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FACTORS ASSOCIATED WITH ANTIRETROVIRAL THERAPY ADHERENCE AMONGST MEN WHO HAVE SEX WITH MEN IN SELECTED FACILITIES

BY

BISMARK JAMPIM ABROKWAH

(10241858)

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DECLARATION

I, BISMARK JAMPIM ABROKWAH, declare that except for the other people's work which have been duly acknowledged, this work is the result of my own original research, and that this dissertation, either in whole or in part has not been presented elsewhere for another degree. This dissertation had been undertaken under the academic supervision of Dr. Samuel Dery and Professor Kwasi Torpey.

…… …….
BISMARK JAMPIM ABROKWAH DATE
(STUDENT)

……. ……..
DR. SAMUEL DERY DATE
(SUPERVISOR)

…….. ……..
PROF. KWASI TORPEY DATE
(SUPERVISOR)

DEDICATION

This work is dedicated to the loving memory of my mother – the late Comfort Yaa Obenewaa Adu whose guidance and disciplinarian parenting inspired me for a higher heights in life but did not live long enough to see this milestone; and my children Obaa Yaa Obenewaa Abrokwah, Maame Ofosuwaa Abrokwah, Obrempon Jampim Abrokwah and Odehyieh Yaa Abrokwah whose circumstantial births challenged me for this measurable legacy.

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ABSTRACT

Background: Current increase in HIV prevalence among MSM in Greater Accra region of Ghana is a public health concern. This increase translates to higher number of MSM being put on antiretroviral treatment. However, ART adherence amongst HIV positive MSM in Ghana is unknown. Lack of knowledge in ART adherence among MSM could affect the implementation of the 90-90-90 fast track targets. This study therefore sought to determine the level of ART adherence and factors influencing adherence amongst MSM in the Greater Accra region of Ghana.

Methods: This was a cross sectional study which employed a quantitative method. The study was conducted in four selected facilities in the Greater Accra region from the period of April 13th to June 29th, 2018. Through the assistance of ART _case managers', 223 participants on ART across the four selected facilities were recruited for self-administered questions and interviewed on ART adherence. Structured questionnaires were administered and analysis of quantitative data was done using Stata15. Confidence Interval was set at 95% and p-value <0.05 for statistical significance. The Pearson's Chi-square was used to test association between factors and ART adherence. Multiple logistics regression model was used to quantify the adjusted effects of the various factors on ART adherence.

Results: A total of 233 HIV positive MSM with a median age 24 years participated in the study. Just a third 87(39%, 95% CI: 32.57, 45.75) of participants adhered to ART. Criminalization of homosexuality was positively associated with ART adherence (p<0.033). Fear of gender

discrimination limiting sexual orientation disclosure for a holistic ART service was also significantly associated with ART adherence ($p<0.021$).

Conclusions: This study demonstrated that ART adherence amongst MSM in the Greater Accra region was low. Fear of gender discrimination limiting sexual orientation disclosure for a holistic ART service were found to be a factor associated with the low ART adherence. This can impede strategies to achieve the 2nd and 3rd 90 of the UNAIDS 90-90-90 HIV treatment targets among MSM. Also, criminalization of homosexuality as perceived to be associated with ART adherence was unsupported, and the perceived ART service disparity between homosexuals and heterosexuals was not associated with ART adherence.

We recommend that Intensive ART adherence education and counseling should be provided by Ghana AIDS Commission and partnered Civil Society Organizations (CSOs) with HIV programming for MSM. The Ghana AIDS Commission should promote rigorous CSOs Advocacy and intervention on eliminating fear of gender discrimination associated with sexual orientation disclosure and ART adherence.

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AIDS – Acquired Immune Deficiency Syndrome

ART – Antiretroviral Therapy

ARVs – Antiretroviral

CBO – Community Based Organization

CCR5 – Coding Chemokine Receptor 5

CD4 – Cluster of Differentiation 4

CEPHERG – Center for Popular Education and Human Rights Ghana

CIA – Central Intelligence Agency

CRC – Constitutional Review Commission

CSO – Civil Society Organization

DIC – Drop-In-Centre

ECOWAS – Economic Community of West African States

GAC – Ghana AIDS Commission

GDHS – Ghana Demographic and Health Survey

GFATM – Global Fund to fight AIDS, Tuberculosis and Malaria

GHS – Ghana Health Service

GHS-ERC – Ghana Health Service Ethical Review Committee

GMS – Ghana Men Study

HAART – Highly Active Antiretroviral Therapy

HAPP – HIV and AIDS Awareness and Prevention Program

HIV – Human Immunodeficiency Virus

HSD – Health Service Delivery

HSS – HIV Sentinel Survey

IBBSS – Integrated Biological and Behavioral Surveillance Questionnaire

ILGA10 – International Lesbian, Gay Association

JHS – Junior High School

JSI – John Snow Incorporated

KP – Key Population

LGBT – Lesbian, Gay, Bisexual and Transgender

MoT – Modes of Transmission

MSM – Men who have Sex with Men

NACP – National AIDS/STI Control Program

NGO – Non – Governance Organization

OI – Opportunistic infection

PEPFAR – President‘s Emergency Plan for AIDS Relief

PI – Principal Investigator

PLHIV – Persons Living with HIV

PLHVA – Persons Living with HIV and AIDS

SHARPER – Strengthening HIV and AIDS Response Partnership with Evidence-Based Results

SHS – Senior High School

SRS – Simple Random Sampling

SSA – Sub-Saharan African

STI – Sexual Transmitted Illness

STI – Sexually Transmitted Infections

UK - United Kingdom

UNAIDS – United Nations Program on HIV and AIDS

UNHRC – United Nations Human Rights Council

USA – United States of America

USAID – United States Agency for International Development

WAAF – West African AIDS Foundation

WAPCAS – West African Program to Combat AIDS and STI

WHO – World Health Organization

CHAPTER 1: INTRODUCTION

1.1 Background to the Study

At the global level, men who have sex with men (MSM) continue to bear a high burden of HIV infection (Smith, Tapsoba, Peshu, Sanders & Jaffe, 2009). This high burden is seen in countries that are affected by HIV, including those where MSM have been excluded from surveillance studies (Baral, Sifakis, Cleghorn & Beyrer, 2007). Recently, gay men and other MSM community groups have been essential to the response to HIV in every setting where it has been safe for them to do so, and in many places where it has not (Beyrer, Wirtz, Walker, Johns, Sifakis & Baral, 2011). The World Health Organization's (WHO's) report indicate that from the beginning of the HIV epidemic in the early 1980s, MSM have been inexplicably affected by HIV (Paper & Flat, 2017).

In many high-income settings like Australia, France, UK, and USA; the overall HIV epidemic trends are in decline but in MSM, where they have been increasing in the period of highly active antiretroviral therapy (HAART) in what have been described as re-emergent epidemics in MSM (Beyrer, Baral, & Griensven, 2012). The UNAIDS 2012 report indicated that nearly three-fourths of the global distribution of HIV is concentrated in sub-Saharan Africa (UNAIDS, 2012). HIV prevalence among MSM is more than three times the HIV prevalence for the general population (5% vs. 17.9%) in the sub-Saharan Africa and higher than any other region in the world apart from the Caribbean (Nelson et al., 2015). The results from some studies, however, indicate the widespread existence of MSM groups across Africa, and high rates of HIV infection, HIV risk behavior, and evidence of behavioral links between MSM and heterosexual networks (Smith, Tapsoba, Peshu, Sanders & Jaffe, 2009).

