

**SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA**



**FACTORS AFFECTING ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG
HIV/AIDS PATIENTS RECEIVING TREATMENT AT SELECTED POLY CLINICS IN
ACCRA METROPOLIS**

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DECLARATION

I, Emmanuel SintimEffah, declare that this study is my own work, except duly referenced ones and that no form has been presented elsewhere for a research and it is in accordance with the school of public health, University of Ghana guidelines for research work.

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DEDICATION

This work is dedicated to my Lord and Savior Jesus Christ by whose Grace I have been able to accomplish this dissertation.

To my Parents, to my lovely Francisca, Brothers and Sister, I am very grateful for your support.

A very big thanks to staff and students from the Department of Epidemiology and Disease control school of the Public Health, University of Ghana, Legon and my supervisor Dr. Anthony Danso-Appaih.

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ABSTRACT

Introduction: Recent research has indicated ART medications require 70% to 90% adherence to provide viral suppression. Other studies also indicate that the optimum adherence level to achieve viral suppression is atleast 95% However, the challenge of maintaining long-term ART treatment has been observed in recent studies.

Objective: This study assess the factors affecting adherence to antiretroviral therapy among HIV patients receiving treatment at selected polyclinics in Accra

Methods: A cross-sectional study design was used to collect data on adherence to ART using structured questionnaire. The study's population consisted of adults, infected with HIV who received antiretroviral therapy in selected polyclinics in Accra metropolis. A sampling frame which consisted of the details of all patients receiving ART was created and participants were randomly selected from the prepared record of sampling frame. Eligibility criteria was for adults who were 18 years and above, who have been given antiretroviral therapy for at least six months and agreed to participate. STATA was used to analyse the data. Structured questionnaire based on study objectives was used to assess factors influencing adherence to ART. The association between community factors, drug related factors, health facility factors and patient factors affecting adherence and the level of adherence were analyzed using multiple logistic regression model and odds ratio (OR) with 95% confidence intervals (CI).

Result: The adherence level of study participants was high (89.47%). Factors which were found to be significant to adherence included instructions from clinician ($\chi^2= 7.97$, p – value = 0.005)

, any method used as reminders (χ^2) value of 9.42 and a p – value of 0.001.

, encountered missed appointment, ($\chi^2= 3.69$, p – value = 0.038) satisfied with support ($\chi^2= 11.64$, p – value = 0.009), knowledge about how medication interact with substances ($\chi^2= 6.71$, p – value = 0.01), missing drug is ok if healthy ($\chi^2= 9.59$, p – value = 0.002), food not available, ($\chi^2= 10.15$, p – value = 0.03) marital status, ($\chi^2= 13.94$, p – value = 0.019) and ethnicity ($\chi^2= 23.83$, p – value = 0.000)

Conclusion: Adherence level of people living with HIV in selected Polyclinics in Accra Metropolis is high as compared to other studies done in different part of the country. The study established that patient related factors, drug related factors, health facility related factors and community related factors were influential in determining adherence to ART among people living with HIV

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LIST OF ABBREVIATIONS

AACTG	Adult Aids Clinical Trials Group
AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Therapy
ARV	Antiretroviral
CD4	Cluster of Differentiation
CDC	Centre for Disease Control
DOT	Directly observed therapy
FDC	Fixed-dose combination
GAC	Ghana AIDS Commission
GHS	Ghana Health Service
HAART	Highly active antiretroviral therapy
HIV	Human Immunodeficiency virus
IDPs	Internationally displaced persons
MDG	Millennium Development Goal
MOH	Ministry of Health
MTCT	Mother-to-child transmission
NACP	National AIDS Commission Programme
NGO	Non-Governmental Organizations
NSP	National Strategic plan
PEP	Post-exposure prophylaxis
PMTCT	Prevention of mother to child transmission
RNA	Ribonucleic acid
SPSS	Statistical Package for Social Sciences

ST	Sexually transmitted infections
TB	Tuberculosis
UNAIDS	United Nations Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
VL	Viral load
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Medication Adherence

Adherence to medication refers to whether patients take their required medications as prescribed (eg, twice daily), as well as whether they continue to take a prescribed medication.

Medication non adherence is a growing concern to clinicians, healthcare systems, and other stakeholders (eg, donors) because of mounting evidence that it is prevalent, associated with adverse outcomes and higher costs of care. To date, measurement of patient medication adherence and use of interventions to improve adherence are rare in routine clinical practice. (Ho, Bryson, & Rumsfeld, 2009)

1.2 Burden of HIV infection

HIV remains a major public health burden globally. Multiple strategies have been implemented in an effort to ensure quality of life including treatment of patients with antiretroviral therapy (ART) among people living with HIV worldwide (Kharsany& Karim et al 2016) However, since the introduction of combination therapies, there have been challenges in adherence for both patients and health care providers. In an average, there is an estimate of over 24.8% rate of non-adherence .("Achappa B et al 2013)

Research has shown that adherence rate of 95% is associated with undetectable viraemia among majority of patients. ("Achappa B et al2013," 2013)Other research has also indicated that ART medications require 70% to 90% adherence to provide viral

suppression..(Lemma Negesa et al 2017) The major factors associated with non-adherence are generally patient related, including alcohol abuse and substance abuse. Also, other contributing factors may include side effect dietary restrictions, pill burden patients/health care provider relations, inconvenient dosing frequency system of care and others.

An estimated individuals living with HIV in 2016 were 36.7 million (which includes 1.8 million children) with a global HIV prevalence of 0.8% among adults. Approximately 30% of these same people do not know they have the virus. An estimated 78 million people have become infected with HIV and 35 million people have died of AIDS-related illnesses ever since the epidemic. 1 million people died of AIDS related illnesses in 2016

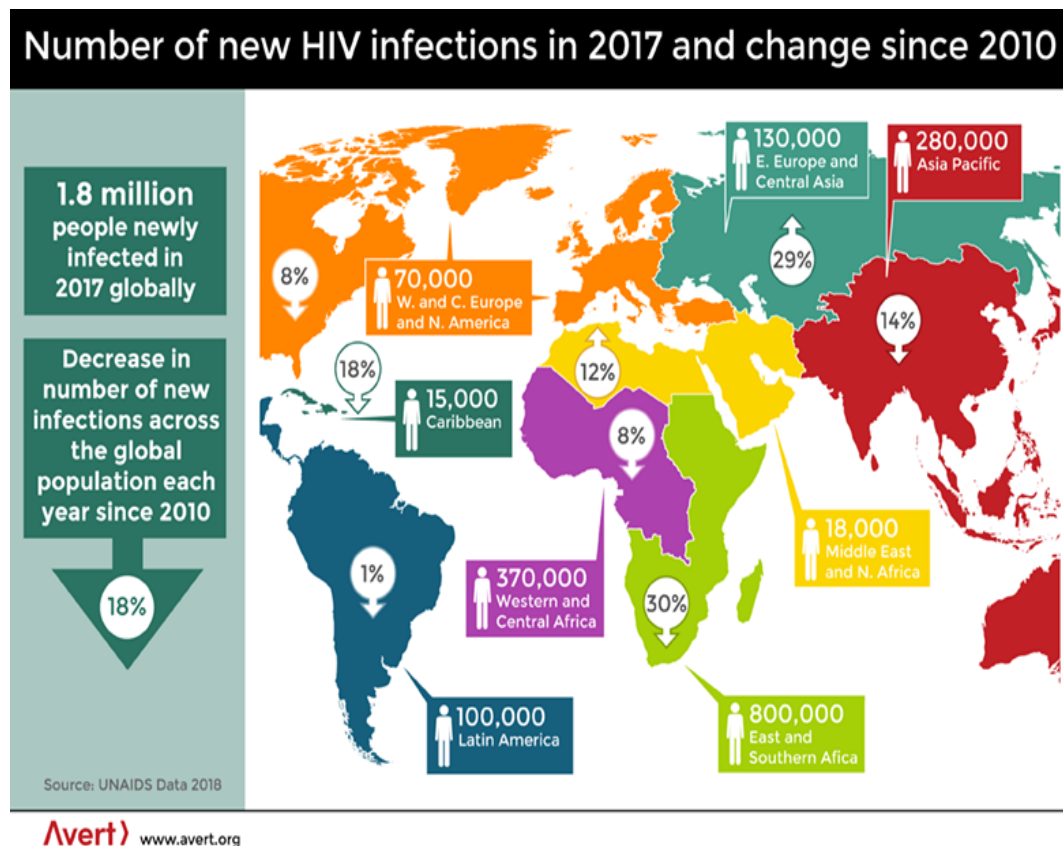


Figure 1: Number of new HIV infections in 2017 and changes since 2010

1.2.1 HIV burden in sub-Saharan Africa

The vast number of people living with HIV are found in low and middle income countries. In sub-Saharan Africa there is an estimated number of 25.5 million individuals living with HIV among this category, 19.4 million are living in East and Southern Africa which saw 44% of new HIV disease globally in 2016. (“UNAIDS,” 2016) Of the evaluated 1.8 million new infections that happen universally every year, 2 out of 3 are in sub-Saharan Africa, with young women 15-24 years having a disproportionate burden. Adults and women from 15-24 years have up to eight overlap higher rates of HIV infection contrasted with their male associates.

There is a gap in HIV prevention innovations among women particularly for women who can't accept the present HIV preventive measures of abstinence, use of condoms and early treatment initiation. The likelihood of an AIDS free generation can't be acknowledged except if we can avert HIV infection in women. (Kharsany & Karim, 2016) Amid ongoing years, the utilization of antiretroviral (ARV) drugs in the United States and other developed nations has drastically reduced AIDS mortality rates, yet not long ago, just a little scope of AIDS patients in Sub-Saharan Africa have gotten treatment (Souleymane Mboup, et. al 2016)

In Sub-Saharan Africa, the AIDS pandemic was seen first in central Africa (Clumeck et al. 1983). Before long, the epidemic was seen in East Africa, and in this manner in West Africa (Essex, Mboup, Musonda, Mhalu, & Max, 2006). The epidemic appeared to happen last in southern Africa, in spite of the fact that rates there are currently the most elevated in Africa and in the world. Six nations of southern Africa have adult rates of 20

percent or higher, and the mean prevalence rate for all of southern Africa is around 18 percent.

1.2.2 HIV in Ghana

The burden of HIV in Ghana cannot be over emphasized. In 2016, the HIV prevalence was 2.4% which represents a second consecutive increase of 1.6% and 1.8% prevalence in 2014 and 2015 respectively. Among the prevalence, the Brong Ahafo region and the Volta region, recorded the highest prevalence rate of 2.7 % while the Northern recorded the lowest of 0.7%. HIV prevalence was lower in rural areas (1.9%) than urban areas (2.5%) whereas the young population prevalence remains unchanged at 1.1%(Chizanga et al, 2016). HIV prevalence is low among more youthful age groups, as moderately few are infected amid their childhood (with the special cases of newborn children infected through their mothers). The infection peaks late as compared to other nations, at 35– 39 years for women and 40– 45 years for men. The infection levels are highest in middle income and middle educational group, with poor people and jobless less influenced. With 1.47% being Ghana's adult predominance rate it is the 34th nation with the highest rate out of 196 nations in the world.

Despite the fact that proof is as yet to be gathered , a few populaces thought to be at risk include sex workers, transport workers, detainees, sexual partners of individuals living with HIV/AIDS, and men who engage in sexual relations with men and their female sexual accomplices. HIV predominance among uniformed services are not completely settled.

