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SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

LEGON

DETERMINANTS OF LATE DIAGNOSIS AMONGST HUMAN IMMUNODEFECIENCY VIRUS (HIV) POSITIVE PATIENTS ENROLLED IN HIV TREATMENT CENTRES IN RIDGE REGIONAL HOSPITAL AND ADABRAKA POLYCLINC

BY

AKOSUA SIKA AYISI

STUDENT ID: 10508335

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DECLARATION

I, Ayisi, Akosua Sika hereby declare that apart from references to other people's works, which have been duly acknowledged, this dissertation is a result of my own independent work. I further declare that this dissertation has not been submitted for award of any degree in this institution and other universities elsewhere.

…… Date……..

Akosua Sika Ayisi

…… Date…….....

Dr. Patricia Akweongo

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DEDICATION

This thesis is dedicated to Kwame Ayisi, my husband who has been an immense source of support through this period of study. God bless you.

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ACKNOWLEDGEMENT

I am grateful to the Sovereign God who has blessed me with good health, wisdom and strength during this period of study.

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I am also grateful to the wonderful and supportive staff of the ART clinics of the Ridge Regional Hospital and Adabraka Polyclinic. Without your support this dissertation would not have been possible.

INTEGRI PROCEDAMUS

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ABSTRACT

Late diagnosis of HIV is a major hindrance in the campaign to control the spread of HIV/ AIDS. Late diagnosis, defined as the presence of CD4 lymphocyte count of less than 350/ul and or WHO stage 3 or 4 disease at diagnosis, leads to late entry into care. This subsequently results in a delay in ART initiation and poorer treatment outcomes.

In sub-Saharan Africa, 45% - 72.8% of HIV positive patients are being diagnosed at a late stage of the disease. However the proportion of HIV patients in Ghana who are diagnosed late and the factors associated with these patients have not been well documented.

This study sought to determine the extent to which late diagnosis is prevalent amongst HIV positive patients enrolled in ART centres in the Ridge Regional Hospital and Adabraka Polyclinic. The patient dependent factors associated with late diagnosis were also examined. A cross sectional study involving 325 participants was carried out from the 22nd May to the 20th June 2015.Closed ended questionnaires and data extraction forms were used to collect data on socio-demographic characteristics, perceived need of HIV test and on missed opportunities for testing. Logistic regression analysis was used to assess the relationship between the independent variables and the occurrence of late diagnosis of HIV.

The findings from the study showed that the prevalence of late diagnosis was 62.8 %(204). Older age and the occurrence of missed opportunities for testing were found to be associated with late diagnosis. Seventy eight percent (169) of participants experienced one or more missed opportunities in which HIV testing could have been offered for testing. Having 7-9 missed opportunities was found in this study to be the strongest predictor of late diagnosis of HIV.

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This study highlights that several opportunities for testing are missed amongst HIV patients. This study also shows that people of older age are most at risk of having a late diagnosis. There is therefore the need to introduce policies that would ensure routine screening of all patients who seek medical care in health facilities especially people of older age.

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LIST OF ABREVIATIONS

AIDS…… ACQUIRED IMMUNE DEFICIENCY SYNDROME

AOR……ADJUSTED ODDS RATIO

ART……ANTIRETROVIRAL THERAPY

COR……....CRUDE ODDS RATIO

GHS……GHANA HEALTH SERVICE

HIV ……HUMAN IMMUNODEFICIENCY VIRUS

HAART……HIGHLY ACTIVE ANTIRETROVIRAL THERAPY

KYS…….....KNOW YOUR STATUS

NACP……NATIONAL AIDS/STI CONTROL PROGRAMME

PLWHIV……PEOPLE LIVING WITH HIV/AIDS

PMTCT……..PREVENTION OF MOTHER TO CHILD TRANSMISSION

VCT……..VOLUNTARY COUNSELLING AND TESTING

WHO……WORLD HEALTH ORGANISATION

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CHAPTER ONE

1.0 Introduction

This chapter provides the background to HIV burden globally and in Ghana, the problem statement, conceptual framework explaining the factors affecting late diagnosis and their interaction, the justification for doing the study and the objectives the study seeks to answer.

1.1 Background

Since the onset of the Human Immunodeficiency Virus (HIV) epidemic in the 1980's to the year 2012, it is estimated that 35.3 million people have been infected globally. Sub-Saharan Africa is the worst affected accounting for 69% of HIV positive cases and 70% of HIV/ AIDS deaths worldwide (UNAIDS, 2013). Ghana is also said to have a generalized epidemic with a national HIV prevalence of 1.3% in the general population(Commission, 2013).

By the end of 2011, it was estimated that 8 million HIV positive patients were on antiretroviral therapy (ART) treatment in Sub Saharan Africa. ART significantly reduces morbidity and mortality from HIV(Lawn, Harries, & Wood, 2010). HIV treatment with ART's also reduces the risk of transmission since it can drastically decrease the viral load in the peripheral blood of patients (Attia, Egger, Müller, Zwahlen, & Low, 2009). The global scale-up of treatment has saved 4.2 million lives in 2002–2012 in low- and middle-income countries. The full benefits of treatment can however be realized only if treatment is made early in the disease progression (Country Aids Response Progress Report, 2013).

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Early HIV detection with subsequent linkage to care is the access route for treatment initiation. However most HIV cases are diagnosed late in the disease progression. Late diagnosis, defined as the having a CD4< 350/UL and or an AIDs defining illness at diagnosis, is a major hindrance to the campaign to use treatment as a prevention tool (Gardner, McLees, Steiner, Del Rio, & Burman, 2011). In a study done in the United Kingdom on the epidemiological trend of HIV from 2002 to 2011, the prevalence of late diagnosis of HIV exceeded 60% in all the years (Rice et al., 2014). Similar high values were observed in studies across sub-Saharan Africa (Forbi, Forbi, & Agwale, 2010; Kigozi et al., 2010)

Late diagnosis has been shown to be associated with people of older age, the male sex, perceiving one's partner as faithful and lower socio-economic status(Bonjour et al., 2008). In a study in British Columbia, it was realized that undiagnosed people with HIV were more likely to visit a primary care physician. People with HIV were also twice as likely to be admitted to hospital when compared to a random sample of the general population. Such visits to a health facility for care represent missed opportunities in which HIV testing could have been offered (Demlow et al, 2013).

This study therefore defined the extent to which late diagnosis occurred amongst people diagnosed with HIV and enrolled in HIV treatment centres. The patient dependent factors associated with late diagnosis including the occurrence of missed opportunities for testing was assessed. It is hoped that the findings of this study will help in the development of target specific interventions aimed at early detection of the HIV disease.

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1.2 **Problem statement**

Late diagnosis of HIV leads to late entry into care which leads to delayed initiation of treatment and eventually results in poorer treatment outcomes(May et al., 2011;Sterne et al., 2009) . Late diagnosis also delays the establishment of HIV preventive interventions that can protect the wider population from infection(Cohen et al., 2011).

Several studies in some developing and developed countries have shown that between 35% to 85% of people are diagnosed at a late stage of HIV (Lahuerta et al., 2012; Alvarez-Uria et al., 2012;Vincent et al., 2012; Fasakin et al., 2014; Agaba et al., 2014). As such policies such as routine offer of HIV counselling and testing services to all patients seeking care in health facilities have been advocated in order to reduce the effect of late diagnosis(WHO, 2013).

In Ghana however, the evidence of the existence of late diagnosis amongst HIV positive patients is not well documented. Some studies have been done on the characteristics of people utilizing testing services and the characteristics of those enrolled on antiretroviral therapy (Yawson, Dako-Gyeke, & Snow, 2012; Nyuzaghl & Ohene, 2011; Dako-gyeke, Snow, & Yawson, 2012). Such studies have helped refine our testing and treatment strategies in order to ensure improved access to HIV care services. However not much work has been documented on the stage of the HIV disease at which we are diagnosing our HIV patients. Current evidence from WHO shows that early treatment of HIV is beneficial as compared to treatment at a late stage of the disease(World Health Organization, UNICEF, & UNAIDS, 2013). An evaluation of the stage of the disease is necessary to

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assess whether current HIV programme strategies are able to identify the diseased early enough for us to derive the full benefits of interventions.

Contextual level factors, clinic level and individual level factors have been shown to influence the occurrence of late diagnosis of HIV (Lahuerta et al., 2012). Male sex, older age, wealth status, perception of stigma, site of testing and missed opportunities for testing are some of the factors known to be associated with patients diagnosed late for HIV. (Wanyenze et al., 2011;Zango et al., 2013;Alvarez-Uria et al., 2012;Wilson et al., 2014). Such studies have been used to develop target specific strategies to reduce the effect of late diagnosis(Lawn, Harries, & Wood, 2010). In Ghana, however, there is no documented evidence on the factors that influence the occurrence of late diagnosis. Knowledge of the factors accounting for the late diagnosis HIV will be helpful in developing target specific HIV interventions aimed that reducing the occurrence of late diagnosis.

This study is therefore crucial in determining the extent to which late diagnosis exists amongst HIV positive patients seeking care in the Ridge Regional Hospital and Adabraka Polyclinic. It helps to quantify the issue of late diagnosis amongst those assessing care in our health facilities. An understanding of the magnitude of late diagnosis amongst patients provides the baseline information needed to explore the effects of late diagnosis on the wider problem of HIV disease control and management in Ghana.

1.3 Justification

The knowledge obtained from this study may help in developing more targeted testing strategies to ensure that HIV positive patients are identified early and linked with care to help the individuals and the nation derive the full benefits of early treatment. This study may add to the body of knowledge on the extent to which late diagnosis is prevalent

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amongst HIV patients linked to care in Ghanaian HIV treatment centers. It also seeks to provide information for the scientific exploration of the association between patient dependent factors and the phenomenon of late diagnosis.