Ministers of Health, Heads of National AIDS Commissions, Public Prosecutors and Inspector Generals of Police of ECOWAS countries, on the 10th of April 2015, made a declaration in Dakar on factoring Key Populations in the response to HIV and AIDS in ECOWAS Member States. One of the key emphasis in the Dakar Declaration was that –without a significant improvement in the AIDS response for Key Populations, it is impossible to end the AIDS epidemic"(Prosecutors, 2015). The MSM are among these Key Populations who have been factored in the response to ending AIDS endemic in ECOWAS Member States by 2030. The Ghana AIDS Commission identifies MSM among key populations, and underlined the importance of equal access to health care and the reduction of social stigma towards them (GAC, 2016).

Since the intervention of antiretroviral therapy (ART), persons living with HIV (PLHIV) have healthier and longer life spans. It is now possible for antiretroviral therapy (ART) to reduce viral load to the point where an infected person is no longer, or much less, infectious to others. Treatment as a prevention strategy is a basic factor of the post-2015 UNAIDS global Fast-Track strategy to end AIDS as a public health concern by 2030. The strategy aims by 2020 to have 90% of all people living with HIV to know their HIV status; 90% of all people with diagnosed HIV infection receiving sustained ART, and; 90% of all people receiving ART to have viral suppression. As access to ART scale-up continues to be at the forefront of program efforts to prevent new infections and HIV progression, socio-behavioral factors that may affect the adherence of ART become increasingly salient (Cock, 2009). For viral suppression to occur, evidence shows that optimal adherence to ART should be greater than 95%. Studies suggest that

adherence in resource - poor countries averages 23%, varying considerably by context (Paterson, Swindells, Mohr, Brester, Vergis, Squier, Wagener & Singh, 2000).

Antiretroviral Therapy (ART) has been available in Ghana since June 2003 and the number of ART sites has increased from 175 to 197 in 145 districts out of the 216 districts (Korley, 2016). Over the last two decades, Ghana has made modest gains in the national HIV response: new HIV infections have been going down and more people are getting access to life-saving antiretroviral medicines (Abdulai, 2016). The Ghana Men's Study (GMS, 2011) highlighted vulnerability of HIV infection among MSM. The study reported HIV prevalence of 1.3% in general population, thus, 7 folds higher but 17.5% among MSM in Ghana was 17.5%. In 2017 HIV Sentinel Survey (HSS) Report, national HIV prevalence went up (1.67%) while Ghana Men's Study round 2 reported upward HIV prevalence (18.1%) among MSM. Overall, the 2017 HSS reported a need for ART adults (248,860) of 15 years and more. However, data review of HIV & AIDS patients on ART between 2005 and 2010 (Addo, Yawson, Addo, Dornoo, & Seneadza, 2014) showed that the number of patients who stopped treatment increased from 57 to 243 and those who were lost to follow-up also increased from 41 to 4,191 respectively. A report by UNAIDS from 2015 shows that HIV prevalence is still high among MSM in Ghana, and there are still many challenges to changing this situation (Paper & Flat, 2017).

Data from the 2011 Integrated Biological and Behavioral Surveillance Survey (IBBSS) indicated high HIV prevalence among KPs, many of whom reside in urban areas (Abdulai, 2016). Paper & Flat (2017) shows that 25% of Ghanaian MSMs were HIV-positive in the year 2006 and that Discrimination MSM population face in the society causes the individuals, either, to delay or

avoid seeking HIV-related information, services and care. Like many other African nations, Ghana laws criminalize sexual practices between men and impose penalties on people who engage in same-gender sexual practices. In this context, Ghanaian MSM must make informed decisions about sexual behaviors within a context where homophobia is the norm. The MSM who were going for HIV education programs at the CEPHERG stopped for fear of being arrested by police (Paper & Flat, 2017). Research exploring the challenges to adherence for PLHIV on ART in the general population within sub Saharan Africa is on the increase (Scanlon & Vreeman, 2013) but, as yet, there has been extremely limited focus on key populations like MSM. Research to improve access and adherence among the key populations is virtually non-existent in Low and Middle Income Countries (Scanlon & Vreeman, 2013).

1.2 Problem Statement

The heavy burden of HIV among gay men and other MSM is a reality in virtually every country affected by HIV and for which data on MSM are available (Baral, Sifakis, Cleghorn, & Beyrer, 2007). In the UK, for example, over 3000 MSM were diagnosed with HIV in 2010, the highest number since the start of the epidemic (Health Protection Agency, 2013). There is great interest in the possibility of extending ART use in order to help to reduce HIV incidence (Cambiano, Rodger & Phillips, 2011), but a cautionary consideration is that the rise in incidence observed in MSM has occurred during a period in which ART use has expanded and the proportion of people with viral suppression has increased (Bansi, Sabin, Delpech, Hill, Fisher et al. 2009). For instance, the HIV and AIDS community has considerable challenges in clarifying and addressing the needs of MSM in sub-Saharan Africa, because homosexuality is illegal in most African countries including Ghana (Trust, 2015).

Results from the 2011 IBBSS estimates the total population of MSM to be 30,600 and that 17.5% of MSM were living with HIV (GAC, 2016). On the other hand, Ghana Men's Study round I (2011) recorded 34.3% HIV prevalence in Greater Accra region (GAC, 2016). As the national HIV prevalence had gone up from 1.3% (GAC, 2016) to 1.67% (HSS, 2017) while Ghana Men's Study round 2 reported upward HIV prevalence of 18.1% (GMS, 2017) from 17.5% (IBBSS, 2011) among MSM, the Greater Accra region recorded 42.2% HIV prevalence among MSM (GAC, 2016) from 34.3% (GAC, 2016). The HIV prevalence among MSM in Greater Accra region remains a public health concern that calls for study. Antiretroviral (ART) adherence is a key in addressing the upward HIV prevalence among MSM in Greater Accra region. The intervention in the Western region of Ghana, using HIV positive MSM case managers as a strategy to achieve the 2nd and 3rd 90 of the UNAIDS 90-90-90 HIV treatment targets among MSM succeeded in initiating 76.5% retention of HIV positive MSM enrolled on ART (Ekem-Ferguson, Owusu, Wosornu, et al. 2018). Despite their intervention, the level of ART adherence is unknown among MSM in Ghana. Lack of knowledge in ART adherence among MSM in Greater Accra region poses a public health concern in the attempt to end AIDS epidemic in Ghana. Also, factors associated with ART adherence and the barriers to ART adherence amongst MSM population have not been fully explored. As part of measures to fill these gaps, this study sought to determine the level of ART adherence; examined factors associated with ART adherence and explored barriers to ART adherence amongst MSM in four selected ART facilities in the Greater Accra region of Ghana.

1.3 Study Objectives

The objectives of the study focused on general and specific as discussed below.

1.3.1 General Objective

To assess factors associated with ART adherence amongst MSM in the selected facilities.

1.3.2 Specific Objectives are:

1. To determine the level of ART adherence amongst MSM in the selected facilities.

2. To examine factors associated with ART adherence amongst MSM in the selected facilities.

3. To examine perceptions of MSM on factors associated with ART adherence in the selected facilities.

4. To examine the factors that influence ART adherence amongst MSM in the selected facilities.

1.4 Research Questions

The specific objectives of the study were achieved by answering the following questions:

1. What factors are associated with ART adherence amongst MSM in the selected facilities?

2. What is the level of ART adherence amongst MSM in the selected facilities?

3. What is the perception of MSM on factors associated with ART adherence amongst MSM in the selected facilities?

4. To what are the factors that influence ART adherence amongst MSM in the selected facilities?

1.5 Justification of the Study

Given the uneven burden of HIV infection amongst MSM in the global setting, sub-Saharan Africa and Ghana compared to heterosexual populations, it is essential that more research work were carried out on MSM living with HIV to know factors associated with their ART adherence. Adherence to ART amongst MSM in Ghana is critical as far as the upward HIV prevalence of 18.1% (GAC, 2016) from 17.5% (GAC, 2016) among MSM is concerned. The upward HIV

prevalence of 42.2% among MSM (GAC, 2016)from 34.3% (GAC, 2016) in the Greater Accra region notwithstanding the ART intervention needs to be investigated to find out the level of adherence amongst HIV positive MSM. Knowledge in the factors associated with ART adherence amongst MSM is a key in assessing the strengths and weaknesses of ‗strengths-based case management' strategy (Ekem-Ferguson et al. 2018). Knowledge in the level of ART adherence amongst MSM is essential in the response to HIV and AIDS epidemic in Ghana. Knowledge in the barriers to ART adherence amongst MSM would help stakeholders, policymakers, service providers and researchers in HIV and AIDS to re-strategize for improved interventions and service delivery.