Roughly 32000 children under age 15 are living with HIV/AIDS, . Just a couple of thousands of these children had gotten help, for example nutritional help, social welfare, security, educational or psychosocial support. There is broad learning of HIV and methods of transmission with awareness of AIDS assessed at more prominent than 95% in spite of the fact that fear and stigmatization of HIV-positive individuals stay high.

The masses are in danger of further HIV spread for an assortment of reasons, incorporating participating in value-based sex, marriage and sexual orientation relations that disadvantages women and make them defenseless against HIV, inaccurate perception of individual risk, stigma and segregation toward individuals living with HIV/AIDS (. USAID 2016)

1.3 Transmission and risk factors of HIV

The human immuno deficiency virus can be transmitted like other STI. Unfortunately, it is impossible for the human body to completely eradicate HIV even during treatment. The immune system of the body, especially CD4 cells (T cells), are responsible for the fight against infectious diseases when these cells are destroyed by HIV. As a result, the immune system is compromised, making people more susceptible to infections.

The final stage of HIV infection is called AIDS. There is no existing HIV cure, but with proper medical help, HIV can be controlled. Antiretroviral therapy (ART) are antiviral medicines. These drugs can significantly prolong the lives of people living with HIV if they are treated properly every day. Evidence is that before ART was introduced in the

mid-1990s, people living with HIV could progress from HIV to AIDS within a short period of time. So people who have been diagnosed with HIV and treated can survive, like those without HIV (Sarfo, Vanderpuye, Addison, & Nyasulu, 2017).

The spread of HIV is through the contact with certain body fluids of HIV infected persons. Such body fluids are breast milk, vaginal fluids, rectal fluids, blood, semen, pre-seminal fluids. The spread of HIV from person to person is called infection. Mother-to-child transmission is the spread of HIV by a woman living with HIV to her baby during pregnancy, childbirth or breastfeeding. Mothers-to-child infection has been identified as the most common way to infect children with HIV.

The risk of mother-to-child transmission of HIV is reduced by giving medicines to mother and child during pregnancy and after child birth respectively. HIV cannot be transmitted through objects such as toilet seats, dishes, door knobs, etc. used by HIV infected persons. HIV can also not be spread through mosquito, tick, or other insect bites. (Understanding HIV/AIDS, US Department of Health and Human Services).

Some of the behaviors and conditions that pose individuals at greater risk of contracting HIV are as follows: Unprotected anal or vaginal sexual intercourse, sharing of contaminated sharp objects such as needles, injecting equipment, syringes, shaving sticks, drug solutions when injecting drugs etc. Contaminated blood through blood transfusion, medical procedures that involves piercing and cutting, experiencing needle pricks accidentally among health workers.

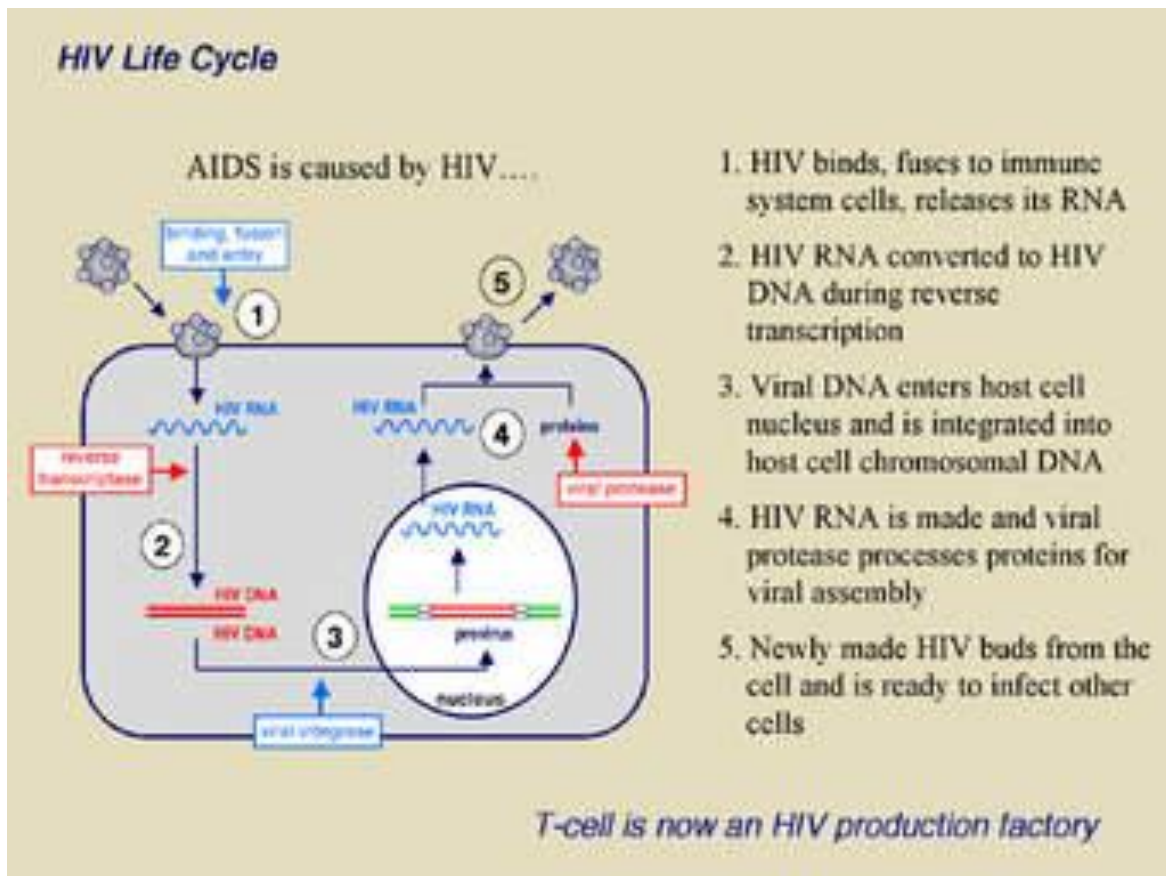


Figure 2: HIV Life Cycle

(Source: www.haroldsmithlab.com)

1.4 Signs, symptoms HIV and staging of HIV

Signs and symptoms of HIV depend on stage of infection. Evidence suggests that about 70-90% of people with the flu have symptoms of the flu within a few weeks of infection. Common symptoms include fever, sore throat, and skin rashes. The determinant of severity of HIV is dependent on the amount of virus in the body an increased in viral load increases the degree of immune-suppression and the increased in opportunistic infections hence increased in severity of infections.

The progression of HIV is marked by WHO in four stages. These are;

Clinical Stage I – Generally asymptomatic, with persistent lymphadenopathy.

Clinical Stage II – Generally presents with unexplained moderate weight loss recurrent respiratory tract infections and other febrile illnesses such as otitis media, pharyngitis, sinusitis and other infectious diseases such as Angular stomatitis herpes zoster (shingles) recurrent oral ulcerations papular pruritic eruption, fungal nail infections, seborrheic dermatitis.

Clinical Stage III –Stage three of HIV generally presents with unexplained chronic diarrhea unexplained severe weight loss, unexplained persistent fever ($>37.5^{\circ}\text{C}$ intermittent or constant for >1 month) persistent oral candidiasis (thrush) pulmonary TB, pneumonia, meningitis, pyomyositis, empyema, unexplained anaemia, chronic thrombocytopenia stomatitis, gingivitis etc.

Clinical Stage IV –The common signs and symptoms of clinical stage four of people living with HIV are: Extrapulmonary tuberculosis, pneumonia, oesophageal candidiasis, tracheal candidiasis, bronchial or lung candidiasis, Kaposi sarcoma, cytomegalo virus infections, central nervous system, toxoplasmosis, encephalopathy, extrapulmonary cryptosporidiosis, extrapulmonary histoplasmosis, progressive multifocal leukoencephalopathy, chronic cryptosporidiosis, invasive cervical carcinoma etc.

1.5 Diagnosis of HIV

HIV status is only known by testing. CDC recommends that, people aged 13-64 years should to be tested for HIV at least once as part of routine health care measures. There are three types of HIV testing. A combination test (antibody/antigen test), nucleic acid

(NATS) tests and antibody tests. Each test has a different window period as a result has different time for detecting HIV infections. The window is the time between when someone gets the HIV virus and when the test can actually detect the HIV infection correctly. HIV tests are typically performed on blood or oral fluid

1.6 Management

Suppression of HIV is achieved by combination therapy of ART consisting of three or more ARV drugs. The main function of ART is not to cure HIV but rather suppresses viral replication within a person's body. This strengthens the individuals' immune system to regain its ability to fight infections.

1.6.1 Non-pharmacological management

These include patient education, life style modification, family and public support, dietary rich in proteins and vitamins smoking cessation, alcohol, drinking, cessation, regular exercise etc.

1.6.2 Pharmacological management

The World Health Organization issued a second directive on the use of antiretroviral drugs for treatment and prevention of HIV infection in 2016. The rationale of these guidelines is to provide antiretroviral drugs to everyone who has HIV, including pregnant women and breastfeeding women irrespective of the number of CD4 cells in the body. This was approved by 122 countries in July 2017, which covers more than 90 percent of

all HIV-infected people worldwide. There are currently six major types of antiretroviral drugs. These drugs include;

Nucleoside/ Nucleotide reverse transcriptase inhibitors (NRTIs): emtricitabine, lamivudine, tenofovir, abacavir, stavudine, zidovudine, didanosine, zalcitabine.

Non-nucleoside reverse transcriptase inhibitors (NNRTIs): efavirenz, nevirapine, rilpivirine, etravirine, delavirdine.

Protease inhibitors (PIs): atazanavir, darunavir, indinavir, amprenavir, fosamprenavir, lopinavir, nelfinavir, tipranavir, ritonavir, saquinavir. Integrase.

Strand Transfer inhibitors (INSTIs): raltegravir, bictegravir, dolutegravir, elvitegravir,

Fusion inhibitors (FIs): enfuvirtide
Chemokine receptor antagonists (CCR5 antagonists): maraviroc.

1.7 Adverse effects of antiretroviral drugs.

Clients should be briefed on adverse effects drugs and appropriate measures to be taken.

Adverse effect of ART can be graded from low, self-limiting to life threatening distinguishing between complications of HIV disease and ART toxicity can be difficult sometimes presenting symptoms should be noted before jumping into conclusion of drug toxicity. Adverse effect may affect adherence to therapy. Common ARV toxicities include; Haematological toxicity: AZT is commonly known for drug-induced bone marrow suppression (anaemia neutropenia). Mitochondrial dysfunction: NRTI drugs are

known to cause lactic acidosis, hepatic toxicity, peripheral neuropathy, myopathy, lipoatrophy.

Renal toxicity: toxicity is known to be associated with renal tubular dysfunction. Nephrolithiasis is also known to be caused by TDF.

Other metabolic abnormalities: More common with PIs. Include hyperlipidaemia, fat accumulation, insulin resistance, diabetes and osteopenia. Lipodystrophy is also associated with Zidovudine. The risk of cardiovascular events with Abacavir (ABC) is still debatable. Allergic reactions: Skin rashes and hypersensitivity reactions, more common with the NNRTI drugs but also seen with certain NRTI drugs, such as ABC and some PIs.

Hepatic toxicity: Liver enzyme elevation with DTG especially in patients with HBV or HCV co-infection. DRV/r also causes liver enzymes elevation.

Muscular toxicity: Muscle weakness and sometimes rhabdomyolysis seen with RAL.