1.4 Conceptual framework

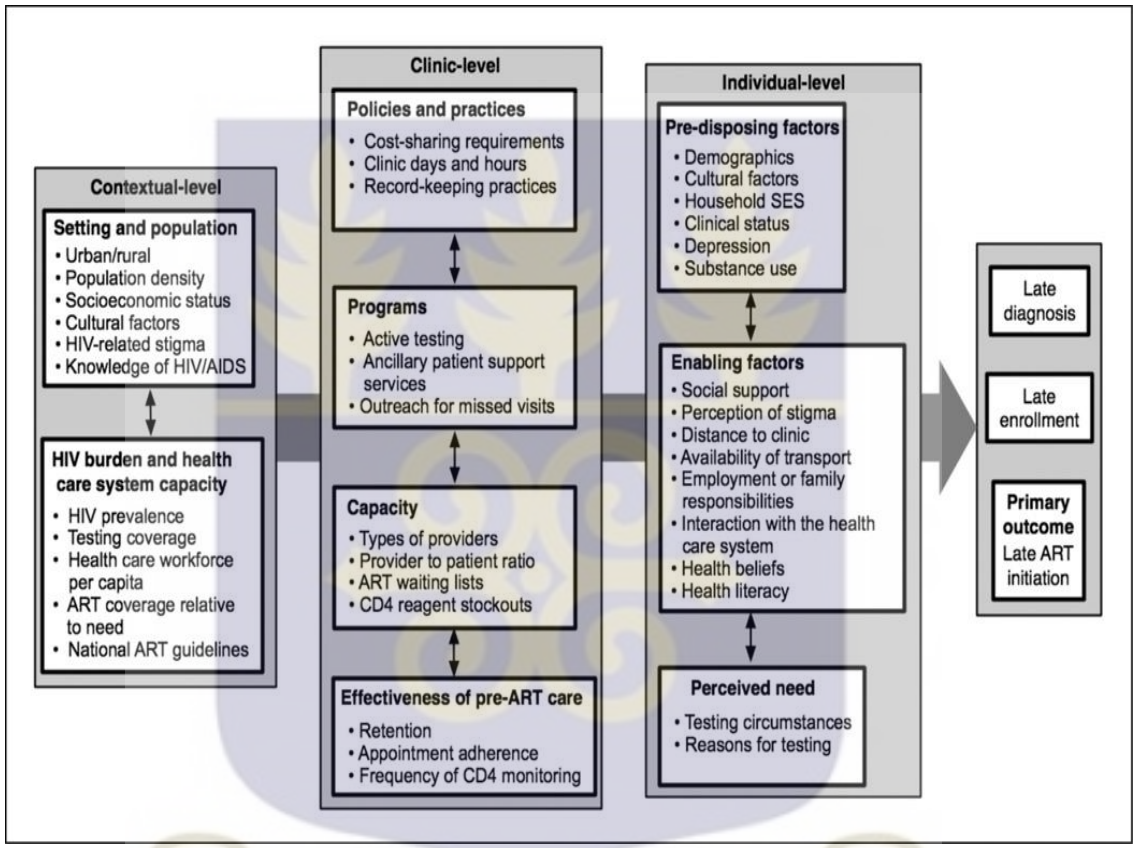

Figure 1.1 Conceptual framework showing factors that influence late diagnosis

Source M Lahuerta et al, 2012

This conceptual framework is adapted from Lahuerta et al's study in 2012 on late initiation of treatment in Sub Saharan Africa. Lahuerta et al described the contextual level, clinic level and individual level factors that influence the outcome variables late diagnosis, late enrollment and late initiation of ART (2012). In this study, only the individual level factors that influence the outcome variable late diagnosis was be assessed. The individual level

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factors are categorized into pre- disposing factors, enabling factors and perceived need factors. Pre-disposing factors of individuals such as demographics, cultural background, and individual socio- economic status can influence an individual's decision to get tested. Males have been found to have a higher incidence of late diagnosis as HIV positive females are usually identified much earlier through antenatal testing programmes (Alvarez-Uria et al., 2012). Lower socioeconomic status ,unemployment and low levels of education are also known to affect late diagnosis (Tang et al., 2014;Crabtree-Ramírez, Caro-Vega, & Belaunzarán-Zamudio, 2012). Stigma is known to prevent people from engaging in HIV testing education programmes. Individuals with HIV are known to utilize health care services more frequently than the HIV negative population in the period prior to diagnosis (Burns et al., 2008). However several studies have shown that during such periods, health providers fail to offer HIV testing services (White, Warren, Scribner, & Frazee, 2009;Ellis, Curtis, & Ong, 2012; Chin, Hicks, Samsa, & McKellar, 2013). These represent missed opportunities for testing. Such missed opportunities lead to a detection of the HIV disease at a late stage of the disease progression.

Perceived need relates to an individual subjective understanding of his need of health care. An individual who considers himself to be at risk of HIV is more likely to get tested as compared to one who thinks otherwise (Girardi, Sabin, & Monforte, 2007). The site of HIV testing has been known to be associated with late diagnosis. Diagnostic testing sites have been shown to have a higher yield of late diagnosis as compared to VCT services and community based testing campaigns (Girardi et al., 2007). Studies have also shown that VCT testing sites have a higher female utilization as compared to males (Mugisha, van

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Rensburg, & Potgieter, 2012). All these patient level factors interact in various ways with clinic level and contextual level factors, which eventually leads to late diagnosis of HIV.

1.5 Study Objectives

General Objective

To determine factors associated with late diagnosis amongst HIV positive patients enrolled in HIV treatment centres in Ridge Regional Hospital and Adabraka Polyclinic.

Specific Objectives

1. To determine the prevalence of HIV positive patients whose first test for HIV was done at a late stage of the disease progression.
2. To assess the relationship between patient related factors and late diagnosis
3. To determine the proportion of missed opportunities for testing amongst HIV positive patients who were diagnosed late.

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CHAPTER TWO

2.0 Literature review

2.1 Burden of HIV

HIV/AIDS has become a disease of significant public health interest since its discovery thirty years ago. It is estimated that there are 34 million people living with HIV globally. Sub Saharan Africa is the region most affected by this pandemic accounting for about seventy (70%) of the existing cases (UNAIDS, 2013). Ghana is also similarly affected with a generalized epidemic and a national prevalence of 1.3% (Commission, 2013)

The introduction of ART has dramatically revolutionized the campaign to control the HIV pandemic. ART has saved 5.5 million lives since its introduction in 1995 to 2012 with sub-Saharan Africa accounting for majority of these lives saved (UNAIDS, 2013). HIV treatment has been shown to reduce the risk of HIV transmission by 96% amongst discordant couples (Hosseinipour et al., 2011). It also cost effective ensuring that returns, more than double the initial amount of money invested in its provision is obtained after ten years of treatment (Resch et al., 2011). Individuals on treatment have a better quality of life. They are able to work more effectively and able to contribute to their individual and national development. In a study by Beard, Feeley and Rosen (2009) HIV-positive patients on treatment had significant improvements in their physical, emotional health and daily function as compared to treatment naïve patients. Their performance at work improved with associated decreased incidence of absenteeism.

The timing of ART treatment is however crucial for the immense benefits of treatment to be obtained. WHO has revised its guidelines over the last eight years as more research on

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the benefits of earlier HIV treatment comes to fore. In 2005, it recommended that treatment be initiated at a CD4 level of less than or equal to 200/ul, in 2010 the threshold was increased to < 350/ul. More recently this threshold has been increased to 500/ul (WHO, 2005;WHO, 2010;World Health Organization, UNICEF, & UNAIDS, 2013). The adoption of these guidelines is a major challenge for resource-constrained settings despite its immense benefits since it creates a greater burden of people in need of treatment. The cost of treatment is also significantly increased putting more stress on the limited resources of such countries.

In Ghana, ART utilization has increased more than 200% from 197 in 2003 to 45000 in 2010 (Dako-Gyeke et al., 2012). The current national HIV initiation guideline recommends that treatment be initiated at 350/ul, which is known to be a late stage in the disease progression. Interestingly despite the late stage at which treatment is initiated many people at diagnosis have CD4 levels far lower than the threshold for treatment initiation (Lahuerta et al., 2012).

As sub-Saharan African countries are faced with the challenge of adopting these new WHO guidelines, it is important that efforts be made to identify the problems hindering earlier diagnosis of HIV to enable their HIV infected population benefit fully from timely early treatment.

2.2 Late diagnosis of HIV

Late diagnosis is simply the diagnosis of HIV disease at a late stage of the disease progression. Throughout literature, various words such as late testing, late stage disease at diagnosis and late presentation for testing have been used to describe the phenomenon of late diagnosis. Late diagnosis is defined as the presence of a CD4 T cell count of less than

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350/ul within three months of an individual HIV diagnosis date as adapted from Kozak , Zinski , Connie , Willig and Mugavero's (2013) review of proposed definitions. The operational definition of the Kozak et al(2013) definition incorporates portions of the European Consensus Definition which defines the presence of an AIDs defining illness at the time of diagnosis and the occurrence of a CD4 level of less than 350/ul (Antinori et al., 2011).

Late diagnosis is also further classified into those with advanced disease at diagnosis under the Antinori et al (2010) and the Kozak et al (2013) definitions. Advanced disease at diagnosis is the occurrence of a CD4 count less than 200/ul at the time of diagnosis.

The Kozak et al (2013) definition is a more comprehensive definition since it reflects an HIV disease stage that is anchored to the date of first positive testing.

HIV disease progression is clinically classified into four main stages. The first stage is usually asymptomatic with the second stage characterized by muco -cutaneous infections. Most people are largely well during these two phases of the disease. The third and fourth stages are characterized by ill health and certain AIDS defining illness such as tuberculosis (WHO,2005). People who are diagnosed at these advanced stages are said to have tested at a late stage of the disease.

The staging of HIV disease progression can also be classified by the level of CD4 T lymphocyte count the patient has. CD4 cells are part of the humoral response to disease. These cells are specifically invaded by the HIV virus, which replicates in these cells and eventually destroys it as it releases its replicates into the body. The rate of depletion of CD4

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cells has therefore been found to be a good marker of viral replication and HIV disease progression.

Studies have shown that patients with low CD4+ T lymphocyte cell count may have been infected for long-time as compared to those with higher CD4 count (Hammer, 1997)

Late diagnosis accounted for 47% of diagnosed cases in the United Kingdom (Health Protection Agency Report, 2012). Similar values of 47% in Taiwan and 55.2% in Italy (Lo et al., 2011 ;Hall et al., 2013) have been reported. In Sub Saharan Africa, Fasakin et al (2009) recorded a prevalence of 72.8% in Nigeria and Wayenze et al in a separate study recorded prevalence rates of 59.6% in Uganda. Such high prevalence rates of late diagnosis is worrying since late diagnosis is preventable and the failure to eliminate it has negative implications on the individual and the wider population.

Late diagnosis has immense clinical and public health implications (Moreno, Mocroft, & Monforte, 2010). Late presenters for testing are more likely to present with an AIDs defining illness at diagnosis. They tend to have a higher frequency of admissions on account of these infections. Shrosbree et al (2013) showed that late diagnosis was a major risk factor for admission into the Intensive Care Unit. They are also at a higher risk of death from these infections. Simmons, Ciancio, Kall, Rice, and Delpech (2013) showed that the most significant determinant of dying from AIDS was late diagnosis. According to them sixty percent (60%) of all- cause specific mortality and eighty one percent (81%) of deaths related to HIV were caused by late diagnosis.