CHAPTER 2: LITERATURE REVIEW & CONCEPTUAL FRAMEWORK

2.0 Introduction

This chapter presents the literature review of related studies on the concepts underlying this study. There are fourteen sections discussing ART adherence; factors influencing ART adherence, barriers to ART adherence, level of ART adherence, conceptual framework, operationalized concept and chapter summary.

2.1 Definition and Uses of ART

Antiretroviral therapy (ART) refers to the use of a combination of HIV & AIDS drugs that have specific inhibitory effects on HIV replication. These inhibitors belong to six distinct classes of drugs: the nucleoside and nucleotide reverse transcriptase inhibitors (NRTIs, NtRTIs), the non-nucleoside reverse transcriptase inhibitors (NNRTIs), the protease inhibitors (PIs), the fusion inhibitors (FIs), the CCR5 co-receptor antagonists and the integrase strand transfer inhibitors [INSTIs (Institute, 2015). The number of ART centers or treatment sites has increased from 175 in 2013 to 197 in 2015 (Abdulai, 2016). Historically, individuals with HIV have had low CD4 counts at presentation to care (Althoff, Gange, Klein et al. 2010). However, there have been concerted efforts to increase testing of at-risk individuals and to link individuals with HIV to medical care before they have advanced HIV disease. Deferring ART until CD4 counts decline puts individuals with HIV at risk of both AIDS-defining and certain serious non-AIDS conditions. Furthermore, the magnitude of CD4 recovery is directly correlated with CD4 count at ART initiation. Consequently, many individuals who start treatment with CD4 counts 500 cells/mm3 after up to 10 years on ART (Moore & Keruly, 2007) have a shorter life expectancy than those initiating therapy at higher CD4 count thresholds (Samji, H., Cescon, A., Hogg, 2013).

Antiretroviral therapy (ART) is recommended for all individuals with HIV, regardless of CD4 T lymphocyte cell count, to reduce the morbidity and mortality associated with HIV infection. ART is also recommended for individuals with HIV to prevent HIV transmission. The classifications of ART regimens recommended for initial therapy have been changed from Recommended, Alternative, and Other to Recommended Initial Regimens for Most People with HIV; and Recommended Initial Regimens in Certain Clinical Situations. Patients should also understand that currently available ART does not cure HIV.

To improve and maintain immunologic function and maintain viral suppression, ART should be continued indefinitely. While ART is recommended for all patients, the following conditions increase the urgency to initiate therapy: Lower CD4 counts (e.g., <200cells/mm3). Although observational studies had been inconsistent in defining the optimal time to initiate ART, (Samji, H., Cescon, A., Hogg, 2013) randomized controlled trials now definitively demonstrate that ART should be initiated in all patients with HIV, regardless of disease stage. The urgency to initiate ART is greatest for patients at lower CD4 counts, where the absolute risk of OIs, non-AIDS morbidity, and death is highest. Randomized controlled trials have long shown that ART improves survival and delays disease progression in patients with CD4 counts. A number of investigations, including biological, ecological, and epidemiological studies and one randomized clinical trial, provide strong evidence that treatment of individuals with HIV can significantly reduce sexual transmission of HIV. Lower plasma HIV RNA levels are associated with decreases in the concentration of the virus in genital secretions (Vernazza, P.L., Troiani, L., Flepp, 2000).

The prevalence amongst males, 15-49 years in 2016 was 1.1% (GAC, 2016), which increased to 1.67 in 2017 (HSS, 2017). The overall HIV prevalence of 2.4% in Greater Accra region (2016) increased to 3.2% (HSS, 2017). The national aggregate of 17.5% representing MSM HIV prevalence in 2011 Ghana Men Study round one has slightly increased to 18.1% (GMS, 2017). However, the 34.3% HIV prevalence among MSM in Greater Accra region (GMS, 2011) has increased to 42.2% in 2017.

2.2 Global Picture on ART

Worldwide, survival of HIV-infected populations has improved with the increasing availability of antiretroviral therapy (ART). By 2014, 40% of eligible HIV-infected individuals had initiated ART globally (UNAIDS, 2016a). In the same year, the Joint United Nations Program on HIV/AIDS (UNAIDS) announced the 90-90-90 targets, which aim for 90% of all people living with HIV to know their HIV status, 90% of all people with diagnosed HIV infection to receive sustained ART and 90% of all people receiving ART to have HIV viral suppression(UNAIDS, 2016b). As shown by the increasing CD4 cell counts observed at ART initiation worldwide, a trend towards earlier ART initiation is seen in most countries (Avila, Althoff, Mugglin et al. 2015). With the scale up of ART, the reduction in early mortality seen in high-income countries over 20 years ago (Egger, Hirschel, Francioli et al. 1997) has also become evident in sub-Saharan Africa. For example, in a study from Botswana, mortality in the year after ART initiation decreased from 7% to 2% between 2002 and 2012 (Farahani, Price, El-Halabi et al. 2016).

2.3 Challenge to the Fight against HIV in sub-Saharan Africa

The sub-Saharan Africa includes 14 countries, 3 landlocked and 11 with a coastline with the majority French speaking as their national language. The epidemic in West Africa is deemed to be heterosexually driven, but recent data suggest that sex between men play a significant role in the spread of HIV infection (Samuelsen, Norgaard & Ostergaard, 2012; De Cock, Jaffe & Curran, 2012). Data from Senegal, The Gambia, Côte d'Ivoire, Ghana and Nigeria indicate a substantial number of infections occurrence (Merrigan, Azeez, Afolabi, et al., 2011; Vuylsteke, Semde, Sika, et al., 2012) in many of MSM reports having sex with women (Sheehy, Tun, Vu, et al., 2013). Review on strategies in response to HIV and AIDS found that Ministers of Health, Heads of National AIDS Commissions, Public Prosecutors and Inspector Generals of Police of ECOWAS countries, on the 10th of April 2015, made a declaration in Dakar on factoring Key Populations in the response to HIV and AIDS in ECOWAS Member States. One of the key emphasis in the Dakar Declaration was that –without a significant improvement in the AIDS response for Key Populations, it is impossible to end the AIDS epidemic"(Prosecutors, 2015). The MSM are among these Key Populations who have been factored in the response to ending AIDS epidemic in ECOWAS Member States, 2020. Even in areas of medium to high prevalence such as parts of Asia and sub-Saharan Africa, MSM are on average over nine times more vulnerable to infection than the general population (Baral, Sifakis, Cleghorn & Beyrer, 2007).

2.4 HIV Acquisition and Transmission among KPs in Burkina Faso and Togo

A review of the study by Papworth, Grosso, Ketende, Wirtz, Cange, Kennedy, Lebreton, Ky-Zerbo, Anato & Baral (2014) indicated that epidemiology of HIV in Burkina Faso and Togo are not different from other central and west African countries with data regarding Key Populations, and targeted, cost-effective programs that address not only behavioral, but biological and

structural risk factors associated with HIV acquisition and transmission in Key Population, which should be implemented to reduce the onward spread of HIV. The authors suggest that prevention programs should model strategies on the continuum of care and appropriate programs that increase uptake of treatment among Key Populations, address the barriers to healthcare that exist in highly stigmatized settings, and ultimately reduce community viral loads and transmission.