1.8 Problem Statement

According to recent studies, ART regimen requires 70-90% of adherence in order to be effective. The effectiveness of ART strictly depends on the adherence in order to avoid inadequate viral suppression, immunological failure, rapid disease progression and drug resistance. In view of this, World Health Organisation (WHO) recommends at least 95%

adherence level. However many of the reported adherence levels are below the optimum level of 95%.

Many factors could be attributed to the non-adherence of ART, these factors may include pill burden, drug reaction, cost of drugs, food requirement, drug regimen, illness presentation, duration of treatment, proximity to health facility, clinician patient relationship, dissatisfaction with post clinic exposure, family support, peer support cultural beliefs ,occupation, religion, educational level and so on.(Negesa, 2017)

The number of individuals on ART has increased, however HIV still remains a major public health issue due to challenges of ART adherence. (Bolarinwa, 2018.) Also, there is a projection that HIV population will increase, but at a rather slow rate (Ghana AIDS Commission, 2014).

It has been shown that antiretroviral therapy prolongs the life of people living with HIV infection (Eyawo et al., 2017). In recent times, the viral load-driven treatment of the virus has been used as a significant predictor of disease inflammation. Overall, these developments have led to significant changes in the management of the disease and have led to a sharp increase in the use of combined therapies three or more times of antiretroviral therapy among those infected with HIV.

Today, more than 20 drugs are approved for HIV treatment. Most people who treat HIV will take two or more pills a day for the rest of their lives. You have to take antiretroviral drugs at the right time and in the right way for them to work. Implementing one's HIV

treatment plan is not always easy. These medicines can cause side effects that can make some people stop using them. If you skip doses, the virus can start copying itself in your body again. This can cause HIV to become resistant to the drugs the patient is taking. If this happens, you will have little chance of treating the HIV. HIV drugs have seen an improvement in recent times, and serious side effects are less likely to occur than they used to be.

However, HIV drugs can still cause adverse reactions. Some of the side effects are considered mild while others are more serious or even life-threatening. The side effects may be worse the longer you take the medication. Other medications you use is also likely to interact with the HIV drugs. Other conditions you have, may also make the effects of HIV medicines worse. For these reasons, when you start taking medication, you should tell your pharmacist about other drugs, supplements, as well as herbs that you are currently using.

If there is any new or unusual side effect, a doctor should be called. It should be done even if patient has been on the medication for a long time. It can take months or years for a patient to start reacting to a drug.

In the case of an adverse reaction, the doctor has to ensure that it is the patient's medication and not any other factor that is responsible for the patient's symptoms. If the virus is to blame, doctors can switch patients to other anti-HIV drugs. It's not as easy as it sounds. Doctors must make sure the new treatment will continue to work and not cause

further adverse effects (Chizanga et al, 2016). Therefore, strict adherence to therapeutic guidelines is crucial in suppressing the virus but maintaining a high level of adherence to the drug regimen is identified as a challenge in some situations()(Chizanga et al, 2016).

There is an increase in patients receiving ART generally in Accra metropolis but as to whether patients are adhering to ART and the factors affecting adherence are not known. Therefore there is the need to investigate the adherence level and the factors affecting adherence to ART

1.9 Justification

The study undertaken is very important because HIV/AIDS is still a global health issue and without strict adherence to ART, limitation of transmission and complications of the virus cannot be achieved.

To ascertain the factors affecting adherence to anti-retroviral therapy, patients factors, community factors, health facility factors and drug factors, affecting adherence to ART medication have to be examined. In both clinical trials and non-clinical practice. Maintaining high adherence levels would lead to low viraemia, which will lead to reduction in mortality and morbidity rates, thus contributing to a reduction in the number of orphaned children to HIV/AIDS.

In addition, on the off chance that high level of adherence to the medication routine is kept up, patients will proceed on first line treatment which is a lot less expensive and the

weight of changing over patients to second line treatment because of medication resistance will be diminished.

Also once patients are stable and in good health, it will help to strengthen the nation's human resource to enhance productivity and national development. It will also help the economy by reducing the burden of raising huge sums of money in importing alternative ART's to reduce resistance. When patients are able to adhere with ART drugs, there would be reduction in viral load which would lead to reduction in HIV transmission and hence low incident rate of HIV/AIDS.

However little research has been done on factors affecting adherence to ART to explore their respective remedies.

1.10 Conceptual framework

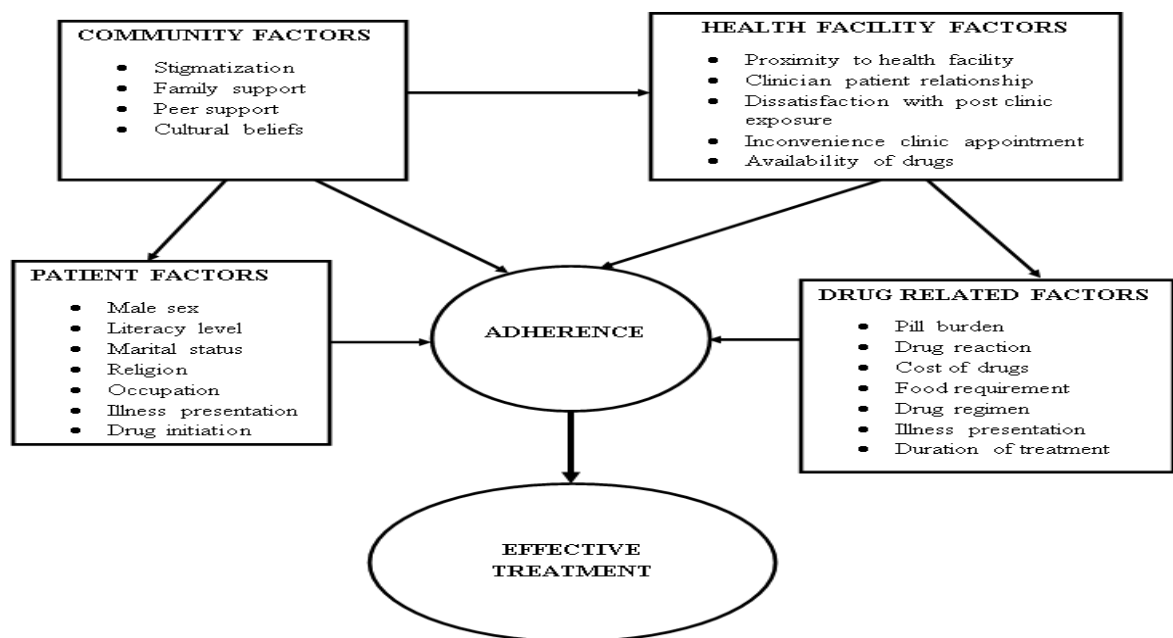


Figure 3 : Conceptual framework

1.11 Objectives

1.11.1 General objective

To ascertain factors that affect adherence to antiretroviral medication of HIV/AIDS patients at selected polyclinics in Accra Metropolis.

1.11.2 Specific objectives

The specific objectives are;

- To identify patients factors that affect adherence to antiretroviral medication
- To identify health facilities factors that affect adherence to antiretroviral medication.
- To identify community factors that affect adherence to antiretroviral medication.
- To estimate outcome of adherence to ART

CHAPTER TWO

LITERATURE REVIEW

2.1 Adherence to medication

Adherence to medication is very imperative so far as patients care is concern. Increasing in effectiveness of adherence interventions to medication would have a major impact on effectiveness of treatment, by opposition poor adherence would lead to poor clinical outcomes, increased in morbidity and mortality. Measuring adherence is, however significant to both researchers and clinicians. Inaccurate measurement of medication adherence can lead to several problems which are potentially costly and perilous in both settings.

Nevertheless, measurement of medication adherence can be quite challenging since the parameters of acceptable adherence is dependent on individual situations. There are several tools available for these measurements, but these need to prove to be valid, reliable, and sensitive. Currently none of the available methods can be considered as a gold standard and the combination of methods is recommended(Lam & Fresco, 2015)The measurement can be classified as objective or subjective however both have advantages and disadvantages and should be used in combination. Some also categorise it as direct and indirect. Direct measures include measurement of the drug or its metabolite concentration in body fluids, such as blood or urine and evaluation of the presence of a biological marker given with the drug and direct observation of patient's medication-taking behavior.

Examples of tools for measuring medication adherence are; two days recall diary, visual analogue approach, pill count, electronic medication packaging device, morisky

2.2 Factors that impact Adherence to ART

Many factors that affect adherence to ART medication have been identified in the literature under these broad categories; patient related, health service related, community related and drug related. When we are able to identify factors contributing to adherence we can ensure appropriate strategies to improve adherence even prior to ART treatment initiation. The Antiretroviral Guide for Adults and Adolescents recommends strategies to help patients follow an anti-retroviral drug regimen. Some of these strategies include an easy-to-manage system for dealing with the psychological needs of patients, a training need, and a multidisciplinary healthcare team before treatment begins.

Adherence in Ghana has been influenced by some factors such as reducing waiting time, training more health personnel on ART, task shifting policy implementation, provision of ART related costs. Factors that lead to Adherence to ART are complex; therefore require actions that can help to ensure that. The factors can be categorized in four groups thus individual or patient related factors, drug related factors, socio-cultural related factors and service delivery factors.

2.2.1 Patient-related factors

Before a patient is put on ART medication, certain requirements have to be reviewed to ensure patient readiness to take the medication. According to the HSS Panel on ART

guidelines and (2013), this will make them recognize and deal with limitations to drug adherence. Indicators to ease adherence to ART among patients include making treatment plan personal, forgetfulness, improved knowledge of adherence, counseling sessions, housing, age, missing appointments, competing priorities, educational level, substance abuse, food, depression, marital status, religion, general health status improvement etc.

According to the HSS working group on Adult Drug and Adolescent Procedures (2013), the patient's involvement in the cure plan ensures better adherence to the drug regimen. Regular monitoring of adherence at each clinic helps to highlight factors associated with the failure of patient performance in the schedule. A survey conducted in Uganda, which identified the level of adherence, shows that the patients missed appointments because of their travels, and others are caused by forgetfulness, labour disputes and bad health (Shumba, Atuhaire, Imakit, Atukunda, & Memiah, 2013).

Transportation cost was also identified as a major limitation to some patients due to the fact that they were not able to afford transport fares. As a consequence, they were unable to reach ART clinics for their pharmacy refill and is probable for them to miss ART doses if they have insufficient supply for their daily use (Shumba et al., 2013).

A study has shown that this conflict impedes adherence to ART adherence because the patients are not able to access the health center, leading to appointment rescheduling and other people lost follow up visits with their care providers (Mendelsohn, Schilperoid,

Spiegel & Ross, 2012). Nyambura (2009) indicated that adherence to HIV treatment had a direct relationship with age and the strength of this relationship decreased after age 60. Young people affected by stigma and denial in adherence while older people are affected by old-age dementia, affecting their understanding of the issue of adherence to ART regimen (Nyambura, 2009).

Forgetfulness has also been cited in some studies as a dominant factor influencing non-adherence to ART. Mobile phone text messaging, cell phone calls from care providers, and alarm clocks were mostly used as tools to serve as reminders to enhance ART adherence among patients (Marukutira, 2012). Despite these considerations, conflicting tasks such as housing, household activities, housing, and work. Some patients were unable to honour their reminders while others ended up to set alternative reminders (Huang, Sangthong, Meilvel, Chongruvivatwong, Zheing & Yang, 2012) (ی آذر & ی دے لی ام, 2014)

According to Huang et al (2012), some HIV clients who disregarded handset message prompts from their healthcare providers desired to rather converse with them personally and gain detailed facts with regards to treatment. A study conducted in Vietnam revealed that there is a marginal significance between lower educational level and non-adherence (Do, 2011), nevertheless, references were made not to disregard these persons, and however strategies were instituted to contain not many persons with difficulty in reading and understanding medical instructions.

