES	SKIP TO	CODES
1	Do you sometimes forget to take your ART drugs?	Yes.....1 No.....2.		
2	Over the past two weeks, were there any days you did not take your ART medications?	Yes.....1 No.....2		
3	Have you ever cut back or stopped taking your medications without telling your doctor because you felt worse when you took it?	Yes.....1 No.....2.		
4	When you travel or leave home, do you sometimes forget to bring along your medications?	Yes.....1 No.....2		
5.	Did you take your ART drugs yesterday?	Yes.....1 No.....2		
6	When you feel like your symptoms are under control, do you sometimes stop taking your medicines?	Yes.....1 No.....2		
7	Do you ever feel hussled about sticking to your ART treatment plan?	Yes.....1 No.....2		
8	How often do you have difficulty remembering to take all your ART medications?	Never.....1 Almost Never.....2 Sometime.....3 Quite often.....4 always.....5		

SECTION THREE: PATIENT'S RELATED FACTORS

1.	For how long have you been diagnosed HIV positive?	1year.....1 2years.....2 3years.....3 4 years.....4 5 years.....5 More than 5 years.....6		DGNS
2.	For how long have you been on ART medications	1year.....1 2years.....2 3years.....3 4 years.....4 5 years.....5 More than 5 years.....6		TART
4.	Do you have to pay any money for the medications?	Yes ..... 1 No.....2	To 6 if No	MONI
5.	If yes; Do you always have enough money to pay for the drugs?	Yes.....1 No.....2		EMON
6.	Do you have financial support from your spouse/family/friends	Yes .....1 No.....2		FNSS

	?			
7.	If yes, from who do you get most help	Partner.....1 Family .....2 Friends.....3 Pastor.....4 Church Members.....5	To 8 if No	HELP
8.	Who do you live with?	Partner.....1 Relatives .....2 Alone .....3 a friend.....4		RESD
9	Does the distance from your house to this hospital sometime prevent you from coming for your medications?	Yes ..... 1 No.....2		DIST
10	If yes, is it due to the lorry fare	Yes ..... 1 No.....2	To 11 if No	LRFR
11	Do you have any form of support from anyone?	Yes..... .....1 No.....2		SUPP
12.	If yes, from who?	Partner.....1 Family 2	To 13 if No	PEAS

		Friends.....3 Pastor.....4 Church Members.....5		
13	Are your religious beliefs preventing from taking your ART medications?	Yes ..... 1 No.....2		RGTD
13.	Do you drink alcohol?	Yes .....1 No.....2		DRNK
14	If yes how much do you take in a day	.....	To 15 if No	MUCH
15	Do you smoke?	Yes .....1 No.....2		SMOK
16	If yes how many sticks a day	1.....1 2.....2 3.....3 4 or more.....4	To 17 if No	STKS

b. HIV DISEASE AND TREATMENT RELATED FACTORS

1.	Do you have any other illness apart from this one?	Yes .....1 No.....2	To 3 IF No	SOLI
2	If yes please specify	.....		DEAS
3	Have you lost weight considerably in the last six (6) months?	Yes .....1 No.....2	To 5 if No	WTLT
4	If yes, please specify	.....		MCLT
5	How many pills at a time do you take a day?	1.....1 2.....2 3.....3 More than 3.....4		NOPL
6.	Does the number of pills border you?	Yes .....1 No.....2		PIBO
7.	How many times do you have to take your medications in a day?	Once.....1 Twice.....2 Three times .....3 More than 3 times.....4		MEDT

8	Do you experience any side effects after taking the pills?	Yes ..... 1 No.....2	To 10 if No	SIEF
9	If yes, what are the major side effects you experience?	....		
10.	Do the side effects prevent you from taking the medications sometimes	Yes ..... 1 No.....2		SEPM
11	Do you have any means of reminding you of your pills taking on time?	Yes .....1 No.....2		MROP

C. FACILITY RELATED FACTORS

	QUESTIONS	ANSWER		
1.	Were you counseled on the drugs before you started the treatment?	Yes ..... 1 No.....2		CONSL
2.	Are you treated with respect anytime you come for your medications in this hospital?	Yes ..... 1 No.....2		RESP
3.	Are you given the opportunity to ask questions anytime you come here?	Yes ..... 1 No.....2		OPTU
4.	Are your concerns always addressed whenever the need arises?	Yes ..... 1 No.....2		COSA
5.	Do you have confidence in the system in this facility?	Yes ..... 1 No.....2		CONF
6.	Do you feel discriminated against anytime you come for your medications?	Yes ..... 1 No.....2		DISC

7.	Do you have privacy? A) In the consulting rooms B) Atthe pharmacy? C) At the lab?	Yes.....1 No.....2 Yes.....1 No.....2 Yes.....1 No.....2		PRCY
8	Do you usually have to wait for long hours in order to be attended to?	Yes.....1 No.....2	To 10 If No	LGWT
9	If yes, averagely for how long do you have to wait?	.....		WTTM
10.	Did your doctor involve you in the decision as to what type of medicationsyou needed?	Yes ..... 1 No.....2		DODE