According to Papworth et al, structural barriers to health services for Key Populations include stigma and discrimination, the inability to disclose sexual practices and health needs to health practitioners, and economic limitations to seeking services. Some of these barriers seem to be overcome when specific community based organization (CBO) associations or services are developed to create safe spaces for the population to discuss health issues. Few specialized CBOs exist in Burkina Faso and Togo. The review further disclosed that where expertise exists, the clinical capacity of these groups is limited. The authors suggested that the clinical capacity could be scaled up to provide further HIV care and treatment services to the KPs. The literature revealed that concurrently, the KPs also attend general population health services, and in this context disclosure of their sexual orientation or behavior becomes limited. They recommended that developing tailored services for KPs, integrated into general population services may avoid community-level stigma and discrimination from deterring individuals from accessing services. According to them, the regional disparities of the results is an indication that local models should be developed on a city-by-city or region-by-region basis, and community structures should facilitate the relationship between the community and integrated health services.

The paper further indicated diversity of results across cities for MSM, which highlights the needs for tailored services per city that account for the social and cultural dynamics across the two

countries. The review found that cities where tailored service existed, higher levels of HIV status knowledge, discloser to health providers, and condom use among both male and female partners was reported. Health providers were cited as a source for HIV prevention information, as were peer-educators, mainly supported through PEPFAR HAPP program. Finally, the authors suggested that combined-programs that integrate community-level interventions (CBOs, peer educators, counseling) with support and links to HIV care and treatment services (integrated into public or private health services, or stand-alone), will greatly alter the uptake of care and treatment services among MSM in Burkina Faso and Togo.

2.5 Antiretroviral Adherence in General

The introduction of combination antiretroviral therapy (ART) has dramatically reduced morbidity, mortality and infectiousness of persons infected with HIV (UNAIDS, 2016c). Of the estimated 17 million people receiving ART worldwide, about 12 million reside in sub-Saharan Africa and 2 million in Asia, the two regions most affected by the HIV epidemic (UNAIDS, 2016c). Consistently high levels of adherence to ART are essential for sustained viral suppression, thus preventing drug resistance (Gardner, Burman, Steiner, Anderson & Bangsberg, 2009) and disease progression (Bangsberg, Perry, Charlebois, Clark, Robertston, Zolopa et al. 2001). The Joint United Nations Programme on HIV/AIDS (UNAIDS) 90–90–90 global treatment targets emphasize sustained viral suppression and therewith the need for optimal adherence (UNAIDS, 2014b). Characterizing and understanding determinants of adherence in settings with the highest disease burden will be critical to attaining these targets (O'Connor, Gardner, Mannheimer, Lifson, Esser, Telzak et al. 2013). Despite favourable short-term data from low-resource settings, concerns remain that long-term adherence may be suboptimal because of multiple barriers including lack of basic health education and enrolment in massive

ART programmes with limited capacity for patient monitoring and support (Safren, Biello, Smeaton, Mimiaga, Walawander, Lama et al. 2014).

2.6 Antiretroviral Adherence among MSM

From Beyrer's work, targeted interventions to promote ART adherence among MSM could significantly reduce HIV transmission and improve clinical outcomes including adherence (Beyrer, 2014). In their work, ART adherence was a struggle among MSM, which proved poorer health outcomes compared to other high-risk groups, including men with multiple sex partners (Gichuru, Thiong'o, Macharia, Okuku, et al. 2013). As access to ART scale-up continues to be at the lead of program efforts to prevent new infections and HIV progression, socio-behavioral factors that may affect the adherence of ART become increasingly salient (Cock, 2009:488). Viral suppression requires >95% antiretroviral therapy (ART) adherence, but resource-poor countries average just 23%, and some much lower (UNAIDS, 2010). The exclusive general population approach to researching and promoting ART adherence repeats similar knowledge gaps of earlier HIV prevention research (UNAIDS, 2010: 3; Beyrer et al. 2011: 8).

2.7 Social Factors associated with ART Adherence

Adherence to HIV antiretroviral regimens is affected by a complex array of factors (Crespo-Fiero, 1997; Keuroghlian, Kamen, Neri, Lee, Liu & Gore-Felton, 2011) and occurs in the context of lives already burdened by socio-economic, psychological, cultural and health challenges (Halkitis, 1998; Halkitis & Kirton, 1999). Non-adherence to HIV antiretroviral medications can compromise the health of an HIV positive individual by producing a rapid increase in circulating virus. Patients who miss even a few doses of their medications demonstrate increases of 100,000 copies or more of the virus per milliliter of blood (Ho, Neumann, Perelson, Chen, Leonard & Markowitz, 1995; Ferguson, Donnelly, Hooper, Ghani, Fraser, Bartley, Rode, Vernazza, Lapins,

Mayer & Anderson, 2005). To achieve long-term viral suppression and potential eradication of the virus, strict adherence is essential (Carpenter et al., n.d.). Recent data suggests that HIV-positive patients, however, must take their medications on time at least 95% of the time to achieve viral suppression (Paterson, Swindells, Mohr, Brester, Vergis, Squier, Wagener & Singh, 2000). One study found that 61% of those with undetectable viral load reported 80% or better adherence, whereas only 36% of those with less than 80% adherence were found to have undetectable viral loads (Silveira, Draschler, Leite, Pinheiro, Silveira, et al., 2002). Adherence has also been associated with immunologic outcomes, specifically in terms of CD4 counts. Studies have shown that adherent patients demonstrate significant increases in CD4 counts compared to non-adherent patients (Singh, Berman, Swindells, Justis, Mohr, Squier & Wagener, 1999). Adherence rates to HIV antiretroviral medications among diverse populations of HIV positive persons have been found to be highly variable (Chesney, Ickovics, Chambers, Gifford, Neidig, Zwickl, 2000). Rates of adherence have been shown to differ substantially based on measurement period like missed doses in past month, past week, past day; and measurement format like interview, anonymous self-report, pill counts, electronic measurement (Chesney et al., 2000). In their work, (Fay et al. 2011) reported that stigma targeting MSM has been shown to limit both the provision and uptake of HIV services. Similarly, a research (Poteat et al. 2011) in Senegal reported stigma as influencing provision and uptake of HIV prevention, treatment, and care services in the context of arresting MSM.

2.8 Legal Factors associated with ART Adherence

A review by (Paper & Flat, 2017) indicated that Ghana AIDS Commission issued a statement about the situation of MSM in Ghana, emphasizing that ~~–~~it is important that all hands are on deck to reduce the number of young people who are lured into MSM", and called on ~~–~~all religious

leaders, traditional authorities, educationists, parents and NGOs working with young people to get involved in educating males on the dangers of being involved in sex with other men"(Paper & Flat, 2017). Condemnation of same sex relationship by religious, social and political leaders in Ghana may create environment of fear with verbal and physical assault, which may prevent MSM living with HIV from accessing vital health services including ART adherence. A literature review found that in August 2014, the Police in Walewale, a small farming town and capital of the West Mamprusi District, Northern Region, arrested a 21-year-old man on suspicion of being homosexual and _recruiting' other youth to be homosexuals. Police stated the arrest was for the suspect's own safety, since residents of the town had vowed to kill the man and his entire family if he was not removed from the community (Trust, 2015).