Food is another contributing factor to drug adherence. Good nutrition is a necessity for strong immune system among patients on ART hence the need to ensure adequate provision of food to patients on ART in order to promote adherence among patients (NAC, 2011). According to the World Health Organisation, lack of access to food especially in impoverished economies led to low ART adherence most especially during the preliminary periods of ART when the body requires extra nutrition (WHO, 20016).

The inability to secure access to food strained a few patients to resort to taking their treatments once daily, mostly at night as a replacement for the recommended twice daily dosage (WHO, 20016). NAC (2011) also revealed that high mortality rate which was observed during the 90 days of the ART regimen were associated with lack of good nutrition and access to adequate and sustained supply of food. Difficulty in incorporating HAART to individual's way of life and psycho-emotional problems such as unhappiness, desperateness, alcohol abuse, were contributing factors that influenced patient's adherence to ART medication (Chizanga et al, 2016)(ی آذر & ید دے لی ام, 2014)

("GUIDELINES FOR ANTIRETROVIRAL," 2010) highlighted that though directly observed therapy (DOT) was noted to be a very effective approach to ART drug addicts, the stratagem was seen to be untenable in the long run. Counseling of patients about their condition as well as treatment is vital. This allows patients to make up to date decisions about their treatment(Batki, 2008)

Many at times challenges faced by persons living with HIV in acquiring adequate resources necessary facilitate them to adhere with the requisite treatment prescriptions can lead to non-adherence (Nunes et al., 2009). In this view taking the burden of ART treatment related cost from patients is a crucial factor that leads to adherence. Despite the fact that antiretroviral drugs are provided at no cost to the patient at government hospitals and facilities due to sponsorship from the United States Emergency Plan for AIDS Relief and the Global Fund to Fight AIDS, TB and Malaria (Nagaddya Lubega, Musinguzi, Omiel, & Tumuhe, 2015)

Evidence suggested that some patients were still not able to pay for other secondary costs such as clinic cost, transportation costs (Maokisa, 2011). Some of the hidden costs were clinic registration fees at privately owned health facilities and extended waiting hours. These were some considerations that required to be tackled in order to encourage adherence to ART.

Religion can influence adherence to ART either positively and negatively. Many at times due to individuals believe and faith, it takes some time for them to come to realization that the best resort is the ART, as such during counseling meetings religious values and practices that may hold back adherence to ART should be tackled (Maokisa, 2011). Mbirimtengerenji et al. (2013) in their study indicated among other findings that Christians adhere superior to ART than any other religions. In that study, findings suggested that some believers discontinued ARVs treatment because they believed that God has the supernatural power and would be able to heal them from HIV and AIDS.

This belief impeded their commitment to adhere with the ART regimen. Moreover, self-employed patients or those who operate their own company adhere with ART better than workers employed formally for the reason that they were self-represented on the time they go for refill though the individuals who are utilized in 'blue-busted' occupations some of the time missed arrangements when they were denied of the break by their bosses to go for their month to month refills.

Workmanship adherence requires the patient to follow with the medication routine, however might be impossible at times (Do, 2011) because of elements, for example, extraordinary occasions, being excessively caught up with, modifying every day plan, travel, sleeping late and among others are factors that denied PLHIV from taking their ART. Patients on ART who noted enhancement of their general wellbeing position were spurred to keep every one of the arrangements and not to let pass a portion as should have been obvious that ART made an enhancement in their personal satisfaction (Mbirimtengerenji et al., 2013;Maokisa, 2011).

2.2.2 Health facility factors

Superior service provision rendered by a health team with diverse backgrounds and experiences adherence to ART as the administrations were conveyed in the system of a boundless consideration that tended to medicinal, social and passionate needs of PLHIV (Kharsany & Karim, 2016).Service conveyance factors that bolstered ART adherence distinguished by (campbell et al, 2015) were open ART facilities, accessibility of

satisfactory human asset, client charge evacuation, great attendant and patient relationship keeping up a standard wellbeing specialist organization enhances adherence.

Adequate human asset guarantees that quality administrations are conveyed, execution of procedures that enhance benefit conveyance and making accessible administrations to poor people and defenseless networks were a portion of the components that enhanced adherence to ART (WHO, UNICEF, UNAIDS, 2011). A model steered in Tete area at Mozambique as an out of facility show enhanced adherence circulated the ARVs to their colleagues, checked adherence levels among themselves and offered each other help for adherence. (Decroo et al 2011) This model likewise realized decongestion in the centers, expanded adherence, and lessened transport costs and diminished lost to catch up as there close observing of adherence among the patients themselves (Decroo et al., 2011).

ART services that are too far from beneficiaries makes it difficult for patients to meet their regular or month to month schedules nevertheless bringing ART facilities to open spots decreases transport costs guarantees strict checking and advance adherence (WHO, UNICEF, UNAIDS, 2011). An examination which was directed in Vietnam found that patients who had simple access to ART centers, were extra consistent contrasted with those living in excess of 10 km from the facility (Do, 2011).

Individuals who remained a separation far needed to obtain cash for their transportation, and the individuals who even had cash neglected to take transport from their rural homes to the health facility subsequently compelling them to miss arrangements (Campbell et al., 2011).

The development and implementation of a task shifting model of care in Thyolo which involves assigning of task to less specialized health workers confirmed to be efficient in ART clinics decongestion and also making ART clinic to be reachable to the the people (Bemelmans et al 2010).

Warm relationship between health care providers and patients ease good adherence. A cordial relationship between patients and health care provider encouraged patients to be involved in their treatment and focusing mainly on exploring patients views on treatment plan, therefore promoted adherence (Chizanga et al, 2016).It was also revealed that patients manage well with their conditions and stick more to ART on condition that there is a current well-disposed and believing connection among patients and human services suppliers (Campbell et al., 2011). The investigation additionally uncovered that shaking hands with patients by medical caretakers which is socially acknowledged as a type of welcome, giving a listening ear to patients' issues and handling patients' religious convictions are a portion of the elements that encouraged adherence to ART.

The examination additionally found that patients were glad when staff demonstrated enthusiasm for their lives and prosperity by associating with them amid each facility visit (Campbell et al., 2011). Since HIV has now being considered as an chronic condition, a few patients are comfortable with maintaining regular health care provider since it helped in providing good interpersonal relationships with them (Marukutira, 2012).However some misunderstanding arose when out of ignorance patients identified bad nurses as those who prescribed drugs for only a month or less and good nurses as those who

prescribed drugs for a number of months which led to misunderstanding (Campbell et al., 2011).

Patients will barely miss engagements if they are taken care of within a short time. (Maokisa 2011). Campbell (2011) in his study noted that patients who waited for longer hours before they were seen were depressed from visiting the clinic for their next review and drug refill. Campbell further indicated that waiting for long hours in a queue was found to be stressful to patients and sometimes this situation can escalate due to poor interpersonal communication between patients and health care providers (Campbell et al 2011).

2.2.3 Factors related to drugs

Drug related diseases that support adherence includes the prescribed of drugs that are simple enough to take with nominal side effects, medications with limited or no food precincts and does not run out of stock. Some of the factors that influence adherence were number of pills, size of pills, side effects, nourishment confinements and additionally dosing occasions had negative impact on adherence (Marukutira, 2012). Antiretroviral treatment users are supposed to have regular doses intervals for life that makes it very difficult.

The HSS panel on antiretroviral guidelines (2013) noted that patients are more likely to adhere better to the ART regimen which would have low occurrence or less side-effects on their system, medications that are easy to take, have a low pill weight and low

recurrence dosing. A standout amongst the most widely recognized elements that added to non-adherence was side effects of antiretroviral medication (Do, 2011). Some patients completely stopped treatment and some skipped their doses despite the fact that they were privy to relevant information about medication discomfort (Maokisa, 2011).

World Health Organization (2009) reported some of the side effects of antiretroviral medications which included retching, pedal oedema, palpitations, nausea, anaemia, headache, skin rashes and dizziness. It was likewise uncovered that extra prescriptions taken for overseeing opportunistic conditions, for example, TB drugs, cotrimoxazole, medications for cough diarrheal medications and different medications further added to the pill burden (Nyambura 2009). A study conducted in rural Zambia revealed that non-adherence had a strong relationship with stock-outs of ARVs and as an outcome, a portion of the patients were made to impart their ARVs to a relative or a companion who was likewise experiencing HIV until the point when the other individual anchored his/her supply (Nozaki et al., 2011). This made another issue on the grounds that the medication might be inadequate to provide food for the need of even of the patients and subsequently influenced the adherence level (Nozaki et al, 2011)

As an approach to avert medicate stock outs, WHO prescribed a lot of lucid observing and assessment pointers to be checked for obtainment and supply of antiretroviral drugs ((WHO, UNICEF and UNAIDS, 2011). Zimbabwe was among alternate nations that directed a pilot test on medication the board and acquisition the outcome uncovered that acquirement and the executives markers very much observed can build the execution of

national acquisition and supply the board in this way advancing adherence (WHO, UNICEF and UNAIDS, 2011).

2.2.4 Community factors

ART adherence is much influenced by community and family support. Disclosing of one's HIV positive status and social issues assume a huge job in ART adherence. Network bolster has been affirmed to improve adherence to ART and has additionally helped in maintenance as uncovered in a study led in Tete Mozambique that associated with network ART groups (WHO, UNICEF & UNAIDS, 2011). Peer groups support were also found to be very significant in helping PLHIV to adhere with ART (Do, 2011). A study conducted in Botswana revealed that family members played a significant role which led to good adherence to ART among adolescence (Marukutira, 2012). Community involvement in HIV and AIDS care encouraged a limited stigma and also encouraged disclosure to family members. (charurat et al, 2018)

2.3 Summary

The discussion of literature review on factors affecting adherence to ART among people living with HIV which is categorized under community factors, drug related factors, patient related factors and health facility related factors.

CHAPTER THREE

METHODS

3.1 Study design

This is a quantitative cross sectional study. The design was appropriate to investigate the research questions in the study population. Data related to adherence level and factors affecting adherence were conducted quantitatively using a structured questionnaire from study participants within a specific period.

3.2 Study location

The study was undertaken in selected polyclinics in the Accra metropolis, specifically in the Greater Accra region. Accra is the capital city of Ghana with an estimated urban population over 2.27 million. The greater Accra Metropolitan Area has an estimated 4 million population making it the largest metro area in Africa. Accra is geographically located at a coastal area which makes it exposed to the impact of climate change and sea level rise. Population growth also put pressure on the coastal areas. Accra is Greater Accra Region's economic and administrative hub. The study was conducted at two major Poly clinics in Accra. Mamprobi Polyclinic and Usher Poly clinic. Mamprobi polyclinic is situated at the Ablekuma south constituency of Accra metropolis which serves the people around Korlegono, chorkor, Mamprobi, Banana Inn and its environs. There are about 650 HIV positive patients currently receiving treatment. Usher poly clinic is situated at central part of Accra its HIV department serve people from Bukom , James town Makola, Arena and its environs. There are about 700 HIV positive patients currently receiving treatment at Usher poly clinic

3.3 Research Method

3.3.1 Study population

The study population included adult who are living with HIV receiving antiretroviral therapy in Mamprobi Polyclinic and Usher Polyclinic. This population also fit in the suitability criteria for the study. The suitability criteria also includes those who are 18 years and above, those who have given their consent to participate, those who have received the therapy for at least six months with the exception of those who participated in the pilot study. The accessible population was adults who met the eligibility criteria and attended follow up visit in the ART clinic of Mamprobi Poly clinic and Usher poly clinic during the period of data collection.