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Individuals diagnosed late are linked to care late and subsequently have late initiation of treatment (Moreno et al., 2010). The resultant late treatment initiation leads to poor outcomes with higher incidence of morbidity and mortality.

Late diagnosis is also associated with higher cost of treatment. In a study to find the direct medical cost of treatment among people diagnosed late, it was found that late presenters at diagnosis had higher medical costs especially from inpatient admissions. The authors also showed that these higher medical costs persisted after the initial year of treatment despite improvement in the immunological and virological states of the late presenters (Krentz & Gill, 2012)

Late diagnosis has been shown to cause an increased risk of transmission of the disease in the period prior to diagnosis. Research has shown that once people are diagnosed they tend to adapt behaviours that reduce the risk of transmission(Marks, Crepaz, Senterfitt, & Janssen, 2005). Some of the adaptive behaviours are the use of condoms and sero-sorting which is the identification of other HIV positive patients for sexual intercourse(Golub et al., 2010). Patients on treatment also tend to have lower viral load leading to a reduction in their ability to transfer the infection to uninfected partners. In a randomized control trail study, the risk of transmission was reduced by 96% amongst discordant spouses who had the infected person on treatment (Hosseinipour et al., 2011).

2.3 Predisposing factors associated with late diagnosis

Ndawinz et al (2013) carried out a study to assess the factors influencing late initiation of HAART. They concluded from their study that multi-level factors were associated with late initiation. From their study individual level, facility level and regional level factors

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were identified which all required different interventions to help prevent a late start of HIV treatment.

The predisposing factors known to be associated with late diagnosis of HIV are older heterosexual males, low socio- economic status and living > 5kilometres from a health facility proving testing (Bonjour et al 2008; Drain et al., 2013 ; Moreno et al,2010).

The association of older age and late diagnosis of HIV has been extensively described in literature. The high trends of late diagnosis in older people could partly reflect low suspicion of HIV risk in older people and thus delayed testing. This trend is also particularly troubling because older people have a blunted CD4 response to antiretroviral therapy compared with younger people. This is notwithstanding the fact that older people tend to respond better to treatment virologically (Manfredi, 2004 ; Althoff et al., 2010;Grabar, Weiss, & Costagliola, 2006).

Other studies have also shown that naturally CD4 levels decline with age and that may also account for the high number of older patients amongst those presenting with late diagnosis (Martinson et al., 2014).

Males are generally known to access health facilities less frequently than females. In a study to assess the acceptability and challenges of voluntary counselling testing, it was realized that more females (79.4%) patronized these services compared to males. The study also showed that men usually considered VCT only after becoming seriously ill (Chirawu et al., 2010). They are therefore more likely to present with late HIV disease.

In a nine cohort study involving HIV patients from 6 European countries, it was realized that people with less education were more likely to be diagnosed late and subsequently

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more likely to initiate ART treatment late(Lodi et al., 2014). According to the authors in this study, individuals with higher education had better employment and salaries. They could therefore easily access health care services. Higher education also made individuals more likely to practice healthy behaviors and to engage in health screening exercises including HIV testing. Education was also said to improve health literacy and to help people make informed health choices.

A study was carried out in South Africa in which wealth was assessed amongst HIV positive patients using a socioeconomic index score. This score was derived from a multiple correspondence analysis of measures of ownership of durable assets. Individuals were grouped into low or poor, middle and upper (not so poor) groups. People of the Upper socio- economic index were found to be more likely to go for an HIV test earlier than people of the other classes (Wabiri & Taffa, 2013) .

2.4 HIV/AIDS related stigma and discrimination

HIV related stigma is defined as the negative attitudes, beliefs and prejudice directed at people with HIV or associated with it. Stigma is known to influence people's decisions with regards to testing (Houlin Tang et al., 2014). In this study 68.8% of people who had an awareness of the need to go for HIV testing, did not do so because of HIV related stigma and discrimination. HIV related stigma can affect people's readiness to engage in HIV testing, treatment and prevention. It may make people reluctant to engage in activities educating people on HIV. Stigma may also prevent people from utilizing testing clinics. In a study by Ulasi et al (2009) in Ghana showed that the fear of HIV associated stigma and the fear of knowing your status were the main reasons why majority of the study respondents had not tested for HIV. In another study carried out in Ghana by Tenkorang

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and Owusu (2013), it was realized that women who had previously undergone HIV testing had significantly less levels of stigma compared to those who had never tested.

An individual's knowledge of issues related to HIV/AIDS can greatly influence their stigmatizing behavior. In a study on the changing patterns of stigma within communities, it was found that as interventions to improve HIV knowledge increased over time, there was a decrease in the level of stigma and an increase in the utilization of VCT services (Malla, Middelkoop, Mark, Wood, & Bekkerb, 2013)

2.5 Missed opportunities for testing

It is known that most HIV infected patients access health care facilities much more often than the general population in the years prior to their diagnosis. There is also clear evidence that people infected with HIV access healthcare settings in the years preceding their diagnosis, often with HIV-associated morbidity (Burns et al 2008;(Ellis et al., 2012). Any contact with a health care facility in the period prior to diagnosis for which HIV testing was not offered, represents a missed opportunity. Fetene and Feleke (2010) found out in Ethiopia that 80.0% of clients who were not offered testing during a visit to their health provider were actually willing to get tested. When these willing people were tested 43% tested positive for HIV.

In 2013, Champenois et al highlighted that 82% of newly diagnosed HIV positive patients had at least one missed opportunity in the three years prior to their diagnosis.

In another study of missed opportunities in an emergency department with a HIV screening policy for all patients, 69.6% of the confirmed cases were diagnosed on their first visit to the facility. The remaining 30.5% made a total of 59 visits ranging from 1 to 8 before they

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were offered HIV testing. Opportunities for testing were missed in 63% of these patients (White et al., 2009).

Liggett, Futterman, Umanski, and Selwyn (2014) showed in a study done in the United States of America that of the 309 missed opportunities amongst participants, 29% of these were associated with non- specific symptoms , 23% were for preexisting chronic disease follow-up , 20% were for respiratory conditions and 11% for gynecological, genitourinary and sexually transmitted diseases. They found that very rarely were prominent HIV-associated symptoms such as oral thrush related to a missed opportunity for testing.

2.6 HIV testing in Ghana

HIV testing is the main entry point into all forms HIV care. Without testing no diagnosis can be made and without a diagnosis no treatment can be made. HIV testing services in Ghana are provided through three main strategies championed by the National AIDS Control Programme (NACP). The services are the "Know your status" campaigns (KYC), Prevention of Mother to Child Transmission (PMTCT) services and diagnostic testing services.

The "Know your status" (KYS) campaigns are usually community based -screening done to encourage members of a community to know their HIV serostatus (Alfred E Yawson, Dako-gyeke, Addo, & Dornoo, 2014). Health personnel usually set up static spots within the community for a period of time and encourage people to get tested. The primary aim of this campaign is to move HIV testing beyond the walls of health facilities and bring it right to the door-step of community members. Individuals who have problems accessing health facilities due to barriers such as distance, travel cost or health facility associated stigma can access HIV services through this strategy.

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This method of testing has been found to have a high utilization. Between 2009 and 2010 the Ashanti and Upper West regions recorded increases of 167.9% and 252.2% respectively in KYS utilization.

Testing within the spectrum of PMTCT services is incorporated in antenatal services. HIV counseling and testing is currently done routinely as part of the required tests for ANC. Individuals can however opt out of the test. This opt out testing approach has been found to have a 90% acceptance rate among antenatal attendants in the WA municipality. (Nyuzaghl & Ohene, 2011). Accompanying this is a high uptake rate exceeding 100% in all regions between 2007 and 2010 as found by Yawson et al (2014). Testing through PMTCT ensures that all pregnant women have the opportunity to test and also to be linked to ART services when found to be positive. The high patronage of PMTCT partly accounts for the high female to male ratio of HIV testing service utilization which was found to be 2.8:1 by Yawson et al (2012).

Diagnostic testing services are facility based and have their main source population being patients referred by health practitioners for testing. Most of these patients usually have clinical symptoms suggestive of HIV infection at diagnosis. This probably accounts for its high yield of positive cases (8.9%) between 2007 and 2010 as found by Yawson et al (2014).

2.7 Site of testing

In Yawson et al (2014) study on the utilization of HIV testing services in Ghana, it was realised that majority of people preferred to assess the community based KYS campaigns as compared to the facility based diagnostic centres and PMTCT services. Whilst testing was high in the KYS campaigns their yield of HIV positive cases was low as compared to

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the health facility based testing sites. They therefore advocated for the establishments of more health facility based testing sites in order to ensure that those who are vulnerable and at risk of infection are identified early. This was further substantiated in a Taiwan study in which patients who had their HIV test done in a voluntary counselling site were found to be less likely to have a late diagnosis (Lo et al., 2011).

In line with WHO recommendation for the adoption of provider initiated testing strategies (WHO & UNAIDS, 2007), some countries such as the United States of America have introduced an opt out HIV testing strategy for all patients visiting a new clinic for the first time. This involves informing the patient that an HIV test will be performed for them unless they decline. In some other countries, all patients reporting for medical admissions and emergency room consultations services would have an HIV test offered.

Initial pilot studies carried out in the United Kingdom have shown that the offering of HIV testing to all patients attending a general practitioners clinic is feasible and practicable. Such studies have shown that routine testing carried out at the general practitioner's clinic can result in earlier testing as compared to targeted testing. The mean CD4 level for patients during targeted testing was 285u/l. This increased to 351u/l when routine testing was offered by general practitioners (Millett D, Creighton S, 2011;Ellis et al., 2012).

Patients have given various reasons for testing for HIV. According to Dokuzoguz et al., (2014) the most common reason for testing amongst newly diagnosed HIV patients was diagnostic work up for an illness.

When participants were asked to identify factors that prevented them from testing earlier, 69.9% said they had not considered the possibility of being positive. This was reflected in

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the fact that 64.4% said they were not expecting to have received a positive result (Burns et al., 2008). Studies have shown that low perception of an individual's risk is an important inhibitory factor to early testing(Fetene & Feleke, 2010; Obermeyer & Osborn, 2007 ; Camoni, Raimondo, Regine, Salfa, & Suligoi, 2013). Individuals who consider HIV to be associated with certain immoral acts may not consider themselves at risk since they may not personally engage in such acts. Wrong perception of their partner's status and risky behaviour may also lead to a poor judgement of personal risk of HIV(Burns et al., 2008).