In 2013, The Centre for Popular Education and Human Rights Ghana (CEPEHRG) recorded five cases of LGBT people in Ghana being robbed and beaten after responding to profiles on dating websites (Kweku, 2013). In 2012, Ghana rejected recommendations to decriminalize same-sex sexual activity between consenting adults but to adopt measures that would raise awareness in the fight against homophobia. Ghana considered that it had already taken steps to prevent acts of violence against the gay community (UNHRC, 2012). A review found that in August 2012, Nine LGBT people fled the Accra neighborhood of Jamestown after a group of youths were assaulted in the area perceived to be homosexual community (Mensah, 2012). Data from SHARP's 2007 behavioral and HIV biomarker survey of MSM in Greater Accra region (AED-SHARP, 2007) revealed that 61% of the MSM identified themselves as bisexual. (Attipoe, 2004) revealed that approximately half of the MSM surveyed also had sexual relationships with women, that about half were selling sex, and that nearly 80% would not go to a government health clinic if they thought they had an STI for fear of mistreatment, harassment, or arrest.

Criminalization and stigmatization of homosexuality, as in other settings (Altman, Aggleton, Williams, Kong, Reddy & Harrad, 2012; Smith, Tapsoba, Peshu, Sanders & Jaffe, 2009) are likely underlying factors for ART Adherence amongst MSM in Ghana. A literature review showed that Ghana Criminal code of 1960, Act 29, amended in 2003, outlaws ―unnatural carnal knowledge". Chapter 6, Section 104 ―Unnatural Carnal Knowledge" reads as follows: (1) Whoever has unnatural carnal knowledge – (a) of any person of the age of sixteen years or over without his consent shall be guilty of a first-degree felony and shall be liable on conviction to imprisonment for a term of not less than five years and not more than twenty-five years; or (b) of any person of sixteen years or over with his consent is guilty of a misdemeanor; or (c) of any animal is guilty of a misdemeanor. (2) Unnatural carnal knowledge is sexual intercourse with a person in an unnatural manner or with an animal (Christensen, 2008). As stated in Section 296 (4) of the Criminal Procedural Code, a misdemeanor can be punished with up to three years in prison (CIA., 2016). According to ILGA, only same-sex activity between men is criminalized, while same-sex activity between women is legal (Clark, 2014). The Constitution Review Commission (CRC) was set up in 2010 to consult with Ghanaians on the 1992 Constitution and possible changes that should be made to the document (Cobbinah, 2011). While the CRC received a few submissions from people who wanted the Constitution to recognize the rights of homosexuals, most of the submissions called for not recognizing such rights by the Constitution.

The arguments used in the submissions against recognizing lesbian and gay rights include that homosexuality prevents procreation without which the society can become extinct, that being homosexual, culturally, is an abomination and alien to Ghanaian culture, that even animals do not engage in homosexual practices, that Ghana should not copy blindly from foreign countries,

and last but not least, that homosexuality is against the laws of nature, against the laws of God, and will not bring development to the society (Commission., 2011). The arguments for recognizing lesbian and gay rights were that a man should have the freedom to live with his fellow man if that is what pleases him, and that some people are born homosexuals and should be allowed to express their sexual orientation (Bil-Jaruzelska, Sigurd, Oppegaard, Berntsen, Flatås, Rindal, Sarpong & Stenwig, 2017). Previous studies have shown that MSM are stigmatized by habitual attitudes and laws against same sex in many African countries (Fay, Baral, Trapence, Motimedi, Umar, Iipinge, et al. 2011). As a result, they have poor access to care and may lack trust in health service providers (Okall, Ondenge, Nyambura, Otieno, Hardnett, Turner, et al. 2014). Similarly, criminalization of same sex makes it risky for men to have honest conversations about their risks for HIV infection, which reduce the extent to which the most appropriate recommendations for health services can be prepared (Semugoma, Beyrer & Baral, 2012).

2.9 Personal Factors associated with ART Adherence

A study reviewed accounted for the first all-inclusive assessment of factors that might contribute to HIV infection disparities within the Black race MSM (Millett, Peterson, Wolitski & Stall, 2006). From the review, a meta-analysis of fifty-six studies, one year later, confirmed that notwithstanding greater HIV burden, Black race MSM across number of studies, regions, and demographics reported similar exposed anal intercourse, less sex partners, fewer substance use, nevertheless greater undiagnosed HIV infection and fewer access to ART (Millett, Flores, Peterson & Bakeman, 2007). Another meta-analysis of one hundred and seventy-six United States studies asserted the outcomes of the first meta-analysis with 40% more odds of the black race compared to other MSM who engage any behavior protective of HIV transmission (Millett,

Peterson, Flores, Hart, Jeffries & Wilson, 2012). In the Ghana Men Study Round 2, most MSM (65.7%) reported in the study, fell in the 18-24 years age category in their socio-demographic characteristics findings. The study found majority of sample (51.8%) completed secondary school across study regions. Similarly, majority of MSM (95%) reported they never married or were single. Most MSM (46%) sampled in the study reported being unemployed while bisexuality was common across study regions (47.5%). On protective sexual activity, condom use at last sex with a man or a woman among MSM in Greater Accra region was the second lowest (45.9%) (GMS, 2017).

2.10 Health Service Delivery Factors associated with ART Adherence

Studies have shown that MSM in general receive inadequate medical care, and repeatedly discriminated in both high income and low middle income countries (Arnold, 2011). In many parts of the world, there are considerable obstructions to receiving adequate coverage of HIV preventive services among MSM. Literature has it that double stigma including HIV and homosexuality work to discourage MSM from disclosing their sexual orientation to their healthcare providers. They conceal their male sex partners from their healthcare providers, and also decline from attending clinical services made to meet the needs of MSM (Fay et al. 2011). Although the AIDS epidemic created awareness of exclusive health needs among MSM, many core causes of HIV susceptibility were initially not fully understood, and integrated into treatment and prevention programs (Makadon, Stall, Goldhammer & Landers, 2008). From other literature, negative experiences shown by healthcare providers could also discourage MSM from disclosing their risks behavior (Baral et al. 2009). Literature shows that members of MSM community can describe their own sexual orientations and healthcare dynamics that drive HIV infection incidence, in order to inform the development of actual responses (DeGruttola, Smith,

Little, & Miller, 2010). In the Ghana Men Study Round 2, majority of MSM in each study region reported never experiencing refusal of health care services for their sexual orientation, neither experiencing uncomfortable when accessing healthcare; nor experiencing symbolic or physical violence because of sexual orientation in the last 12 months (GMS, 2017).

2.11 Proportion of ART Adherence

The UNAIDS in 2013 reported a fall of AIDS-related deaths by 35% since 2005, and this is attributed mainly to the availability of anti-retroviral therapy programs that have been deployed in the heavily hit regions. Because of these interventions, the proportion of people living with HIV & AIDS (PLHIV) who were not receiving antiretroviral therapy had decreased from 90% [90 -91%] in 2006 to 63% [61–65%] at the end of 2013 (UNAIDS, 2014a). It is also estimated that about 87% of Africans with HIV who are aware of their status are currently receiving antiretroviral therapy (ART), and nearly 76% of them have realized viral suppression (UNAIDS, 2013). About 4.8 million HIV & AIDS related deaths in sub-Saharan Africa (SSA) have been avoided since 1995 to date due to the introduction of ARTs (Alvarez-Uria, 2013). The Ghana AIDS Commission‘s (GAC) report for 2013 indicated that 140,000 people were on ART. It also estimates that about 110,494 adults and 12,751 children will be put on ART by the year 2015 in line with universal access targets. The report neither accounted for number of MSM living on ART nor proportion of them adhering to ART. About four years ago, the number of sero-positive HIV patients in Ethiopia was about 700,000 with overall estimated prevalence of 1.5% (Asmare, Aychiluhem, Ayana & Jara, 2014). The introduction of combination ART including protease inhibitors has resulted in striking reductions in HIV-related mortality. Numerous reports have documented that the key to the success of the new HAART is the ability and willingness of HIV-positive individuals to adhere to complex ART regimens, and at least

95% adherence is required for ART regimens to be fully effective (Asmare et al. 2014). However, ART adherence among sero-positive HIV patients was low (88.6 %.).