Inclusion criteria

The inclusion criteria depended on enlisting individuals living with HIV, on ART who are 18 years or more going to ART center with qualities underneath:

- Diagnosed and affirmed HIV positive

- Currently on antiretroviral treatment

- Has been on ART for a half year

- Capable to give informed consent

Patients who were qualified with informed consent were selected and their obscurities were kept up.

Exclusion criteria

Patients with these attributes did not meet the qualification criteria:

- HIV and AIDS patients presently not on ART
- Patients underneath 18 years
- Patients who did not give their consent

3.3.2 Sample, Sampling, and sampling procedure

3.3.2.1 Sample size determination

The formula, $N = p(1-p)z^2/d^2$ was utilized to decide the sample by using an accuracy of 5% and 95% confidence interval Where p = the evaluated extent of patients adherence to ART used from a comparative report in Ethiopia (0.77), z = the cut off estimation of the Normal distribution,(1.96) and d = the precision required on either side of the proportion(0.05). Hence add up to total sample size was 272.13. Taking into thought a few barriers like non readiness, lost to follow up, demise and transfer, 10% of the sample size was added to the aggregate sample size making it 299.2 and approximated to 300.

3.3.2.2 Sampling procedure

List of health facilities which provided ART services were searched from the national AIDS commission website and two of them were selected randomly in Accra out of convenience. Simple random sampling method was used to select participants in each of the health facility. A sampling frame which consisted of the details of all patients receiving ART was created for every facility from the record of adult patients receiving

ART, considering the fulfillment of eligibility criteria. The participants were given unique ART identification numbers generated from their medical record numbers.

Participants were randomly selected from the prepared record of a sampling frame. A total number of sample sizes were identified for each of the facilities based on the figure of ART clients receiving treatment in the facilities. The number of clients receiving treatment at both poly clinics were virtually the same leading to a proportionate number allocated for the two polyclinics as 150(50%) and 150(50%) from a total of 300 sample size.

3.4 Data collection tools and Procedures

A procedure was pursued during the data collection process. An ethical clearance was obtained from Ghana health service. Ghana health service submitted a support letter to the management of the Polyclinics and permission was granted to collect data from the ART clinics. The staff in charge of the ART department was approached and informed about the study. Two data collectors were trained on the objective of the study taking into consideration the ethical principles of the study such as obtaining informed consent, collecting data from the participants based on their willingness and keeping the finished questionnaires confidential.

Data collectors were also asked to sign confidentiality pledge form. (See annexure B). A private room was provided for the data collector to ensure privacy during the data collection. Study participants who were willing to participate were referred to the data collectors who explained the motivation of the study and read the written consent form to

the respondents, and then a written informed consent form was attained from interested participants.

However a consent form was completed by those who could read and write by themselves. The data collectors then interviewed respondents within the stipulated time. The standard time targeted for each participant interview was 25 minutes. In order not to create a room for biases, the data collectors were asked not to wear their gowns enabling the participants to provide authentic responses. The process was closely supervised and necessary supports were provided. The completed questionnaires were finally reviewed.

3.4.1 Variables of the study

The outcome variable in this study is the adherence to antiretroviral therapy. The outcome variable was determined by knowing the viral suppression using the viral load and the pharmacy refill records. The independent variables were community factors, patient factors, health facility factors, drug factors and other demographic factors such as age, occupation sex, etc.

Measuring Adherence

Pill count

The pill count was used to measure the adherence level by measuring the pills left over since the previous review date. The clinics appointment date were 28 days but 30 day supply of pills were provided for each month per their records. Since individual patient take one pill per day there would be left with an excess pills of 2. The remainder pills

confirm the adherence level of the patient. An exact number confirmed with undetected viraemia was considered an optimal adherence per the records.

Viral load

Patients with undetected viraemia were considered as those with optimal adherence level per the records

3.4.2 Data analysis

The data was cleaned, coded and entered into a computer. STATA was used to analyze the data. The association between factors affecting adherence and the level of adherence was analyzed using multiple logistic regression model and odds ratio (OR) with 95% confidence intervals (CI). The socio-demographic characteristics of the participants were summarized using percentages, means, and standard deviations for normally distributed data and median for skewed data.

Basic characteristics of the participants were analysed by descriptive statistics using univariate analysis and reporting percentages, means, medians and standard deviations. Bivariate analysis using odds ratio, chi-square test, Fisher exact test with 95% confidence interval examined the relationship between levels of adherence and the independent variables of categorical data. A P-value of less than 0.05 was considered for an association between dependent and independent variables to be statistically significant. In addition, multiple logistic regression analysis was carried out to identify factors that are independently associated with adherence to antiretroviral therapy.

3.5 Ethical Consideration

The basic standards of ethical research which incorporate regard for human respect, and beneficence were not overlooked in the study. The expectations and the right to quit during the study were discussed with the participants by the data collectors. The progress of the data collection was determined by the study participants. Study participants were guaranteed that their refusal to take an interest in the investigation would have no consequences. The written informed consent form detailed the requirements and how study participants could respond. The consent form was explained in Twi and Ga to make those participants who could not read and write understand the purpose. Participants were given the opportunity to ask questions at any time. The questionnaires were anonymous which did not bear any individual recognizable information. The interview did not last more than 30 minutes per participants. Psychological encouragement was given to patients who were affected with different psychological troubles. Data collectors were trained and made to pledge for confidentiality of the participants data. No one was permitted to access the data and all completed questionnaires were gathered in time and kept locked.

CHAPTER FOUR

RESULTS

4.1 Socio-demographic Characteristics of Respondents

Majority (38.95%) of the respondents were between 25 – 34 years of age while those above 54 years represented the least age group (Table 4.1). Females (70.88%) dominated the sample while males represented 29.12% of the sample. Among the respondents, married couples represented 45.26%, slightly higher than those who were never married (39.90%). Most participants of the study had some form of education, with majority (42.81%) indicating that they had a primary level of education. Respondents who were employed represented 80.70% of the sample while the least category (2.46%) of respondents were students. Christianity (86.67%), Islam (9.82%) and Traditional (3.51%) religions were the various religious affiliations of respondents. Akans (43.86%) represented the main ethnic group of respondents while Hausa (11.93%) was the least ethnic group of respondents. Averagely, majority (66.67%) of respondents earned between GHC 500 – 1500 on a monthly basis while few (7.37%) respondents earned above GHC 1500.

Table 4.1: Socio-demographic characteristics of Respondents

Demographic factors	Frequency (285)	Percentage (%)
Age (years)		
< 25	33	11.58
25 – 34	111	38.95
35 – 44	97	34.04
45 – 54	31	10.88
> 54	13	4.56
Gender		
Male	83	29.12
Female	202	70.88
Marital status		
Never married	112	39.30
Married	129	45.26
Divorced	17	5.96
Widowed	13	4.56
Separated	14	4.91
Literacy status		
No formal education	55	19.30
Primary	122	42.81
Secondary	101	35.44
Tertiary	7	2.46
Occupation		
Unemployed	48	16.84
Employed	230	80.70
Student	7	2.46
Religion		
Christianity	247	86.67
Traditional	10	3.51
Islamic	28	9.82
Ethnicity		
Akan	125	43.86
Ga	79	27.72
Ewe	47	16.49
Hausa	34	11.93
Income in cedi		
< 500	74	25.96
500 – 1500	190	66.67
> 1500	21	7.37

4.2 Clinical Condition of Respondents

The study found that majority (46.32%) of respondents have been living with HIV/AIDS for two years or more while 50 (17.54%) respondents had been living with the condition between 3 – 6 months (Table 4.2). Whereas the clinical stage of most (41.75%) of the respondents' condition was unknown, a slightly lower proportion (40.70%) were at clinical stage 1 of the condition. The viral load of majority (57.89%) of the respondents was detected while the viral load of 17.54% of the respondents had been undetected. It is also interesting to observe that the viral load of 252 (88.42%) cases was undetected after 6 months while the viral load of a comparatively lower proportion (2.80%) of respondents was detected after 6 months. Majority (78.60%) of respondents indicated that they had felt sick in the past month prior to the data collection, whereas 61 (21.40%) of respondents noted that they were not sick in the past month. The seriousness of the condition of most respondents were either mild (39.34%) or moderate (49.18%).

Table 4.2: Clinical condition of study participants

Variable	N	Percentage(%)
Duration of condition		
6-12 months	50	17.54
1-2 years	25	8.77
2-3 years	78	27.37
>3 years	132	46.32
Clinical stage*		
1	116	40.70
2	40	14.04
3	10	3.51
Unknown	119	41.75
Viral load		
Undetected	50	17.54
Detected	165	57.89
Unknown	70	24.56
Viral load after 6 months		
Undetected	255	89.47
Detected	8	2.80
Unknown	22	7.71
Sick in past month		
No	224	78.60
Yes	61	21.40
Seriousness of illness		
Mild	24	39.34
Moderate	30	49.18
Severe	7	11.48

*1=asymptomatic stage 2=symptomatic stage 3= chronic stage (of HIV)

4.3 Drug Related Factors Influencing Adherence to HIV medication

Among the variables considered, availability of food was found to be the only significant factor ($\chi^2 = 10.15$, p – value = 0.03)(Table4.3). Other variables in the model including (Table 4.3) were not significant since their respective p – values were greater than 0.05.

Table 4.3: Drug related factors influencing adherence to HIV medication

Variable	N (%)	Non-adherence	Adherence	χ^2	p-value
Away from home				3.41	0.097
No	274 (96.14)	27 (9.85)	247 (90.15)		
Yes	11 (3.86)	3 (27.27)	8 (72.73)		
Busy with other things				1.35	0.287
No	274 (96.14)	30 (10.95)	244 (89.05)		
Yes	11 (3.86)	0 (0.00)	11 (100.00)		
Simply forgot				0.03	0.594
No	277 (97.19)	29 (10.47)	248 (89.53)		
Yes	8 (2.81)	1 (12.50)	7 (87.50)		
Side effects of drugs				6.71	0.056
No	281 (98.60)	28 (9.96)	253 (90.04)		
Yes	4 (1.40)	2 (50.00)	2 (50.00)		
Avoid notice of taking drugs				0.90	0.361
No	281 (98.60)	29 (10.32)	252 (89.68)		
Yes	4 (1.40)	1 (25.00)	3 (75.00)		
Change in daily routine				0.90	0.361
No	281 (98.60)	29 (10.32)	252 (89.68)		
Yes	4 (1.40)	1 (25.00)	3 (75.00)		
Drugs are harmful				3.33	0.200
No	283 (99.30)	29 (10.25)	254 (89.75)		
Yes	2 (0.70)	1 (50.00)	1 (50.00)		
Felt ill				0.90	0.361
No	281 (98.60)	29 (10.32)	252 (89.68)		
Yes	4 (1.40)	1 (25.00)	3 (75.00)		
Felt depressed				0.49	0.429
No	280 (98.25)	29 (10.36)	251 (89.64)		
Yes	5 (1.75)	1 (20.00)	4 (80.00)		
Lack of transportation				0.03	0.675
No	274 (96.14)	29 (10.58)	245 (89.45)		
Yes	11 (3.86)	1 (9.09)	10 (90.91)		
Food not available				10.15	0.030*
No	282 (98.95)	28 (9.93)	254 (90.07)		
Yes	3 (1.05)	2 (66.67)	1 (33.33)		
Past alcohol intake				0.78	0.378
No	235 (82.46)	23 (9.79)	212 (90.21)		
Yes	50 (17.54)	7 (14.00)	43 (86.00)		
Current alcohol drinker				0.44	0.666
No	34 (68.00)	4 (11.76)	30 (88.24)		
Yes	16 (32.00)	3 (18.75)	13 (81.25)		
Past cigarette smoker				0.06	1.000
No	273 (95.79)	29 (10.62)	244 (89.38)		
Yes	12 (4.21)	1 (8.33)	11 (91.67)		

*Significant at 0.05 significance level

4.4 Patient related Factors influencing Adherence to HIV medication

The study explored the patients' knowledge-related factors influencing adherence to HIV medication. The findings indicated a significant association ($\chi^2= 9.59$, $p - \text{value} = 0.002$) between respondents knowledge regarding the omission of drug intake from their routine (Table 4.4) and adherence. Respondents indicated that missing drugs is ok as long as they remain healthy. Moreover, a significant association ($\chi^2= 6.71$, $p - \text{value} = 0.01$) was also established between adherence to HIV medication and knowledge about how the medication would interact with substances. Thus respondents' knowledge about the interaction effect of the HIV medication plays a significant role in patient adherence to HIV medication.