2.8 Measurements of socio-economic status

The asset index has been used in assessing socioeconomic status by researchers since 1998 (Filmer & Pritchet, 2001). The process involves the use of household assets such as durable and semi-durable goods to describe the household wealth instead of income or expenditure data. It relies on the principle that money based analysis gives a limited view of the wealth status of a household. The advantage of using the asset index method is that household assets are fewer, easier for households to report on and easier to measure than household income and expenditure. Research has also shown that asset data tend to have less incidence reporting bias since a well-defined checklist is used by the interviewer and will be consistent for all study participants (Sahn & Stifel, 2003). This method is however limited in accessing more technologically advanced assets (Moser, 1998). For instance, owning a television set might not capture the difference between a coloured television and a flat screen television set which have different cost implications.

The principal component analysis (PCA) is the variable reduction procedure, which is used to analyze the data on assets and properties. PCA is used to reduce correlated variables that are measuring the same construct. It is believed that because the variables are correlated it

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is possible to reduce them into smaller principal components that will account for most of the variation in the observed data.(Smith, 2002)

2.9 Measurement of HIV/AIDS related stigma

Whilst many tools for the assessment of stigma exist in literature, many of these are very long and cumbersome and difficult to assess within the context of a more extensive research (Genberg et al., 2008)

This makes the process of defining and assessing stigma very difficult. Most stigma tools are also difficult to use in developing countries. This study will utilize the standardized stigma tool proposed by Genberg et al (2008).They provided a systematic tool which was tested in a developing and a developed country.

This scale has three main components which are, HIV/ AIDS related stigma, perceived discrimination and equity. The scale assesses the factors shame, blame and social isolation under the broad component of HIV/ AIDS related stigma. When compared to other stigma scales, this scale is easy to administer, is short and effective in measuring stigma in different population segments. It is also useful in assessing stigma from the view of people living with HIV and also from the view of the general population.

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CHAPTER THREE

3.0 Methods

3.1 Type of study

The study was a facility based cross sectional study. The data collection was carried out in the ante-retroviral treatment centers of the Ridge Regional Hospital and the Adabraka Polyclinic from the 22nd of May 2015 to 20th June 2015.

3.2 Study setting

The Ridge Regional Hospital is located in Accra along the Castle road about 200 meters from the African Union Roundabout. It is a tertiary hospital, which serves as a referral centre where a lot of cases are referred to from health facilities in the Greater Accra region and beyond.

Ridge Regional Hospital operates an ART treatment centre with an enrollment of about four thousand patients since its establishment in the year 2006 to 2015. However only about two thousand of these patients are active with an average of 70 patients attending the clinic per a day. The clinic is one of the pioneer providers of ART treatment in the Greater Accra Region. It also provides other services such as HIV counselling and testing, infant diagnosis, CD4 testing and STI preventive and curative services.

The Adabraka polyclinic antiretroviral treatment centre is operated within the grounds of the Adabraka Polyclinic. This is a relatively young clinic in its fourth year of operation. It has an ART clinic enrollment of 700 patients since its establishment in 2011 to date. The average clinic attendance per day is 60 patients. Study participants were enrolled from both

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clinics with 221 recruited from Ridge Regional Hospital and 104 participants recruited from the Adabraka Polyclinic.

3.3 Study population

The study population were HIV positive patients enrolled in the antiretroviral treatment centers of the Ridge Regional Hospital and Adabraka Polyclinics.

3.4 Inclusion and Exclusion Criteria

All study participants were HIV positive patients aged 18years and above who had been enrolled in the HIV treatment clinic for at least three months, had a documented CD4 level done within the three months of initial diagnosis and who were attending the clinic during the period of the study.

Newly diagnosed patients yet to be enrolled into the clinic were not eligible for the study since relevant study data was not available for these patients. Patients who were not selected on one visit were eligible for enrollment if they visited the clinic again within the study period. Patients who were enrolled on one visit were not eligible for re-enrollment on subsequent visits during the study period.

3.5 Sample size calculation

The sample size was determined using the formula and the prevalence of late diagnosis of 71%.

$N= (Z^2 \times P \times Q) / d2$

Where N is the sample size

P= the assumed prevalence of Late diagnosis of HIV

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(Forbi et al, 2009, Prevalence 71%)

d-the significance level at 95% confidence interval

Q = 1-P

$= (1.96^2 \times .71 \times .29) / 0.05^2$

= 316.3 Assuming a non- response rate of 10% a total of 349 sample size was used.

3.6 Sampling procedure

Two hundred and twenty one participants were enrolled from the Ridge Regional Hospital and one hundred and four participants were enrolled from the Adabraka Polyclinic.

The simple random sampling method was used. At the beginning of each clinic day, patients who were above 18 years old, had enrolled in the clinic for at least three months and who consented to be involved in the study were made to pick numbered cards. Random numbers were generated for the number of participants to be interviewed each day using Microsoft excel software rand ( ) command. Patients whose numbers were generated for the day were then enrolled in the study until the required number of participants for the day was obtained. Thirty five (35) participants were enrolled each day. Those whose numbers were not generated but were eligible for enrollment in the study on subsequent visits to the clinic within the study period.

3.7 Data collection methods and techniques

A closed ended questionnaire was administered to the study participants. The questionnaire gathered information on the socio- demographic characteristics of participants, patient's perception of HIV related stigma prior to their diagnosis, site of testing, patient's

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perception of risk prior to diagnosis and the occurrence of missed opportunities for testing. The questionnaire was administered to study participants by research assistants who had years of experience in the field of HIV care and who had been trained on the protocol of the study.

Information on their clinical status at diagnosis was extracted from their individual ART folders and entered into a data extraction form. The clinical status of patients at diagnosis was defined by their CD4 levels and by their WHO clinical stage at diagnosis.

3.8 Variables

Outcome variable

Late Diagnosis- CD4 < 350U/L and or WHO Stage 3 and 4.

Independent Variables

Pre disposing factors

1. Demographic information- Age, Sex, Marital Status,
2. Socioeconomic Status- Employment status, Education, Wealth Index

Enabling Factors

1. Perception of Stigma- HIV/ AIDs related stigma- (Shame , Blame and social isolation),perceived discrimination and equity (attitudes and beliefs related to fair treatment of PLHA
2. Interaction with health care system- Missed opportunities for testing (No of visits to health facility , symptoms presented during the visits)

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Perceived Need

1. Site of Testing- Provider Initiated Diagnostic Centre, PMTCT, Know your status campaign, VCT.

The operational definitions for the outcome variable and independent variables have been defined in Table 3.1 and Table 3.2.

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Table 3.1 Variable table showing dependent variable and socio-demographic variables

Variable	Type of Variable	Operational Definition	Scale of Measure
Late Diagnosis	Dependent	A CD4 < 350U/L and or WHO Stage 3 and 4 within three months of diagnosis.	Binary Yes No
Age	Independent	Age at time of study	Categorical 18- 35 35-50 >50
Sex	Independent	Gender	Binary Female Male
Educational Status	Independent	Having formal education	Categorical No schooling Primary education Secondary education Tertiary education
Employment	Independent	Employment Status	Binary Employed Unemployed
Wealth Index	Independent	Assets index score derived from principal component analysis of durable and non-durable household assets	Categorical poorest poor middle rich richest

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Table 3.2 Variables related to testing circumstances and enabling factors

Variable	Type of variable	Operational Definition	Scale of Measure
Perception of Stigma	Independent	Patient's negative attitudes, beliefs and practices in relation to HIV/AIDS prior to diagnosis.	Categorical High stigma Moderate stigma Low stigma
Missed Opportunities for testing	Independent	Any visit to a health facility for health care within the three years prior to diagnosis with an HIV associated illness in which an HIV test was not offered	Categorical Variable 1-3 4-7 7-8 >8
Symptoms associated with missed opportunities	Independent	Symptoms for which patients presented for health care in which an HIV test was not offered during in the three years prior to diagnosis	Nominal Chronic Cough Chronic Diarrhoea Persistent fever Unexplained weight loss Dermatomal skin rash Generalised rash Limb weakness Neurological symptoms Others
Perception of Risk	Independent	Patients perception of his/her risk of contracting HIV prior to diagnosis	Categorical I did not think I could be infected with HIV prior to diagnosis I knew I could test positive for HIV prior to diagnosis
Site of Testing-	Independent	Nature of testing site where HIV test which lead to diagnosis was done.	Categorical 1.Diagnostic Centre 2. PMTCT 3. Know your status campaign 4. VCT

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3.9 Data analysis

The data that were obtained were coded and entered into the Epidata software. In order to validate the data, two data entry assistants entered the data separately after which, the data were merged to check for any inconsistencies. The data were then cleaned and exported into STATA 12 software for analysis.

The outcome variable late diagnosis was determined using the clinical status at diagnosis. Late diagnosis was defined as a CD4 count of < 350/ul and or a WHO clinical stage 3 or 4. A sub analysis of late diagnosis categorized as advanced disease at late diagnosis was analyzed. This was defined by a CD4 count of < 200/ul and or a WHO stage 3 or 4.

Age, sex, education, employment status and wealth index were the key covariates, which were considered under the demographic and socioeconomic factors. Age was self-reported, measured in years and entered as a continuous variable. It was also categorized into the age groups 18-35, 36-50, >50 during analysis to help examine variations in the age groups.

Education was specified as no schooling, primary education, secondary education and tertiary education. The frequencies for the various categories were presented.

Wealth was measured with an asset quartile method. This has been used in various studies in low and middle-income countries and has been shown to be very useful in approximating individual household wealth (Clements & Pritchett 2008). The assets quartile method, which was estimated based on the principal components analysis of a study participant's household's assets (television, telephone, land and cooking stove) and amenities (water closet, tap water and electricity) was used. The responses of participants to these assets were coded as 1 for yes and 0 for no. The coded data for the household assets were entered

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into STATA from were quintiles representing the wealth index was generated using principal component analysis. The minimum and maximum values for the generation of the quintiles were obtained from the 2008 version of the Ghana Demographic and Health Survey. Wealth status was categorised into poorest, poor, middle, rich and richest.

Perception of stigma was measured using a standardized scale proposed by Gernberg et al (2007). It assessed the study participant's HIV/AIDS's related stigmatizing behavior, beliefs and attitudes prior to their diagnosis.