2.12 Proportion of ART Adherence among MSM in England and Wales

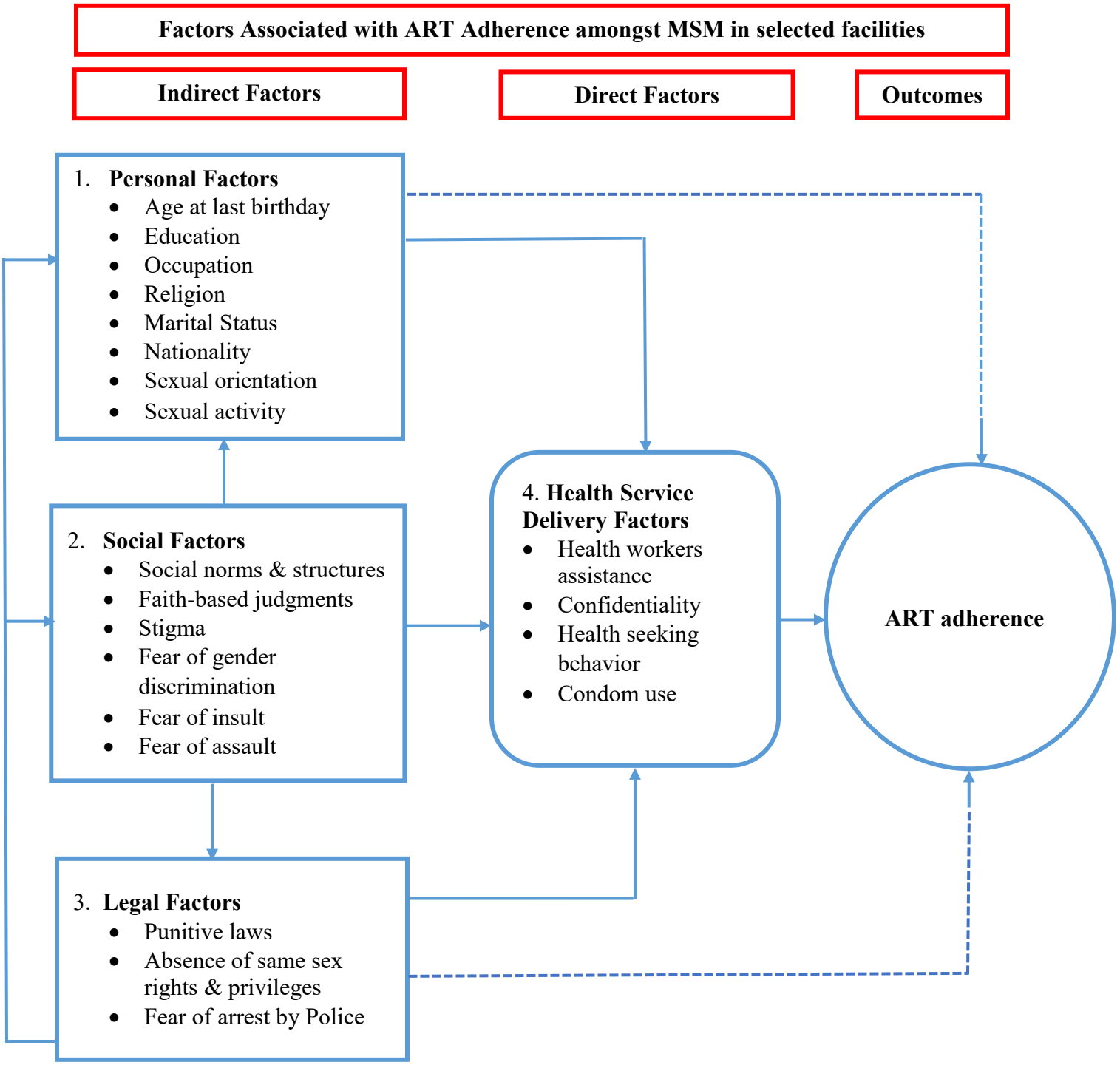
Results from a randomized clinical trial have shown that antiretroviral therapy (ART) can significantly reduce the risk of HIV transmission in serodiscordant heterosexual couples. It is reasonable to infer that ART should also reduce the risk of transmission in other populations, such as men who have sex with men (MSM). Data from ecological studies suggest that ART might have some public health benefit in this population, but cannot be a foundation for accurate assessment of effects on the transmission of HIV infection (Montaner, Lima & Barrios, 2010). Birrell and colleagues have presented robust data that question the undue expectations placed upon the ability of ART to significantly affect the transmission of HIV infection in MSM in the community setting (Birrell, Gill & Delpech, 2013). Their analysis clearly shows that, in England and Wales the proportion of HIV-positive men taking ART between 2001 and 2010 rose from 69% to 80% and rates of HIV testing increased by 3.7 times. However, despite these improvements, the population-level incidence of HIV infection did not decrease in MSM.

2.13 Conceptual Framework

Based on the above discussed literature, the conceptual framework of the study was developed. The conceptual framework in Figure 2.1 explains how the personal factors, which are the age, gender, education, occupation, religion, marital status; social factors, which are societal prejudice, religion, stigma, discrimination, fear of insult, fear of assault; legal factors, which are punitive laws, absence of same sex rights & privileges, fear of arrest by Police; and health service delivery factors, which are attitudes of some health workers, confidentiality, health

seeking behavior, income and affordability influence ART adherence amongst MSM in selected facilities in Greater Accra and Central regions of Ghana.

The four main constructs covering the independent variables on the outcome/dependent variable are personal, social, legal and health delivery service factors. The conceptual framework shows how the four main factors directly influence one another and consequently influence ART adherence. Additionally, personal and legal factors indirectly influence. Literature has it that these factors as operationally have been defined in **Table 2.1** can directly and indirectly influence ART adherence.



Source: Researchers' drawings

Figure 2.1 Conceptual Framework

2.14 Concept Definition

Table 2.1: Concept Definition

No.	Theme	Item	Definition
1	**Personal Factors**	Age	Age refers to age at last birthday.
		Education	This refers to the level of education completed: primary education, junior high school, senior high school and tertiary.
		Occupation	This is defined as the main employment status of participants: public servant, private sector employee, self-employed and unemployed.
		Religion	This refers to religious affiliation of the participants, which are classified as: Christianity, Islam, Traditional, Atheism, etc.
		Marital status	Marital status is classified as: Single, Married, Divorced, Separated, Widow and Co-habiting.
		Nationality	This refers to Ghanaian or foreigner
		Sexual orientation	This refers to gay or bisexual
		Sexual activity	This refers to male sex work, pleasure or both
2	**Social Factors**	Social norms & structures	This refers to social justice based on beliefs.
		Faith-based judgments	This refers to prejudices on social behavior.
		Stigma	Stigma is defined as negative perceptions of society about vulnerability.
		Fear of gender discrimination	This is defined as setting limitations to vulnerable populations.
		Fear of insult	This refers to verbal attacks raised on vulnerable groups for social justice.
		Fear of assault	This refers to open physical beatings and damaging of lives of the vulnerable for social justice.
3	**Legal Factors**	Punitive laws	This refers to stigmatized behaviors within the purview of laws.
		Absence of same sex rights & privileges	This refers to lack of freedom to live and act as homosexual, whether one was born a homosexual or chooses as sexual orientation.
		Fear of arrest by Police	This refers to feelings of criminality about men who have sex with men.
4	**Health Service Delivery Factors**	Health seeking behavior	This refers to missed antiretroviral therapy appointments.
		Health workers	This refers to a mixture of socio-religious perception in a professional practice of health care delivery.
		Confidentiality	This refers to experiencing fear within the purview of law to disclose gender and homosexual activity.
		Condom use	This is defined as yes I use or No I don‘t use.
5	**Outcome of interest**	ART adherence	This is defined yes or no to antiretroviral therapy compliance.