Table 4.4: Patient related factors influencing adherence to HIV medication

Variable	N (%)	Non-Adherence	Adherence	χ^2	p-value
What to do after missing medication				0.24	0.800
No	2 (0.70)	0 (0.00)	2 (100.00)		
Yes	283 (99.30)	30 (10.60)	253 (89.40)		
Skipping medication affects health				0.79	0.494
No	66 (23.16)	5 (7.58)	61 (92.42)		
Yes	219 (76.84)	25 (11.42)	194 (88.58)		
Side effects of medication				0.25	0.490
No	6 (2.11)	1 (16.67)	5 (83.33)		
Yes	279 (97.89)	29 (10.39)	250 (89.61)		
Missing drugs is ok if healthy				9.59	0.002*
No	123 (43.16)	5 (4.07)	118 (95.93)		
Yes	162 (56.84)	25 (15.43)	137 (84.57)		
How medication work in body				3.39	0.123
No	6 (2.11)	2 (33.33)	4 (66.67)		
Yes	279 (97.89)	28 (10.04)	251 (89.96)		
Not well taken drugs may not work				0.01	1.000
No	40 (14.04)	4 (10.00)	36 (90.00)		
Yes	245 (85.96)	26 (10.61)	219 (89.39)		
Medication eradicate HIV				0.32	0.571
No	247 (86.67)	25 (10.12)	222 (89.88)		
Yes	38 (13.33)	5 (13.16)	33 (86.84)		
Drugs well taken one will live long				0.90	0.361
No	4 (1.40)	1 (25.00)	3 (75.00)		
Yes	281 (98.60)	29 (10.32)	252 (89.68)		
Medication interact with substances				6.71	0.010*
No	4 (1.40)	2 (50.00)	2 (50.00)		
Yes	281 (98.60)	28 (9.96)	253 (90.04)		

*Significant at 0.05 significance level

4.5 Community-related Factors influencing Adherence to HIV medication

Among the community-related factors influencing adherence to HIV medication, satisfaction with support from family, friends and the community at large was identified as one of the significant factors ($\chi^2= 11.64$, p – value = 0.009) influencing adherence to HIV medication among respondents (Table 4.5). According to respondents, any method that can be used to remind them about their medication would significantly enhance their adherence to HIV medication. This factor was found to be significant with a chi-square (χ^2) value of 9.42 and a p – value of 0.001.

Table 4.5: Community related factors influencing adherence to HIV medication

Variable	N (%)	Non-Adherence	Adherence	χ^2	p-value
Disclosed status to family or friends				1.12	0.291
No	145 (50.88)	18 (12.41)	127 (87.59)		
Yes	140 (49.12)	12 (8.57)	128 (91.43)		
Satisfied with support				11.64	0.009*
Never	70 (24.56)	14 (20.00)	56 (80.00)		
Sometimes	33 (11.58)	5 (15.15)	28 (84.85)		
Most of the time	69 (24.21)	3 (4.35)	66 (95.65)		
Always	113 (39.65)	8 (7.08)	105 (92.92)		
Reminder from family to take drug				8.37	0.051
Never	72 (25.26)	14 (19.44)	58 (80.56)		
Sometimes	30 (10.53)	3 (10.00)	27 (90.00)		
Most of the time	54 (18.95)	4 (7.41)	50 (92.59)		
Always	129 (45.26)	9 (6.98)	120 (93.02)		
Any method used as reminder				9.42	0.001*
No	196 (68.77)	28 (14.29)	168 (85.71)		
Yes	89 (31.23)	2 (2.25)	87 (97.75)		

*Significant at 0.05 significance level

4.6 Health Facility related Factors influencing Adherence to HIV medication

Encountering missed ART clinic appointment was established to have a significant effect ($\chi^2 = 3.69$, p – value = 0.038) on adherence to HIV medication among respondents (Table 4.6). Moreover, the instruction from the clinician concerning the medication and the essence to strictly adhere with the regime was also found to be a significant factor ($\chi^2 = 7.97$, p – value = 0.005) in determining patient adherence to HIV medication.

Table 4.6: Health facility related factors influencing adherence to HIV medication

Variable	N (%)	Non-adherence	Adherence	χ^2	p-value
Provide medication information				0.36	0.715
No	3 (1.05)	0 (0.00)	3 (100.00)		
Yes	282 (98.95)	30 (10.64)	252 (89.36)		
Discuss medication related problems				0.24	0.800
No	2 (0.70)	0 (0.00)	2 (100.00)		
Yes	283 (99.30)	30 (10.60)	253 (89.40)		
Understand medication problems				0.36	0.715
No	3 (1.05)	0 (0.00)	3 (100.00)		
Yes	282 (98.95)	30 (10.64)	252 (89.36)		
Solve medication related problems				0.24	0.800
No	2 (0.70)	0 (0.00)	2 (100.00)		
Yes	283 (99.30)	30 (10.60)	253 (89.40)		
Satisfied with health facility support				0.12	0.895
No	1 (0.35)	0 (0.00)	1 (100.00)		
Yes	284 (99.65)	30 (10.56)	254 (89.44)		
Keep information confidential				8.53	0.105
No	1 (0.35%)	1 (100.00)	0 (0.00)		
Yes	284 (99.65)	29 (10.21)	255 (89.79)		
Encountered missed appointment				3.69	0.038*
No	69 (24.21)	3 (4.35)	66 (95.65)		
Yes	216 (75.79)	27 (12.50)	189 (87.50)		
Problem with medication refill				0.03	0.594
No	8 (2.81)	1 (12.50)	7 (87.50)		
Yes	277 (97.19)	29 (10.47)	248 (89.53)		
Instructions from clinician				7.97	0.005*
No	159 (55.79)	24 (15.09)	135 (84.91)		
Yes	126 (44.21)	6 (4.76)	120 (95.24)		
Change of medication				0.24	0.797
No	238 (83.51)	26 (10.92)	212 (89.08)		
Yes	47 (16.49)	4 (8.51)	43 (91.49)		

*Significant at 0.05 significance level

4.7 Socio-demographic Factors Associated with ART Adherence

Marital status of the respondents ($\chi^2= 13.94$, p – value = 0.019) as well as the ethnicity ($\chi^2= 23.83$, p – value = 0.000) of respondents were identified as the significant socio-demographic variables associated with ART adherence among patients (Table 4.7). Other variables in the model were not significant since their respective p – values were greater than 0.05.

Table 4.7: Factors associated with ART adherence

Variable	Non-Adherence	Adherence	χ^2	p-value
Age			4.91	0.260
< 25	1 (3.03)	32 (96.97)		
25 – 34	11 (9.91)	100 (90.09)		
35 – 44	10 (10.31)	87 (89.69)		
45 – 54	6 (19.35)	25 (80.65)		
> 54	2 (15.38)	11 (84.62)		
Gender			1.35	0.245
Male	6 (7.23)	77 (92.77)		
Female	24 (11.88)	178 (88.12)		
Marital status			13.94	0.019*
Never married	11 (9.82)	101 (90.18)		
Married	11 (8.53)	118 (91.47)		
Divorced	3 (17.65)	14 (82.35)		
Widowed	5 (38.46)	8 (61.54)		
Separated	0 (0.00)	14 (100.00)		
Literacy status			4.99	0.237
Illiterate	10 (18.18)	45 (81.82)		
Primary	10 (8.20)	112 (91.80)		
Secondary	10 (9.90)	91 (90.10)		
Tertiary	0 (0.00)	7 (100.00)		
Occupation			2.11	0.474
Unemployed	3 (6.25)	45 (93.75)		
Employed	27 (11.74)	203 (88.26)		
Student	0 (0.00)	7 (100.00)		
Religion			3.68	0.102
Christianity	29 (11.74)	218 (88.26)		
Traditional	1 (10.00)	9 (90.00)		
Islamic	0 (0.00)	28 (100.00)		
Ethnicity			23.83	0.000*
Akan	7 (5.60)	118 (94.40)		
Ga	8 (10.13)	71 (89.87)		
Ewe	14 (29.79)	33 (70.21)		
Hausa	1 (2.94)	33 (97.06)		
Income in cedi			0.7054	0.816
< 500	6 (8.11)	68 (91.89)		
500 – 1500	22 (11.58)	168 (88.42)		
> 1500	2 (9.52)	19 (90.48)		

*Significant at 0.05 significance

4.8 Determinants of Adherence to ART using Binary logistic regression

The study found that the ethnicity of respondents plays a significant role in adherence with ART medication among respondents. Specifically, Gas and Ewes are more likely to adhere with ART medication (Table 4.8). Other factors which were found to be significant include instruction from clinician ($p - \text{value} = 0.007$), any method used as reminder ($p - \text{value} = 0.008$), satisfaction with support received from friends, family, and community, medication interact with substances, missing drugs is ok if healthy, and unavailability of food.