It measured three main components of stigma; HIV/ AIDS related acts of Shame and blame; perceived discrimination and equity or personal attitudes in relation to fair treatment of people living with HIV.

The stigma scale measure was defined as sample means to responses to 19 questions using 5-point Likert scales (4 = strongly agree; 3 = agree; 2 = do not know; 1 =disagree; 0 = strongly disagree). The positive statements in the stigma scale were reverse coded to ensure consistency in interpretation. Mean scores for the various questions in each subscale were obtained. The sum of scores for the questions in each subscale was obtained and divided by the total number of questions within the subscale to obtain a combined mean score for each subscale. The combined mean score was used to assess the level of stigma within each subscale. High and low levels of stigma were defined as values exceeding the upper quartile or values lying below the lower quartile respectively. Moderate level of stigma was defined by values lying within the interquartile range.

An overall stigma level encompassing all three subscales was not analysed since each subscale measures a different aspect of HIV stigma. Bivariate analysis was then used to

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assess the relationship between the stigma levels within each subscale and late diagnosis. Possible associations between stigma level and the age and sex of participants were also explored using bivariate analysis.

The study also assessed missed opportunity for testing. A missed opportunity for testing was defined as any visit to a health facility for health care within three years prior to diagnosis with in which an HIV test was not offered. The number of missed opportunities was entered was collected as a continuous data. It was however categorized into 1-3, 4-6, 7-8, >8 visits during analysis for ease of analysis and interpretation.

The symptoms, which patients presented with for which HIV testing was not offered was also analyzed to find out which symptoms were most associated with late diagnosis.

Bivariate analysis using chi- square test was used to assess the relationship between the various independent variables. The level of significance of the test was set at a P- value <0.05).

Univariate logistic regression was then used to assess the association between late diagnosis and the predictor variables. The crude odds ratio obtained was used to assess the association between the independent variables and the outcome variable. Variables with p-value of 0.05 or below were accepted as statistically significant. Multivariate analysis was then carried out using the variables of interest found to be significantly associated with late diagnosis on univariate logistic regression analysis. This was done to further test the robustness of the association of the independent variable with the outcome.

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3.10 Ethical consideration

The study was carried out in accordance with the specified procedure and a study manual was developed to guide the research assistants. All field assistants and supervisors received a two day training on the key aspects of the study prior to the onset of data collection. The training covered areas such as the objectives and significance of the study, sampling techniques, data collection procedures, and the filling of questionnaires. The training sections were practical such that trainees had the opportunity to act out possible scenarios that could occur during the study period. They were also made to develop solutions to the problematic issues that could arise.

The Principal Investigator was present to supervise the entire data collection process. The investigator was responsible for ensuring the accuracy, completeness, legibility and timeliness of the data reported. All the data was entered legibly in English. The data collected each day was reviewed during the data collection period for necessary corrections to be made immediately.

Ethical consideration was sought from Ghana Health Service (GHS) ethical review committee on research on human subjects. Site approval was obtained from the management of the Ridge Regional Hospital and the Adabraka Polyclinic as well as the heads of the antiretroviral therapy centres.

There were no known risks of the study but there was some discomfort experienced by participants when asked about sensitive issues such as their possessions and about their perception of stigma. The study was conducted at the ART clinics with minimal interference on the routine services offered at the clinic.

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The consenting process was done in a place with adequate privacy in a language understood by subject in the presence of a witness. Subjects were not coerced to partake in the study. Participants were informed that they could withdraw at any point of the study if they wanted to. Information collected was kept confidential with anonymity maintained. Participants who were unable to write consented by thumb printing. The emergency contact numbers of the principal investigator and the administrator of GHS ethical review committee were provided on the consent form.

The collected data will be stored for five years following from end of study. This includes the questionnaires and data extraction forms. These are only accessible to the principal investigator. All records will be destroyed in an environmentally friendly manner with witnesses and photographic evidence at the end of the fifth year following the end of the study. Confidentiality and privacy of respondent are assured in accordance with provisions in data protection legislations under the laws of Ghana such that their identities are adequately protected.

There were no conflicts of interest to be reported, the project was self-financed. The final report will be disseminated to the subjects and stakeholders such as the NACP and the Ghana AIDS commission among others.

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CHAPTER FOUR

4.0 Results

4.1Background characteristics of study participants

A total of 325 study participants were involved in the study. There were 221(68%) participants from the Ridge Regional ART centre and 104 (32%) participants enrolled from the Adabraka Polyclinic ART centre. Two hundred and forty-nine (76.6%) of the participants were females. The mean age of respondents was 41.2 ± 9.96. Sixty-two of the participants (19.1%) were above fifty. Majority of the participants, 185 (56. 9%), had up to secondary school education. One hundred and sixty-one of the participants (49.5%) were married. Christianity was the predominant religion amongst the participants with a total of 259 (79.6%) practicing it. Two hundred and sixty- nine (82.8%) of the participants were employed. When participants were classified into wealth index quintiles, 136 (41.9%) fell within the poorest quintile whilst 99 (30.4%) fell within the richest quintile (Table 4.1).

Sex was found to be significantly associated with educational history (P value<0.01) with males (73.7%) more likely to have been educated up to secondary level than females (51.8%). Sex was also associated with the wealth index (P –value =0.02). Males (40.7%) were twice as likely compared to females (27.3%) to belong to the richest quintile whereas females were twice as likely to belong to the poorest quintile (46.9%).

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Table 4.1 Background Characteristics of Study participants

Characteristic	Frequency	Percentage (%)
Age(years)		
18-35	97	29.9
35-50	166	51.1
>50	62	19.1
Sex		
Male	76	23.4
Female	249	76.6
Educational History		
No schooling	59	18.2
Primary Education	48	14.8
Secondary Education	185	56.9
Tertiary Education	33	10.2
Religion		
Christian	259	79.7
Muslim	61	18.8
Traditionalist	1	0.31
Other	4	1.23
Marital Status		
Married	161	49.5
Single	88	27.1
Divorced	34	10.5
Widowed	42	12.9
Employment Status		
Unemployed	56	17.2
Employed	269	82.8
Wealth Index		
Poorest	136	41.9
Poor	28	8.6
Middle	26	8
Rich	36	11.1
Richest	99	30.5

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4.2 Prevalence of late diagnosis

The median CD4 level of study participants was 287. Study participants with late diagnosis that is, those with CD4 less than 350u/l and or WHO clinical stage three or four disease, were 204(62.8%). The prevalence of late diagnosis from this study based on the CD4 level and those with clinical stage three or four disease irrespective of their CD4 levels was found to be 62.8 %(Figure 4.1). On further analysis of the CD4 values, 110 (33.8%) of participants with a late diagnosis were at advanced stage of the disease characterized by CD4 counts of less than 200/ul.

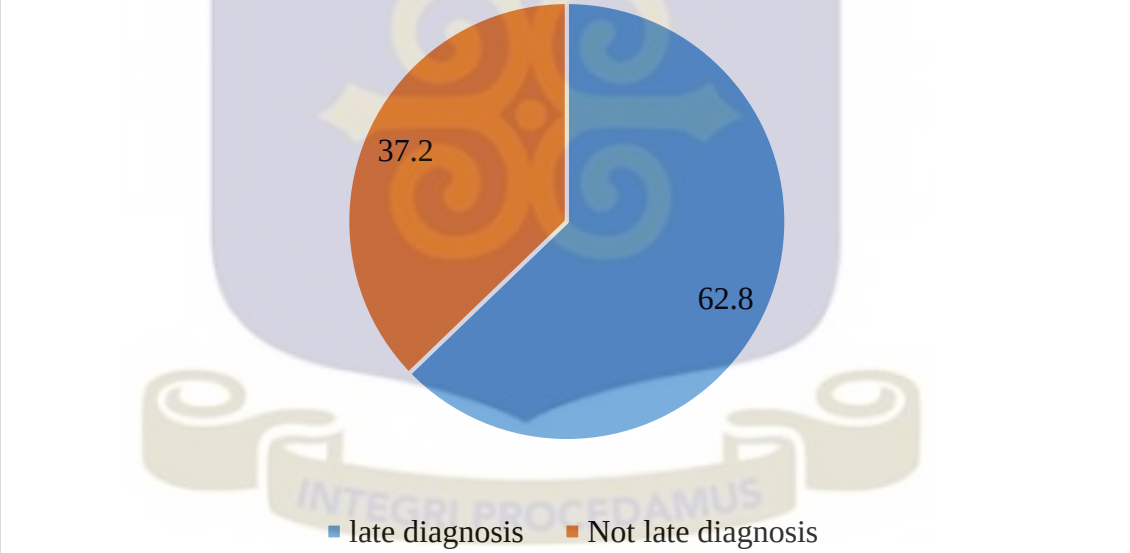

Figure 4.1 Prevalence of late diagnosis of HIV amongst study participants (%)

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4.3 Late diagnosis and socio-demographic characteristics.

The mean age of participants with late diagnosis was 42.8 (95%CI=41.5-44.2) whilst those diagnosed early had a mean age of 38.74(95% CI=36.9-40.5, Table 4.2). The age of participants was found to be associated with late diagnosis of HIV (COR= 1.04; P-value=0.03). The age category of > 50 years was most strongly associated with late diagnosis (COR= 3.32; P-value <0.01; Table 4.2a). Age was strongly associated with perception of risk. (P- value <0.01). Being male was also found to positively associated with late diagnosis on univariate analysis. This association was also statistically significant. (COR =1.91, P value- 0.02).