2.15 Chapter Summary

This chapter has examined literature on the key themes/concepts underpinning the study. It has shown that ART adherence as a dependent variable could be influenced by several factors, including socio-demographic characteristics of the MSM (personal factors), social, legal and health service delivery factors. Based on the gaps identified in the literature, the conceptual framework of the study was developed to establish the relationship between the dependent and independent variables of this study. The concept was operationalized in definition for easy understanding. The next chapter presents the methods applied to collect data for subsequent analysis.

CHAPTER 3: METHODOLOGY

3.0 Introduction

This chapter places the study design and processes of the study in perspective. The chapter is organized as follows. The first section discusses the choice of study design - the rationale for settling on quantitative research method. The second part deals with the population, sampling procedures as well as data collection. The closing part of the chapter deals with data analysis, presentation, and limits on generalization as well as ethical considerations.

3.1 Study Design & Methods

This was a cross sectional study which employed a quantitative method. The study assessed factors associated with ART adherence amongst these Men who have Sex with Men. Data was collected from sampled bisexual and gay sex-oriented participants across four selected ART _strengths-based case management' facilities. The researcher had to establish prior contact with participants before administering of self-reported questionnaires but the type of population for this study led the researcher to use _case managers' in organizing and arranging for the participants. ART _strengths-based case management' is a strategy developed by USAID strengthening the care continuum project, using HIV positive MSM case managers to achieve the second and third 90 of the UNAIDS 90-90-90 HIV treatment targets (Ekem-Ferguson et al. 2018). Researcher used closed-ended structured questionnaire which gave participants the convenience to a self-reported adherence because that was suitable in the study context compared to others (Corbetta, 2003). The ART _strengths-based case managers' who themselves administered questionnaire, after seeking clarifications from researcher on some of the questions, helped many of the study participants for better understanding of the questions.

3.2 Study Area & Sites

This study was undertaken in the Greater Accra region of Ghana. The underlying reason for the choice of Greater Accra region of Ghana was based on the highest HIV prevalence amongst MSM (42.2%) compared to other regions like the Ashanti (25.4%), Eastern (14%) and Central (10%) (GMS, 2017). The four selected ART _strengths-based case management' facilities were African AIDS Foundation (WAAF); Pro-link, Centre for Popular Education and Human Rights, Ghana (CEPEHRG) and Maritime Life Precious Foundation (MARITIME).

3.3 Rationale for Study Sites and Participants Selection

Applicability and accessibility of participants influenced the choice of four sites for this study (Rubin & Rubin, 2012). Maritime Life Precious Foundation, Prolink, WAAF, and CEPHERG under the USAID Strengthening the Care Continuum projects, implemented by JSI Research and Training Institute Incorporation have trained HIV positive MSM _case managers' who are to help bridge the gap between HIV diagnosis and ART enrolment (Ekem-Ferguson et al. 2018). Also, most of these selected facilities contributed to the Ghana Men Study round I and II and therefore were needed to help in identifying participants for this study. The study included biologically males aged 18 years and older who were MSM and were residents of Greater Accra region, and had accessed ART at least in the last 12 months prior to this study. The study defined MSM as males who have anal sex with other males; either in exchange for money or other commodities or for pleasure, regardless of whether or not they have sex with females or have a personal or social gay or bisexual identity. Those who did not meet the inclusion criteria were not part of the study.

3.3.1 Gaining Access to Sites

Researcher used a snowballing approach in locating non-governmental organizations which run HIV positive MSM focused programs and projects in the Greater Accra region. A staff at the

NACP directed the researcher to Ghana-West Africa Program to Combat AIDS and STI (WAPCAS) for a support. Researcher held meetings with CEPHERG programs manager, which led to introduction of researcher to Prolink and WAAF for assistance in getting more participants for the study. This was because the MSM could not be gathered at one particular place due to their confidentiality issues. A similar approach and bureaucratic process of referrals led researcher to Maritime Life Precious Foundation. That notwithstanding, researcher was handed over by the four selected facilities to their ART _case managers' respectively for assistance in the data collection. Prolink and CEPHERG are located in Spintex a suburb of Accra, WAAF is located in Haatso a suburb of Accra while Maritime Life Precious Foundation is located in Tema, all within the Greater Accra region of Ghana.

3.4 Study Variables

3.4.1 Dependent Variable: ART Adherence

3.4.2 Independent Variables

The Independent variables measured included; age at last birthday, highest education completed, main occupation, religion, marital status, nationality, sexual orientation and sexual activity, which represented personal factors. Social norms & structures, faith-based judgments, stigma, fear of gender discrimination, fear of insult and assault represented social factors. Punitive laws, absence of same sex rights & privileges, and fear of arrest by Police represented legal factors while health service delivery factors included health workers assistance and confidentiality, health seeking behavior, and condom use. The independent variables were categorized as indirect and direct factors associated with dependent variable ART adherence.

3.5 Sample Size Calculation

After literature on ART adherence (89%.) among sero-positive HIV patients in Ethiopia was reviewed (Asmare et al. 2014), a sample size of 150 was calculated on estimated population of 500 HIV positive MSM across the four selected facilities in Greater Accra region of Ghana.

To arrive at the sample size calculation of 150, Cochran's (1963) formula was used.

$$n = Z^2 pq/d^2$$

Where n = sample size

Z^2 = confidence level [95% standard normal deviation usually set at $(1.96)^2$]

p = proportion of ART adherence among sero-positive HIV patients (0.89)

q = 1 – 0.89 = 0.11

d^2 = 0.05 * 0.05 acceptable margin of error (0.0025)

Therefore $$n = \frac{(1.96)^2 * 0.89 * 0.11}{(0.05)^2}$$

$$n = \frac{3.8416 * 0.89 * 0.11}{0.0025}$$

n = 150.437056 OR **150**

3.6 Ethical Considerations

Ethical approval was sought from the Ghana Health Service Ethical Review Committee before starting data collection and Ethical Clearance (GHS-ERC: 034/02/18) was granted. A written permission requesting for the use of selected key population in selected health related project sites were sought through the School of Public Health, College of Sciences–University of Ghana. The participants' informed consent form addressed General Information about the Research, procedure, benefits and risk of the study. Additionally, confidentiality of the participants,

compensation and withdrawal from the study issues were addressed in the consent form. Finally, contact for additional information and volunteer commitment was addressed in the consent form. Participants were provided with a brief introduction to the research objective on the questionnaire, which ensured data privacy and protection of participants. All the questionnaires were assigned codes for identification. To keep participants‘ information anonymous, they were not asked for their names or personal identification.

3.7 Confidentiality

This study involved participants of a vulnerable population who required high confidentiality. For confidentiality of participants, the _case mangers‘ of the selected facilities were used to make all the arrangements for a meeting with participants at the ART facilities. This was done in support of the four managers of the selected facilities. All meetings for the administering of the questions were held at the respective ART facilities. This was simple as though participants were coming for their normal ART schedules.

3.8 Privacy

The questionnaire was a structured closed-ended self-reported, which was distributed among individuals depending on their time of arrival at the facilities. This helped in ensuring privacy of the participants. The _case managers‘ assisted participants who could not understand some questions. Some of the participants did not want to see the researcher after a telephone communication and therefore requested their _case managers‘ to arrange a meeting with them at a place convenient for administering the questionnaire. The collection of the questionnaires was done in bulk by the _case managers‘ and handed over to the researcher at the appropriate time.