Table 4.8: Adjusted and unadjusted binary logistic regression analysis showing determinants of Adherence to ART

Variable	N (285)	OR	Crude 95% CI	OR	Adjusted 95% CI
Age					
< 25	33	1		1	
25 – 34	111	0.28	0.04 – 2.29 (0.237)	0.73	0.07 – 7.26 (0.791)
35 – 44	97	0.27	0.03 – 2.21 (0.223)	0.58	0.06 – 5.83 (0.644)
45 – 54	31	0.13	0.01 – 1.15 (0.067)	0.46	0.04 – 5.35 (0.538)
> 54	13	0.17	0.01 – 2.09 (0.167)	0.35	0.02 – 6.06 (0.469)
Gender					
Male	83	1		1	
Female	202	0.58	0.23 – 1.47 (0.250)	0.61	0.21 – 1.79 (0.369)
Ethnicity					
Akan	125	1		1	
Ga	79	0.53	0.18 – 1.51 (0.234)	0.24	0.07 – 0.82 (0.022)
Ewe	47	0.14	0.05 – 0.37 (< 0.000)	0.17	0.05 – 0.53 (0.002)
Hausa	34	1.96	0.23 – 16.48 (0.537)	1.24	0.14 – 11.20 (0.844)
Instruction from clinician					
No	159	1		1	
Yes	126	3.56	1.41 – 8.99 (0.007)	1.80	0.41 – 7.94 (0.433)
Encountered missed appointment					
No	69	1		1	
Yes	216	0.32	0.09 – 1.08 (0.067)	1.14	0.22 – 6.03 (0.870)
Any method used as reminder					
No	196	1		1	
Yes	89	7.25	1.69 – 31.14 (0.008)	3.61	0.59 – 21.92 (0.163)
Satisfied with support					
Never	70	1		1	
Sometimes	33	1.40	0.46 – 4.28 (0.555)	0.44	0.11 – 1.72 (0.238)
Most of the time	69	5.50	1.50 – 20.12 (0.010)	2.35	0.55 – 9.98 (0.246)
Always	113	3.28	1.30 – 8.29 (0.012)	1.44	0.47 – 4.38 (0.520)
Medication interact with substances					
No	4	1		1	
Yes	281	9.04	1.22 – 66.66 (0.031)	13.34	0.58 – 304.52 (0.104)
Missing drugs is ok if healthy					
No	123	1		1	
Yes	162	0.23	0.09 – 0.63 (0.004)	0.73	0.15 – 3.69 (0.708)
Food not available					
No	282	1		1	
Yes	3	0.06	0.00 – 0.63 (0.020)	0.30	0.02 – 4.41 (0.379)

4.9 Adherence level of Respondents

The adherence level of study participants was also explored. The results indicated a high (89.47%) adherence rate among respondents albeit with a few (10.53%) number of respondents who were not adhering to the ART medication as prescribed. All the patients who were having undetected viraemia adhered to their medications, some patients had high adherence level but had detected viraemia and therefore were not considered to have optimum adherence

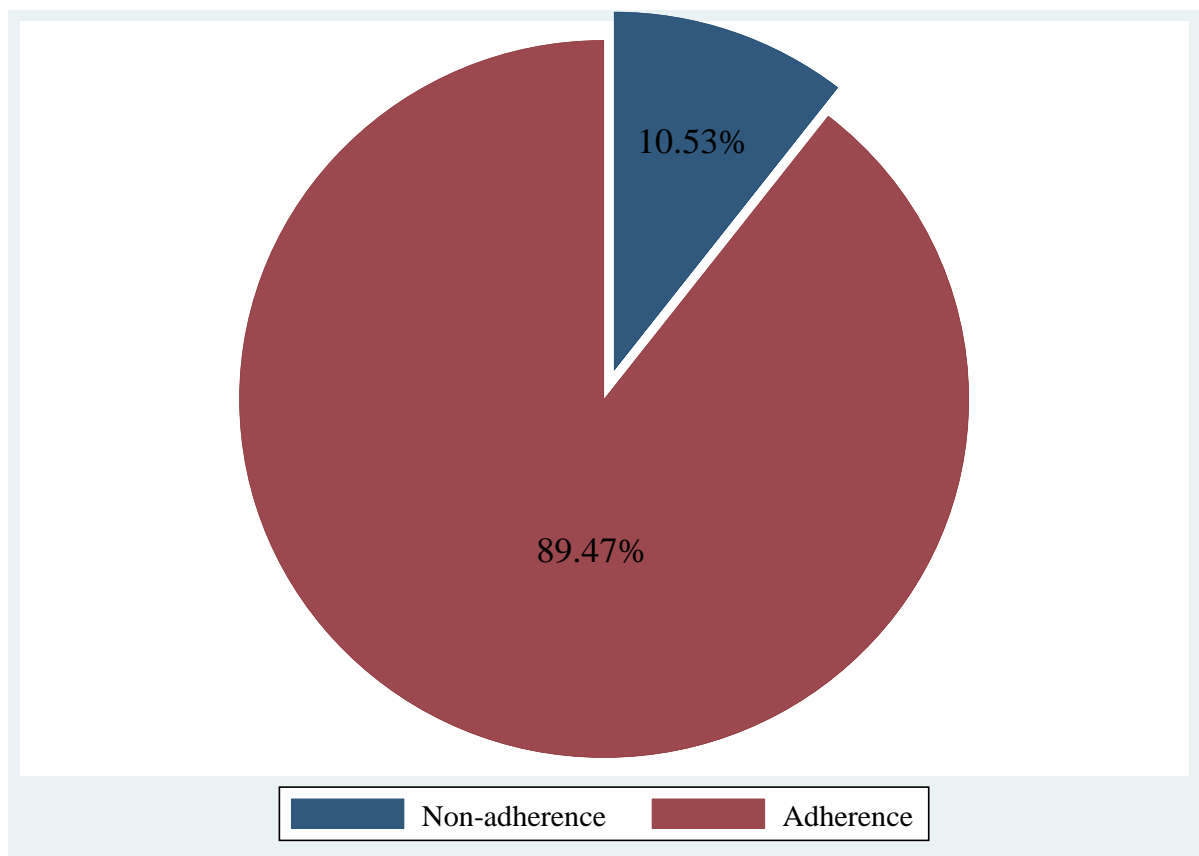


Figure 4: Adherence level of study participants.

CHAPTER FIVE

DISCUSSION

5.1 Introduction

The adherence level of study participants indicated a high (89.47%) adherence level. Factors which were found to be significant to adherence include instruction from clinician, any method used as reminders, and others among the variables considered under drug related factors, availability of food was found to be the only significant factor

5.2 Socio-demographic Factors Associated with ART Adherence

Marital status of the respondents as well as the ethnicity of respondents were identified as the only significant socio-demographic variables associated with ART adherence among patients. This study found no association between religion and ART adherence, contradicting the findings of Maokisa (2011). Maokisa noted that many at times due to individuals belief and faith, it takes some time for patients to come to the realization that the best resort is the ART.

Due to this realization, during adherence counseling meetings, religious beliefs and practices that may impede adherence to ART should be tackled. Another study also contradicts our finding. This study revealed that Christians adhere better to ART than any other religions (Mbirimtengerenji et al., 2013). In that same study, it was revealed that some believers discontinued ARVs treatment because they believed that God has the supernatural power and healed HIV and AIDS.

5.3 Drug related Factors that affect Adherence to ARV Medication

The study explored drug related factors that may be influencing respondents' adherence to HIV medication using the chi-square statistic as well as its associated p – values. Among the variables that were considered, availability of food was found to be the only significant factor. This finding confirms a similar study conducted by NAC (2011) which found that food was a contributing factor to adherence ART medication. Failure to make available enough food led to non-adherence to the ART regimen.

NAC further indicated that good nutrition is a necessity for strong immune system among patients on ART, therefore the need to give patients on ART the essential nourishment is exceptionally observational in order to advance adherence (NAC, 2011). As indicated by WHO (2016), lacking access to sustenance especially in developing nations added to low ART adherence particularly amid the underlying phases of ART when the body requires additional nourishment. In addition, inability to anchor enough nourishment constrained a few patients to take their medications once per day at night rather than twice since that was the main time they got sustenance (WHO, 20016).

Although lack of transportation was identified in other studies as contributing to non-adherence to ART medication, this study found no such influence. Shumba et al., (2013) found that transportation challenges were some of the main limitations to adherence because some people were not able to afford transport fares to reach ART clinics for their pharmacy refill (Shumba et al 2013).

5.4 Patient related Factors that affect Adherence to Antiretroviral Medication

The findings from the study indicated a significant association ($\chi^2= 9.59$, $p - \text{value} = 0.002$) between respondents knowledge regarding the omission of drug intake from their routine. This finding is in line with the recommendation by the HSS panel on antiretroviral guidelines for adults and adolescents (2013) which noted that ART initiation needs to be preceded by certain requirements such as making treatment plan personal and improved knowledge of that should be reviewed to ensure patient readiness to take medication which will make them necessary to recognize and deal with limitations to adherence.

Moreover, a study conducted in Uganda which determined adherence level indicated that defaulters missed appointment because they had travelled and others were due to forgetfulness, work conflict, and ill health (Shumba, Atuhaire, Imakit, Atukunda&Memiah, 2013). Our study thus confirms the important role the patient plays in ensuring that the drug regimen is strictly adhere to good health. Respondents also indicated that missing drugs is ok as long as they remain healthy. This is a disturbing finding given that participation of patients in treatment plan guarantee better adherence to medication and improve the outcome of the medication (HSS Panel on Antiretroviral Guidelines for Adults & Adolescents, 2013). Thus, regular review of adherence at a health facility helps to make out factors relating to adherence failure within schedule time by patients. Moreover, a significant association ($\chi^2= 6.71$, $p - \text{value} = 0.01$) was also established between adherence to HIV medication and knowledge about how the medication would interact with substances.

This finding is in line with a similar observation made by the HSS board on antiretroviral rules for adults and adolescence (2013) which demonstrated that patients adhere better to drugs which have low occurrence or less side-effects, regimens that are easy to take, have a low pill weight and low recurrence dosing. Do (2011) likewise shown that a standout amongst the most widely recognized variables that added to non-adherence was side effects of the antiretroviral medication. As a result, some patients completely stopped treatment and some skipped their doses despite the fact that they were privy to relevant information about medication discomfort (Maokisa, 2011). WHO (2009), reported some of the side effects of antiretroviral medications which included vomiting, pedal oedema, palpitations, nausea, anaemia, headache, skin rashes and dizziness.

5.5 Health Facility related Factors that affect Adherence to Antiretroviral Medication

Confidentiality of the respondents' HIV condition was established to have a significant effect ($\chi^2 = 3.69$, p – value = 0.038) on adherence to HIV medication among respondents (Table 4.6). Moreover, the instruction from the clinician concerning the medication and the essence to strictly adhere with the regime was also found to be a significant factor in determining patient adherence to HIV medication. Our study confirms an observation made by Campbell, Scott, Madanhire, Nyamukapa & Gregson, (2011).

According to these researchers, excellence service delivery rendered by health teams from various disciplines enhanced adherence to ART as the administrations were conveyed with regards to a thorough consideration that tended to medical, social and

emotional needs of PLHIV. Besides, benefit conveyance factors that bolstered ART adherence recognized by Campbell et al., (2011) were open ART facilities, accessibility of satisfactory human asset, client expense evacuation, great medical caretaker and patient relationship and keeping up a standard health service provider.

5.6 Community related Factors that affect Adherence to Antiretroviral Medication

Among the community-related factors influencing adherence to HIV medication, satisfaction with support from family, friends and the community at large was identified as one of the significant factors influencing adherence to HIV medication among respondents. ART adherence is much influenced by community and family support. Disclosing of one's HIV positive status and socio-cultural issues play a significant role in ART adherence.

Community support has been confirmed to enhance adherence to ART and has also helped in maintenance as uncovered in an investigation led in Tete Mozambique that engaged with community ART groups (WHO, UNICEF & UNAIDS, 2011). Peer groups support were also found to be very significant in helping PLHIV to adhere with ART (Do, 2011). A study conducted in Botswana revealed that family members played a significant role which led to good adherence to ART among adolescence (Marukutira, 2012). Community involvement in HIV and AIDS care encouraged a limited stigma and also encouraged disclosure to family members (Charurat et al., 2010).