Table 4.2a Socio-demographic factors associated with late diagnosis on univariate analysis

	Late Diagnosis			
Factor	**Yes**	**No**	**Crude Odds Ratio(COR)**	**95% Confidence Interval(P-value)**
Age				
18-35	43	54	1	
35-50	111	55	2.53	1.51-4.24(<0.01)
>50	45	17	3.32	1.67-6.60(<0.01)
Sex				
Female	105	144	1	
Male	55	21	1.9	1.08- 33.3(0.03)
Educational History				
No schooling	36	23	1	
Primary Education	25	23	0.69	0.32-1.50(0.35)
Secondary Education	119	66	1.15	0.62-2.10(0.65)
Tertiary Education	19	14	0.86	0.36-2.06(0.75)

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Table 4.2b Socio-demographic factors associated with late diagnosis on univariate analysis

	Late Diagnosis			
Factor	**Yes**	**No**	**Crude Odds Ratio(COR)**	**95% Confidence Interval(P-value)**
Christian	162	97	1	
Muslim	34	27	0.75	0.42-1.32(0.32)
Traditionalist	1	0	1	
Other	2	2	0.6	0.08-4.31(0.61)
Marital Status				
Married	91	70	1	
Single	53	35	1.16	0.69-1.97(0.57)
Divorced	25	9	2.13	0.93-4.86 (0.07)
Widowed	30	12	1.92	0.91-4.02 (0.08)
Employment Status				
Unemployed	31	25	1	
Employed	168	101	1.34	0.75-2.40(0.99)
Wealth Index				
Poorest	81	55	1.43	0.60-3.40(0.41)
Poor	19	9	1.84	0.72-4.68(1.20)
Middle	19	7	1.76	0.79-3.95(0.17)
Rich	26	10	0.81	0.48-1.37(0.44)
Richest	54	45	1	

4.4 Site of testing

Diagnostic testing centers was the most patronized testing sites by the study participants. One hundred and seventy (52.7%) of the participants used this site. The site of testing utilized by the least number of participants was the 'Know Your Status' (KYS) site, which accounted for 9 (2.8%) of the participants. Having a late diagnosis was associated with a 629% chance of being diagnosed in a diagnostic centre (COR = 6.29, P- value= 0.01, Table 4.3). In relation to the site of testing, sex was found to be significantly associated (P-value<0.01) with more males utilizing diagnostic centres (71.1%) and VCT centres (28.9%) than females.

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4.5 Perception of risk

Eighty-five of the participants (26.2%) considered themselves at risk of HIV prior to testing (Table 4.3). Females (79.5%) were more likely to perceive themselves as not being at risk of HIV when compared to males. This association was statistically significant (P-value <0.01). Perception of risk was associated with late diagnosis on univariate analysis (COR=1.4; P-value=0.02). It was however not found to be associated with late diagnosis on multivariate analysis.

4.6 Missed opportunities for testing

In the three years prior to participants first HIV test, 215 (66.1%) of the participants visited health facilities for medical care. Amongst those who visited health facilities 169(78.6%) were not offered an HIV test on their first visit. When the number of visits patients made before they were offered an HIV test was assessed, 114(35.1%) of the patients made 1-3 visits, whilst 81(24.9%) of patients made 4-6 visits (Table 4.3). Sex was found to be significantly associated with the number of missed opportunities for testing. Females (40%) were more likely not to have visited a health facility in the three years prior to their first HIV test. Males (59.2%) were two times more likely to be offered an HIV test after 1-3 missed opportunities of testing as compared to females (27.8%).

Age was also strongly associated with the number of missed opportunities for testing (P<0.01). People who had no missed opportunities for testing (52.7%) were more likely to belong to the 18- 35 year group. Those who had more than 9 missed opportunities (62.5%) were more likely to belong to the above 50 year group. Marital status was also associated with missed opportunities for testing (P- value < 0.01). Those who had more than 9 missed opportunities were more likely to be divorced or separated whilst those who had no missed

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opportunities likely to be married. The number of missed opportunities for testing was also found to be associated with late diagnosis on univariate logistic regression and this association was statistically significant. The odds of being diagnosed late was increased 11.3 times if one had 9 or more missed opportunities (COR= 11.3; P- value= 0.03; 95% CI=1.34- 93.3).

Table 4.3 Factors related to HIV testing and late diagnosis on univariate analysis

Factor	Late Diagnosis Yes	No	Crude Odds Ratio(COR)	95% Confidence Interval(P-value)
Site of Testing				
Know your status(KYS) campaign	3	9	1	
Diagnostic center	129	41	6.29	1.5-26.2(0.01)
PMTCT	25	55	0.9	0.21-3.93(0.90)
VCT	42	24	3.5	0.80-15.3(0.10)
Perception of risk				
I did not think I could be infected	142	98	1	
I knew I could be infected	57	28	1.4	0.83-2.36(0.02)
Number of missed opportunities for testing				
0	42	68	1	
1—3	84	30	4.53	2.57-7.99(<0.01)
4—6	56	25	3.6	1.97-6.66(<0.01)
7---9	10	2	8.09	1.69-38.7(0.01)
>9	7	1	11.3	1.34-95.4(0.03)

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4.7 Symptoms presented with missed opportunities

The most common symptom for which most patients reported to the hospital within the three years prior to their diagnosis was unexplained weight loss which had 128 (59.5%) of people reporting with it (Table 4.4). When the symptoms were assessed to find out if there was any association between the symptoms and late diagnosis, none of them were found to have a statistically significant association.

Table 4.4 Frequency table showing symptoms associated with missed opportunities for testing

Symptom	Number of Participants (%)
Chronic Cough	51(23.7%)
Chronic diarrhoea	62 (28.8%)
Persistent fever	93(43.2%)
Unexplained Weight loss	128(59.5%)
STD	39(18.1%)
Dermatomal herpetic rash	21(9.76%)
Recurrent generalised rash	44(20.4%)
Limb weakness	12(5.58%)

4.8 HIV/AIDS related stigma and discrimination

Participants had moderate stigmatizing views (mean score, 1.60, was within interquartile range) with regards to the way they shamed and blamed people living with HIV (PLWHIV) prior to the discovery of their own HIV status. They had a high degree of stigmatizing views (mean score, 2.90, was within upper quartile) when questioned on their view of society's attitude and treatment of PLWHIV and their families. When stigma was assessed based on the equitable distribution of resources and services amongst HIV infected and the

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uninfected, the participants had a moderate degree of stigmatizing views. None of the scores for the three stigma subscales was statistically significant (Table 4.5).

Table 4.5 Level of Stigma within Stigma subscales by late diagnosis

		Late Diagnosis
Stigma Subscale	**Level of Stigma**	**Crude Odds Ratio(P-value)**
Shame, blame and social isolation	Moderate	0.88(0.51)
Perceived Discrimination	High	1.10(0.69)
Equity	Moderate	1.12(0.66)

When the variables age, sex, marital status, site of testing and missed opportunities for testing, which were found to be significant on univariate analysis, were included in a multivariate logistic regression model, the factors found to be associated with late diagnosis of HIV were age and the occurrence of missed opportunities for testing (Table 4.6). Overall the strongest predictor for late diagnosis from this study was the occurrence of 7-9 visits to a health facility in which an HIV test was not offered (AOR=5.7; P-value=0.03; 95%CI=1.15-29.0). Male sex was not statistically associated with late diagnosis on multivariate analysis.

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Table 4.6 Factors associated with late diagnosis on multivariate analysis

Factor	Adjusted Odds Ratio(AOR)	95% Confidence Interval(P-value)
18-35	1	
35-50	1.76	1.01-3.09(0.05)
>50	1.78	1.03-4.60(0.14)
Sex		
Female		
Male	1.42	0.77-2.67(0.27)
Marital Status	1.12	0.86-1.27(0.85)
Reason for testing	1.01	0.80.1.28(0.13)
Number of missed opportunities for testing		
0	1	
1—3	3.48	1.80-6.70(<0.01)
4—6	2.79	1.37-5.67(<0.01)
7---9	5.7	1.15-29.0(0.03)
>9	7.30	0.78-68.23(0.08)

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CHAPTER FIVE

5.0 Discussion

This study sought to determine the proportion of HIV positive patients whose first HIV test is done at a late stage in the disease progression in patients enrolled in the ART clinics of the Ridge Regional Hospital and Adabraka Polyclinic It also sought to determine the individual level factors related to those with a late diagnosis of HIV. The individual level factors in this study are socio-demographic factors – age, sex, marital status, educational level, employment and wealth status. This study also examined the circumstances surrounding patient HIV testing experience. It assessed their perception of personal risk of HIV, site of testing and their interaction with health facilities in the three years prior to testing. Opportunities for testing, which are missed by healthcare providers were also examined. In this study, 62.8% of the study participants are diagnosed at a late stage of the HIV disease progression defined by the occurrence of a CD4 level < 350/ul within three months of diagnosis and or the presence of WHO Stage three or four disease. Such a high prevalence shows that within the Ridge Regional Hospital and Adabraka Polyclinic 6 out of 10 cases of HIV are being diagnosed late. As such opportunities to introduce interventions such as risk reduction, lifestyle modification and treatment as prevention aimed at protecting the uninfected population are lost in over 60% of HIV infected patients. This also means that less than 40% of the patients to be eventually enrolled in HIV care have the required immune ability at baseline to derive the full benefits of early treatment as advocated by the WHO (World Health Organization et al., 2013). The prevalence represents the true burden of late diagnosis within the study population since both the CD4 classification and the WHO clinical staging are used in deriving it (Kozak et al, 2013).The

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prevalence of late diagnosis of 62.8% in this study is higher than that seen in studies in Switzerland and Italy which had 45% and 55% respectively(Buetikofer, Wandeler, Kouyos, Weber & Ledergerber, 2014; Camoni et al, 2013). When compared to sub – Saharan African studies which used the European consensus definition, the prevalence reported in this study is lower than that seen in two separate studies done in Nigeria which reported a prevalence rate of 85.6% and 72.8% (Agaba et al., 2014; Kigozi et al., 2010). For those diagnosed at an advanced stage of the disease, the prevalence in this study is 33.8% which is similar to a prevalence of 34.7% and 41% recorded by Helleberg et al (2012) and Celesia et al (2013) in studies done in Venezuela and Italy. This prevalence of 33.8% in this study is however lower than the 61.8% recorded in Northern Ethiopia by Gebrehiwot and Mekonnen (2015) despite study site having the same regional prevalence of HIV(2.7%) at the time the studies were carried out(Commission, 2013).

This study finds age and missed opportunities for testing to be the key factors associating with late diagnosis. People over 50 years are more likely to be widowed, to have tested at diagnostic sites or VCT sites and to have greater than 9 missed opportunities for testing. There is however no significant relationship between age and sex. As such this study finding shows that irrespective of one's gender late diagnosis occurs more in the elderly who are greater than 50 years and widowed. These people are also more likely to visit the hospital on several occasions without being offered an HIV test. Older age ranging from above 35 and above 50 has been found to be associated with late diagnosis (Vincent et al., 2012;Tang, Mao, Zhang, Han, & He, 2012; Camoni et al., 2013). In this study older age above 35 is associated with late diagnosis. This association between older age and late diagnosis in this study can be due to the natural decline in CD4 levels as one ages

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(Martinson et al., 2014). Some studies have also shown that there is a low perception of risk in this age group, which might delay their initiative to test. This study however finds no association between age and perception of risk. Low risk perception is an important condition which restricts older people from testing for HIV but it however does not sufficiently account for all the reasons why elderly people do not take the initiative to test (Lekas, Schrimshaw, & Siegel, 2005). Lekas et al (2005) found that the occurrence of physical symptoms and encouragement from healthcare workers influenced positively the need to get tested. Similarly in this study most people above 35 years are diagnosed at diagnostic sites on request from a health professional or at a VCT site. Older people are less likely to use the community-based campaigns such as 'Know your status campaigns'. It may be that older people prefer confidentiality and privacy in discussing HIV related issues and these can be obtained in the health professional consulting room or a CT counselling booth.