Moreover, according to respondents, any method that can be used to remind them about their medication would significantly enhance their adherence to HIV medication. Marukutira (2012), indicated that forgetfulness was recognized as one of the determining factors to non-adherence. Due to these reminders such as text messages on mobile phones, alarm clocks, watches and calls from health care providers can remind patients of their medication. Mbirimtengerenjiet al.,(2013) as well as Maokisa(2011) also noted that ART adherence demands patients to follow with the calendars yet in a few examples this probably won't be conceivable because of variables, for example, uncommon occasions, being excessively caught up with, adjusting every day plan, travel, sleeping late among others. The researchers indicated an improvement in the general health status of patients on ART who kept all their appointments and not to neglect a dose as they could recognised that ART made an improvement in their value of life.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The treatment of HIV infection has generated a huge body of research, highlighting both the importance of high adherence to medical regimens for increased treatment effectiveness and the complex array of factors affecting adherence behaviours among patients. Adherence to antiretroviral therapy has emerged as a critical predictor of HIV treatment success. The study explored the factors affecting adherence to antiretroviral therapy among HIV/AIDS patients receiving treatment at selected polyclinics in the Accra metropolis.

The study established that a combination of patient related factors, drug related factors, and health facility related factors as well as community related factors were influential in determining adherence to ART among patients. Although the findings of this study are limited by small sample size, medication adherence tools and inability to address the disease stage of the participants, they stand with other findings to confirm the factors that influence ART adherence among patients.

This study showed that ART medication adherence rate was high among patients receiving treatment at the various health facilities considered in the study. The main reasons for non-adherence cited by respondents included having a busy schedule, simply forgetting medications and religious constraints. Respondents who perceived themselves in good health, did not adhere with their regular ART regimen. The findings from this

study are crucial in designing adherence enhancing strategies among patients in urban Ghana given their busy schedules.

6.2 Recommendations

6.2.1 Clinical/Public Health Practice

The usage of treatment reminders, such as using mobile phone technology and memory aids to reduce non-adherence among patients is recommended as a possible technique to adopt to ensure adherence with ART. Moreover, emphasis during counseling sessions should encourage the continued uptake of the HIV medication even if they feel healthy.

Despite the limitations of treatment adherence among patients, efforts to evaluate adherence must be made in the course of routine HIV care because it offers an opportunity to remind the patient of the critical role of strict pill-taking behaviours. In addition, to counseling, interventions to promote adherence, such as reminders, tailoring the regimen to the patient's lifestyle, and addressing issues related to side effects, may improve adherence. The complexity of adherence likely requires that healthcare providers use of all these approaches to try to help HIV-infected patients with the monumental task of taking medications according to a schedule for the foreseeable future.

Policy: There should be a national policy that will encourage community support to people living with HIV and also reduce stigmatization amongst them

Research: Researcher recommends that there should be a future study with a larger sample size to increase the accuracy of the study. There should also be a study to measure the accuracy of the various medication measuring tools to come out with specific tool suitable for further studies

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APPENDICES

APPENDIX A: QUESTIONNAIRE

We would like to appreciate your willingness to participate in the study. The purpose of the study will be to explore the level of adherence to antiretroviral therapy and its determinant factors among HIV infected adult patients. You are kindly requested to provide genuine responses to the questions listed below. We need you to understand that all your responses are valuable and will be kept confidential. We need to have your patience as it will just take you about 20-30 minutes to respond to the questionnaire. Please do not hesitate to ask any question that may not be clear.

1. Demographic variables:

- 1.1. Age (in years): _____ 1.2. Sex: 1= M 2= F
- 1.3. Marital status: 1=Never married 2=Married 3=Divorced 4=Widowed 5=Separated
- 1.4. Literacy status: 1=Illiterate 2=primary 3=secondary 4=tertiary
- 1.5. Occupation: 1=Unemployed 2=self employed 3=Student 4=Housewife 5= others, specify _____
- 1.6. Religion: 1=Christian 2=Traditionalist 3=Muslim others, specify _____
- 1.7. Ethnicity: 1=Akan 2=Ga 3=Ewe 4=Hausa 5=others, specify _____
- 1.8. Average family monthly income: _____

2. Information regarding the clinical condition of the patient.

2. 1. How long has it been since you were diagnosed with HIV infection?
2. 2. What was the clinical stage of the patient at the time of ART initiation?
- 1 2 3 4 5- Unknown
2. 3. Viral load presence at the time of ART initiation?
- 1- Undetected 2-Detected 3- Unknown
2. 4. Viral load presence after at least 6 months of treatment?

1- Undetected 2-Detected 3- Unknown

2.6. Were you sick in the past one month? 1- Yes 2- No

2. 7. If yes, how serious was your illness? 1- Mild 2- Moderate 3- Severe

3. Question related to the type of current ARV regimen and level of adherence

3. 1. The type of current ARV regimen and frequency

Name of ARV regimen	No. of pills each time	
	Morning	Evening

3. 2. The next section of the questionnaire asks about the ARV medications that the patient may have missed taking over the last three days. IF HE/SHE TOOK ONLY A PORTION OF A DOSE ON ONE OR MORE OF THESE DAYS, PLEASE REPORT THE DOSE (S) AS BEING MISSED.

Names of your ARV medications	HOW MANY DOSES DID YOU MISS....?		
	Yesterday	2 days ago	3 days ago
	Doses	Doses	Doses
	Doses	Doses	Doses
	Doses	Doses	Doses

3. 6. ARV medications need to be taken on a schedule, such as 2 times a day or 3 times a day or once a day. How closely did you follow your specific schedule over the last three days?

1-Never the time 2-some of the time 3-About half of the time 3-Most of the time 4- All of the time.

3. 4. Does any of ARV medication have special instructions from a clinician, such as take with food or on an empty stomach or with plenty of fluids? 1-Yes 2- No If “no” please skip to on. 3.6.

3. 5. How often did you follow those special instructions over the last four days?

1-Never the time 2-some of the time 3-about half of the time 4-most of the time 5-All of the time

3. 6. Did you miss taking any of your ART medications in the past 7 days?

1- Yes 2- No

3. 7. Did you miss taking your ART medications in the past one month?

1- Yes 2- No

3. 8. Has your HIV medication been changed? 1- Yes 2- No

3. 9. People may miss taking their medications for various reasons. What were your reasons for missing any of your ART medications within the past month? (It is possible to give more than one response.)

1-being away from home

2-being busy with other things

3-simply forgot

4-having too many pills to take

5-wanted to avoid side effects

6-do not want others to notice taking medication

7-a change in daily routine

8-felt like the drug was harmful

9-felt sick or ill

10-felt depressed

11-ran out pills

12-felt good

13-lack of transportation

14-shortage of food

15-others, specify

4. Knowledge about HIV disease and antiretroviral therapy

Question	Strongly disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Strongly agree
4. 1. You know how each of your current HIV medications is supposed to be taken.					
4. 2. You know what to do if you miss a dose of any of your HIV medications.					
4. 3. Skipping a few of your HIV medications from time to time would not really hurt your					

health.					
4. 4. You know what the possible side effects of each of your HIV medications are.					
4. 5. As long as you are feeling healthy, missing your HIV medications from time to time is ok.					
4. 6. You understand how your HIV medications work in your body to fight HIV.					
4. 7. If you don't take your HIV medications as prescribed, these kinds of medications may not work for you the future.					
4. 8. Antiretroviral medications eradicate HIV from your body.					
4. 9. You believe that if you take your HIV medications as prescribed, you will live longer.					
4.10. You know how your HIV medications interact with substances such as alcohol and smoking.					

5. The following questions ask about your social support.

5. 1. Have you disclosed your HIV status to your friends &/of family members?

1- Yes 2- No

If “no”, please skip to question no. 5.5 & 5.6

5. 4. How satisfied are you with the support you get from your friends and/or family members?

1- Never 2-sometimes 3-Most of the time 4-Always

5. 3. How often do your friends and/or family members help you remember to take your medication?

1- Never 2-sometimes 3-Most of the time 4-Always

5. 5. Do you use any method to remind taking your ARV medication? 1- Yes 2- No

APPENDIX B: CONSENT FORM

STUDY TITLE: FACTORS AFFECTING ADHERENCE TO ART AMONG HIV/AIDS PATIENTS RECEIVING TREATMENT AT SELECTED POLYCLINICS IN ACCRA METROPOLIS.

Researcher: Emmanuel SintimEffah

Emmanuel S. Effah is a registered master student in public health at University of Ghana conducting a research study aims to describe factors affecting antiretroviral adherence in HIV-positive patients and their outcome using pharmacy records and to describe an alternative method of monitoring outcome to antiretroviral therapy. This study will not benefit you directly, but it will help to inform policy makers on how best to use other easily accessible methods for monitoring outcome to antiretroviral therapy. The structure of this research project has been approved by Ghana health Service. Participants will not be subjected to any harm, discomfort, Stigma or discrimination. The potential risk would be a breach of confidentiality or anonymity. The collection of data in this study will be done using a check list for recording of patient demographic information, medical information, and pharmacy refill records (data).

Your participant in this study is entirely voluntary and free. Your record will be coded; all study data will be kept confidential and will be used for scientific purpose and may be published.

The study has been explained to me; I have read and understand this consent form and voluntary consent to participate in this study.

Signature of Participant:.....Date.....

(if Appropriate) .

I have explained this study to the above participant and to have sought his/her understanding for informed consent

Signature of Researcher

Date.....

APPENDIX C: PHARMACY REFILL FORM

ANTIRETROVIRAL ADHERENCE AND HIV VIROLOGICAL OUTCOMES IN HIV-POSITIVE PATIENTS IN MAMPROBI POLY CLINIC AND USHER POLY CLINIC

CODE NUMBER:

SECTION A: PATIENT INFORMATION

1. GENDER

M	
F	

2. AGE IN YEARS

20-24	
25-29	
30-34	
35-39	
40-44	
45-49	
50-54	
55-59	
60-64	
= 65	

3. MARITAL STATUS

SINGLE	
MARRIED	
CO-HABITING	
DIVORCED	
SEPARATED	
WIDOWED	

4. POPULATION GROUP

AFRICAN	
WHITE	
COLOURED	
INDIAN	
OTHER	

5. EMPLOYMENT STATUS

EMPLOYED	
UNEMPLOYED	
SELF EMPLOYE	
VOLUNTEER	
STUDENT	

6. HOME ADDRESS

RURAL	
URBAN	

7. DISCLOSED OF PATIENT'S HIV STATUS TO ANYONE

YES	
NO	

SECTION B: MEDICAL INFORMATION

8. DATE OF HIV DIAGNOSIS

D	D	M	M	Y	Y	Y	Y

9. SIGNIFICANT PAST MEDICAL HISTORY, INCLUDING OPPORTUNISTIC INFECTIONS (TB, ST/HERPES)

DIAGNOSIS	DATE	TREATMENT RECEIVED	DURATION	OUTCOME

10. PREVIOUS ANTIRETROVIRAL EXPOSURE, INCLUDING PEP, PMTCT, HAART.

DRUGS	DATE TREATMENT STARTED	DATE TREATMENT ENDED	DURATION	REASON FOR DISCONTINUATION

11. DATE OF HAART INITIATION

D	D	M	M	Y	Y	Y	Y

12. MONTHS ON ART

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13. CD4 COUNT & VIRAL LOAD RESULTS

DATE	CD4 COUNT (CELLS/MM)	VIRAL OAD (COPIES/ml)

14. CURRENT ANTIRETROVIRAL THERAPY

MEDICATION	DOSE	DURATION (MONTHS)

SECTION C: PHARMACY REFILL RECORDS

15. DATE OF ARV' COLLECTED FROM PHARMACY

DATE	YES	NO	DATE	YES	NO

16. ADHERENCE LEVEL

Adherence level=no of times collected medication/no of times expected X 100.

Adherence	
Non-adherence	