The occurrence of more than 7-9 missed opportunities is a significant predictor of late diagnosis. (AOR = 5.70; P- value=0.03). Males are more likely to be diagnosed after 1-3 missed visits. This is probably because most males tend to seek care late by which time they might have developed some HIV associated symptoms thereby making it easier for a diagnosis to be made amongst them after 1-3 visits (Celesia et al., 2013). This is reflected in the high patronage of diagnostic testing sites by males in this study and in other studies (Lyons et al., 2008; Hou-lin Tang et al., 2012)

This study also shows that females are more likely not to have a missed opportunity. This is because most females have the benefit of testing early through PMTCT hence their diagnosis is made much earlier before they start developing symptoms (Kozak et al., 2013).

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The high probability associated with late diagnosis in males than in females is consistent with most studies reporting on late diagnosis (Ndiaye et al., 2011; Oliva et al., 2010;Bonjour et al., 2008; Grigoryan, Hall, Durant, & Wei, 2009). The association of the males with late diagnosis is probably due to the fact that there are fewer testing strategies targeted at men. Females generally have the benefit of routine testing offered to them as part of their laboratory work-up during ante- natal clinic visits. As such most females have the benefit of testing early (Lahuerta et al., 2012). However a study questioning whether men were testing for HIV showed that after controlling for tests done during pregnancy for women, women were still more likely to test than men (Snow, Madalane, & Poulsen, 2010).

Symptoms patients presented with during missed opportunities such as chronic cough, unexplained weight loss and chronic diarrhoea are found like in some studies to be associated with late diagnosis although not statistically significant in this study (Wohlgemut, Lawes, & Laing, 2012). Whereas such triggers are helpful for healthcare professionals in their risk assessment for HIV testing, some studies have shown that such triggers give a myopic view of those who are at risk. It is therefore essential that a broad perspective be kept with the understanding that anybody is at risk and hence test should be offered more routinely rather than based on only risk assessment or the presence of certain AIDS defining symptoms. It is however important that healthcare professionals improve their risk assessments skills so they do not miss clear and obvious opportunities to make an HIV diagnosis (Lo et al., 2011; Champenois et al., 2013).

In assessing stigma, late diagnosis is not statistically associated with any of the categories of stigma assessed in this study. This finding is inconsistent with several studies which have shown that fear of stigma associated with HIV testing sites and the fear PLWHIV

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prevents people from testing (Bonjour et al., 2008; Carrizosa et al., 2010; Abaynew, Deribew, & Deribe, 2011). Stigma in this study was assessed based on their perception of stigma prior to testing. It is however possible that the HIV related education and their personal experience after testing positive might have affected their ability to recall their exact HIV- related stigmatizing views they held prior to testing.

5.1 Limitations of study

The design of this study is a cross- sectional facility-based study which assessed the prevalence of late diagnosis amongst HIV positive patients assessing health services in the anti- retroviral treatment centres of the Ridge Regional Hospital and Adabraka Polyclinic. Therefore the findings of the study are limited to patients who seek care in this facility and not representative of the burden of late diagnosis in patients the general population.

The study did not look at trends of late diagnosis over the years. It is therefore unable to provide information on whether late diagnosis has being declining or worsening. This finding would have been helpful in relating the findings of the study to the various HIV interventions introduced over the years.

The study assessed HIV stigma based on the patient's perception of stigma in the period prior to their diagnosis. The patient's recall of such stigmatizing views and experiences could have been marred by their current knowledge of HIV and their personal experiences since they were diagnosed. In order to minimize recall bias a standardized stigma scale, which asked specific questions, was used to assess stigma. All questions on stigma were also introduced by the statement 'Before you were diagnosed' to ensure participants gave

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responses based on their perceptions prior to diagnosis. The responses for questions in the stigma scale were assessed using a 5 point likert scale. This was also to ensure consistency in the responses given.

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CHAPTER SIX

6.1 Conclusion

Six out of every ten HIV positive patients (62.8%) are being identified late.

This implies that patients are being identified too late in the disease progression to fully benefit from treatment since research shows that early treatment has better health outcomes. This high burden of late diagnosis also shows that opportunities for preventive measures derived from the knowledge of one's status such as lifestyle modification and treatment as prevention to protect one's partners are being missed.

The patient dependent factors associated with late diagnosis are old age and missed opportunities for testing. This study highlights that HIV positive patients visit health facilities frequently for care (78%) but health professions fail to offer them HIV tests. People who are diagnosed late are likely to have experienced a high number of missed opportunities for testing.

6.2 Recommendations

The burden of late diagnosis is high in the older age group. It is recommended that HIV testing services provided under the NACP should be targeted at this age group. Annual medical assessment for elderly people can be instituted as a policy by the Ministry of Health. This assessment would offer HIV testing as part of the routine health tests to be done.

HIV education and sensitization campaigns organized by the NACP and its allied agencies messages should be targeted at older people. Adverts in the print and electronic media

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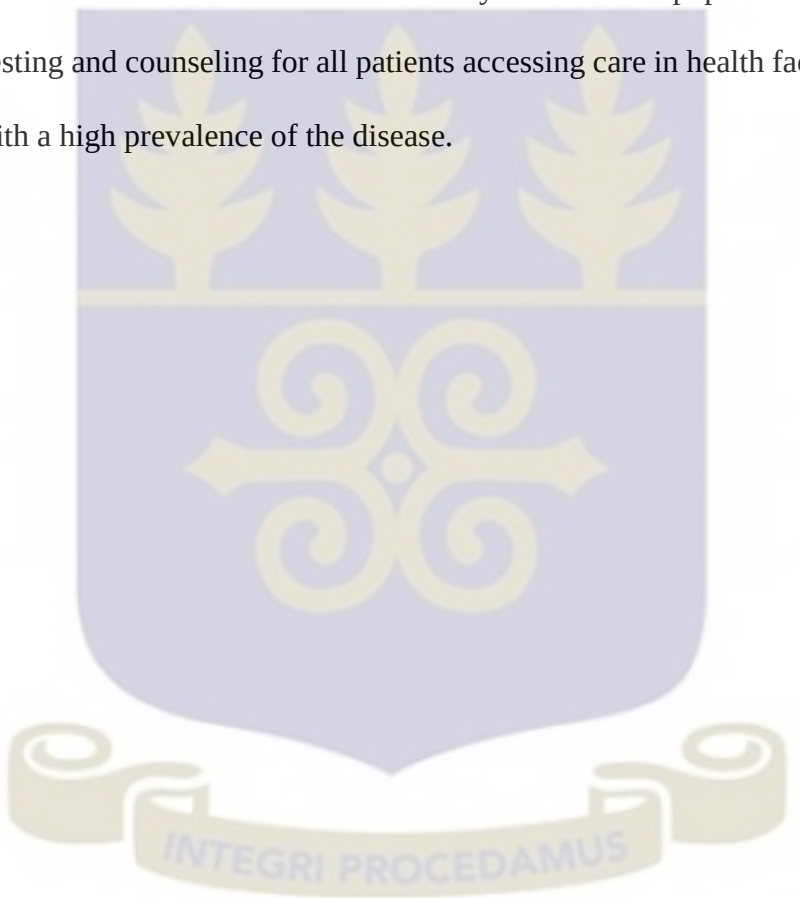
should depict the risk of infection amongst older people. Such messages should be displayed in places where older people are likely to visit or use such as offices, clubhouses and in churches. However any testing service provided for the older age should ensure some level of confidentiality and privacy in order to attract the old.

HIV positive patients are utilizing healthcare services yet clinicians are failing to offer them the test. It is recommended that the Ministry of Health adopt policies such as provider initiated testing and counseling for all patients accessing care in health facilities especially in areas with a high prevalence of the disease.



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APPENDIX 1 CONSENT FORM

Project Tittle: DETERMINANTS OF LATE DIAGNOSIS AMONGST HIV POSITIVE PATIENTS ENROLLED IN HIV TREATMENT CENTRES IN THE RIDGE REGIONAL HOSPITAL

Institution affiliated

School of Public Health, University of Ghana, Legon, Accra

Background of interviewer

My name is ……from……., helping a student to collect data purely for academic work for Masters in Public Health

Procedure

Information to be included in this study includes background characteristics e.g. Age, sex, clinical status at diagnosis, health beliefs and ones perception of HIV/AIDS related stigma. Data collection is purely by the administration of closed ended questionnaires and review of ART folder for information on clinical status at diagnosis.

Risks and benefits

You may feel uncomfortable with some of the questions I will be asking you; however, they will be helpful to me, other researchers, other patients and the general public as well.

Right to refuse

Your consent to participate in this study is voluntary, you are not under any obligation to do so, and you are at liberty to withdraw from this study. However, I will appreciate if you can complete it.

Anonymity and confidentiality

Be assured that any information given will be used purely for the purpose of research. Any information given will be treated with utmost confidentiality.

If you have any questions about the project or your participation feel free to ask or you can contact …….

Before taking consent

Do you have any questions to ask me……? (If yes, note questions below).

……
……

If further clarification is needed, please contact Akosua Ayisi on 0244722555 or Hannah Frimpong 0243235225 or 0507041223.

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Consent

I…….have understood the study, after having the study explained to me thoroughly in English/Twi/Ga language do hereby agree to take part in the study

Signature/Thumbprint…….

To be filled by guardians of participants less than 18 years old

Accent Form

I…….have understood the study, after having the study explained to me thoroughly in English/Twi/Ga language do hereby agree to have my ward……..……..take part in the study.

Signature/Thumbprint…….

Interviewer statement

I……..the undersigned, have explained to the subject in the language he/she understand and the subject has agreed to take part in the study.

Signature of interviewer……

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APPENDIX 2 QUESTIONNAIRE
Project Tittle:

DETERMINANTS OF LATE DIAGNOSIS AMONGST HIV POSITIVE PATIENTS ENROLLED IN HIV TREATMENT CENTRES IN RIDGE REGIONAL HOSPITAL

This questionnaire is designed for a dissertation for Masters of Public Health program. All information form from the interviews will be kept confidential.

Please circle the appropriate codes.

Questionnaire ID:	Names of Research Assistants:
Study Site:	Name of Supervisor:

QUESTIONS	RESPONSES	CODE	SKIP TO
1. Age of patient (years)			
2. Sex of patient	Males Female	0 1	
3. Highest Educational level	No schooling Primary education Secondary education Tertiary education	0 1 2 3	
4. Religion	Christian Muslim Traditionalist Other	1 2 3 4	
5. Marital status	Married Single Divorced Widowed	1 2 3 4	
6. Employment status	Unemployed	1	

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	Employed		2	
7. Asserts and Properties	Does anyone in your household own a functioning Item	Yes	No	
	A wall clock?	1	2	
	A radio	1	2	
	A black and white television	1	2	
	A colour television	1	2	
	A fixed line telephone	1	2	
	A mobile telephone	1	2	
	A fridge	1	2	
	A freezer	1	2	
	An electric generator	1	2	
	A washing machine	1	2	
	A computer/laptop	1	2	
	Digital camera	1	2	
	VCD/DVD player	1	2	
	Home theater	1	2	
	Sewing machine	1	2	
	Bed /Table/ Chair	1	2	
	Cabinet/Cupboard			
	Does any member of your house hold own a	1	2	
	functioning bicycle	1	2	
	Motor Cycle or Motor Scooter	1	2	
	Car or Truck			
	Animal drawn cart	1	2	
	Farm.			
	Land	1	2	
	House	1	2	

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Perceived need of testing		
8. Site of testing	Diagnostic Centre 1 PMTCT 2 Know your status campaign 3 VCT 4	
9. Perception of Risk	I did not think I could be infected with HIV prior to diagnosis 0 I knew I could test positive for HIV prior to diagnosis 1	
Interactions with health care facility		
10. Did you visit a health facility in the three years prior to diagnosis for healthcare	Yes 1 No 2	
11. Was an HIV test offered during the visit	Yes 1 No 2	
12. How many visits did you make within that period	State number _____	
13. What were the symptoms you reported to the health facility	Jaundice 1 Chronic cough 2 Chronic diarrheoa 3 Persistent fever 4 Vomiting 5 Severe unexplained weight loss 6 Sexually transmitted infections 7 Abnormal menses 8 0ral thrush 9 Dermatomal skin rash 10 Recurrent generalized skin rash 11 Limb weakness/ Paralysis 12 Musculoskeletal symptoms 13 Symptoms of preexisting chronic Condition 14 State condition…… 15	
14. Would you have tested if an HIV test was offered to you at that time?	Yes 1 No 2	

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Stigma Assessment Scale **Please answer based on your perception prior to the time you tested.**					
Shame , Blame and Social Isolation	**Strongly Agree**	**Agree**	**Do not Agree**	**Disagree**	**Strongly disagree**
1.People living with HIV/AIDS should be ashamed	4	3	2	1	0
2. People with AIDS should be isolated from other people	4	3	2	1	0
3. People who have HIV/AIDS are cursed	4	3	2	1	0
4. A person with HIV/AIDS should be allowed to work with other people	4	3	2	1	0
5. People living with HIV/AIDS deserve to be punished	4	3	2	1	0
6. Families of people living with HIV/AIDS should be ashamed	4	3	2	1	0
7. It is reasonable for an employer to fire people who have HIV/AIDS	4	3	2	1	0
8. People with HIV/AIDS are disgusting	4	3	2	1	0
9. People who have HIV/AIDS deserve compassion					
Total					
Perceived Discrimination	**Strongly Agree**	**Agree**	**Do not Agree**	**Disagree**	**Strongly disagree**

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11.People living with HIV/AIDS face neglect from their family	4	3	2	1	0
12. People living with HIV/AIDS face physical abuse	4	3	2	1	0
13. People want to be friends with someone who has HIV/AIDS	4	3	2	1	0
14. People living with HIV/AIDS face ejection from their homes by their Families	4	3	2	1	0
15. Most people would not buy vegetables from a shopkeeper or food seller that they knew had AIDS	4	3	2	1	0
16. People who are suspected of having HIV/AIDS lose respect in the Community	4	3	2	1	0
17.People who have HIV/AIDS face verbal abuse	4	3	2	1	0
18. People living with HIV/AIDS face rejection from their peers	4	**3**	2	**1**	0
Equity	**Strongly agree**	**Agree**	**Do not agree**	**Disagree**	Strongly Disagree
19. People who have HIV/AIDS should be treated the same as everyone else	4	3	2	1	0
20. People with HIV/AIDS do not deserve any support	4	3	2	1	0
21. People with HIV/AIDS should not have the same freedoms as other people		3	2	1	0
22. People living with HIV/AIDS should be treated similarly by health care professionals as people with other illnesses		3		1	0
Total					

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APPENDIX 3 DATA EXTRACTION FORM

Participant ID:	Name of Research Assistant:
Study Site:	Name of Supervisor :

CHARACTERISTIC	FILL THE INFORMATION IN THE SPACE PROVIDED
Date of first testing CD4 count at diagnosis Date of CD4 count was done	_____ _____ _____
WHO STAGING AT DIAGNOSIS	CIRCLE THE APPROPRIATE NUMBER STAGE ONE 1 STAGE TWO 2 STAGE THREE 3 STAGE FOUR 4

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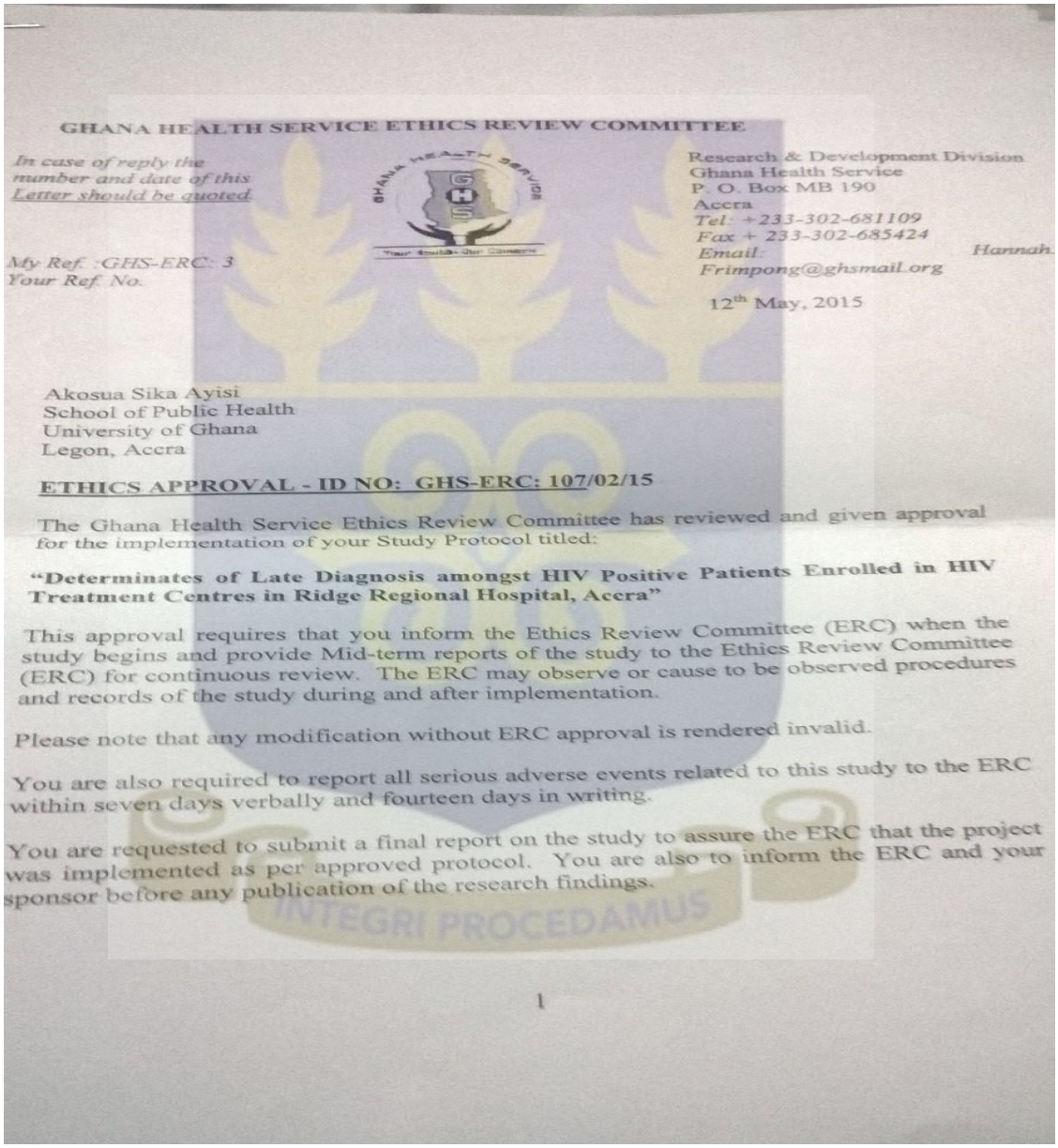
APPENDIX 4
APPROVAL LETTER FROM ETHICAL REVIEW COMMITTEE



GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

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

My Ref: GHS-ERC: 3
Your Ref. No.

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax + 233-302-685424
Email: Frimpong@ghsmail.org

Hannah

12th May, 2015

Akosua Sika Ayisi
School of Public Health
University of Ghana
Legon, Accra

ETHICS APPROVAL - ID NO: GHS-ERC: 107/02/15

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol titled:

"Determinates of Late Diagnosis amongst HIV Positive Patients Enrolled in HIV Treatment Centres in Ridge Regional Hospital, Accra"

This approval requires that you inform the Ethics Review Committee (ERC) when the study begins and provide Mid-term reports of the study to the Ethics Review Committee (ERC) for continuous review. The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Please note that any modification without ERC approval is rendered invalid.

You are also required to report all serious adverse events related to this study to the ERC within seven days verbally and fourteen days in writing.

You are requested to submit a final report on the study to assure the ERC that the project was implemented as per approved protocol. You are also to inform the ERC and your sponsor before any publication of the research findings.

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Please note that this approval is given for a period of 12 months, beginning May 12th 2015 to 11th May 2016.

However, you are required to request for renewal of your study if it lasts for more than 12 months.

Please always quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....

DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra

INTEGRI PROCEDAMUS