3.9 Data Collection Tool & Method

The study succeeded in using _strengths-based case managers' assistance at the four selected facilities in studying 223 participants instead of the 150 sample size. A self-administered adherence structured questionnaire was adapted and administered by most of the participants (for those who could read and write) but those who could not read and write were assisted by the _case manager' through interview (interviewer administered) with questions categorized under sections A, B, C, D and E. The Ghana Demographic and Health Survey (GDHS) demographic characteristics scale was adapted for data on demographic characteristics of participants (section A) while Morisky scale on adherence of 8 items was adapted in measuring adherence and non-adherence of the section B. The response categories were coded as: (Yes =1 and No =0). On the Morisky's scale of 1 to 8, those who scored 1-8 were classified adherence while below 6 scores were classified non-adherence. A two point Likert scale was adapted for the data on sections C, D and E. The adapted Likert scale was used in assessing the association between independent and dependent variables as well as relationships among the independent variables and their influence on the dependent variable. These questions required simple Agree coded as 1 or Disagree coded as 2. Researcher held meetings with _case managers' who arranged and organized participants for the study. The _case managers' played effective role in successfully organizing HIV- positive MSM who were on ART for the study. Overall, data was collected from April 13th to June 29th, 2018. This involved booking appointments with _case managers' for availability and arrangement of study participants. Also the study made use of secondary data through review of books and journals in academic and MSM focused non-government organizations.

3.10 Data Analysis

All the data collected using questionnaires were verified, edited, coded and entered into the computer, using the 2010 Microsoft Excel Spread Sheets. The data verification was done by running consistent checks on all variables, using 2010 Microsoft Excel for accuracy and reliability. Corrections were made after verification from the questionnaire and database was generated afterwards. Data were later imported into STATA version 15. STATA variables manager was used in labeling coded variables. Pearson's Chi-square was used to test the association between personal factors and ART adherence, social factors and ART adherence, legal factors and ART adherence and health service delivery factors and ART adherence respectively. Finally, multiple logistics regression model was used to quantify the adjusted effects of the various factors on ART adherence.

3.11 Quality Control

For quality control of data collection, the researcher met the respective _case managers' of the selected facilities who were informed of the study objectives, understanding of the study questionnaire and how long it would take a participant to respond to the questions. The respective _case mangers' contacted eligible participants and booked appointments with them to come to their facilities where they normally have their ART. Most of the participants who did not have ART appointments within the study period had to travel to their respective ART facilities for the questionnaire administering, on a special arrangement whereas those already on appointment did it without any special arrangement. For data not to be compromised, _case mangers' who had initially been informed by the researcher on the study objectives and understanding of the details of the questionnaire supervised few participants who did not want to see the researcher for administering the questionnaire whiles the researcher, after his introduction by the _case managers', supervised the others. Participants who did not understand some of the

issues on the questionnaire called either the researcher or the ‗case manager' for clarification. All participants filled their questionnaires under the supervision of both the researcher ‗case managers'.

CHAPTER 4: RESULTS

4.1 Demographic and Background Characteristics

From table 4.1, overall HIV positive MSM (233) self-reported on ART adherence with a (median (LQ, UQ)) age of 24(22, 27) year, a total of 121 participants (54.3%) were between 20 and 24 years of age, followed by seventy-eight participants (34.9%) between 25 and 29 years of age and a minority represented by 10.76% between 30 and 35 years of age respectively. The highest education completed amongst the participants was Senior High School (SHS) 117(52.5%). Majority of respondents 169(75.8%) were single. About half of the respondents 110(49.3%) were unemployed. The vast majority of 213(95.5%) were Ghanaian while 10(4.48%) were foreigners with their representation shown in (Figure 4.1). Most respondents 168(75.3%) were bisexual. One hundred and fifty-nine (71.3%) were MSM for pleasure while 47(21.1%) were for both pleasure and male sex work. Majority of participants 195(87.4%) reported using condoms during their most recent sexual activity. Few participants, 51(22.8%) had female sexual partners out of which 31(60.8%) used condom with their female partners. Most of the participants 195(87.4%) did not miss their most recent ART appointments.

Table 4.1: Demographic and Background Characteristics

Characteristics	**Frequency (N=223)**	**Percentage (%)**
PERSONAL FACTORS		
Age in years *(median (LQ, UQ))*	24 (22, 27)	
20-24yrs	121	54.26
25-29yrs	78	34.98
30-35yrs	24	10.76
Highest education completed		
Primary	15	6.73
JHS	27	12.11
SHS	117	52.47
Tertiary	64	28.7
Marital status		
Single	169	75.78
Married	14	6.28

Divorced/separated	9	4.04
Cohabitating	31	13.9
Main occupation		
Public servant	25	11.21
Private sector employee	31	13.9
Unemployed	110	49.33
Self-employed	57	25.56
Nationality		
Ghanaian	213	95.52
Foreigner	10	4.48
Sexual orientation		
Bisexual	168	75.34
Gay	55	24.66
Sexual activity		
Male sex worker	17	7.62
Pleasure	159	71.3
Both	47	21.08
Condom use during most recent sexual activity		
Yes	195	87.44
No	28	12.56
Female sex partner		
Yes	51	22.87
No	172	77.13
Condom use with your female partner		
Yes	31	60.78
No	20	39.22
Missed most recent ART appointment		
Yes	28	12.56
No	195	87.44

LQ: lower quartile. UQ: upper quartile

The 10(4.48%) Foreign National MSM with HIV on ART in the Greater Accra region found in the study was distributed in Figure 4.1.

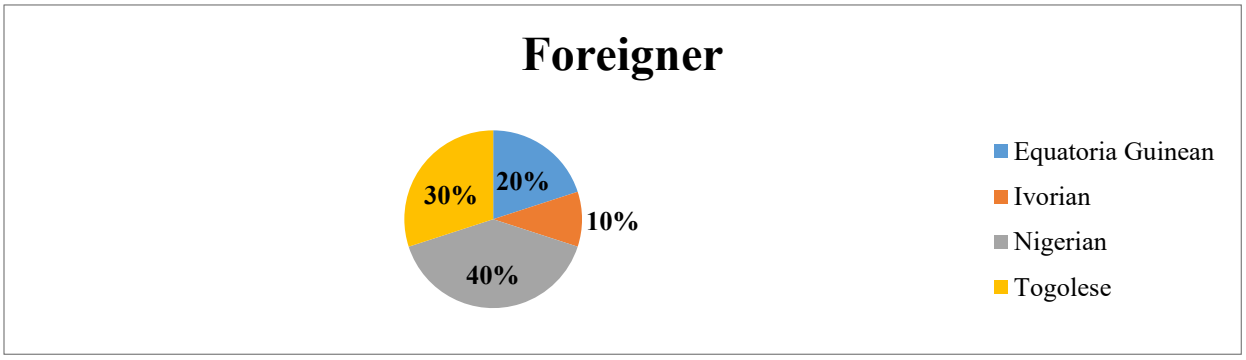


Figure 4.1: Graph on Foreign Nationals

4.2 Morisky Adherence Scale and Overall ART Adherence

From Tables 4.1 and 4.2, just over a third 87(39%) of participants adhered to ART with confidence interval of (CI: 32.57, 45.75). On Morisky's adherence scale of 8 items rating from 1 to 8 score, table 4.2 reports 124 (55.6%) of participants who sometimes forgot to go for their Antiretrovirals. Similarly, majority of participants 124 (55.6%) did not take their antiretroviral in any day of last two weeks calculating from the day of the study. Conversely, 144(64.6%) of participants ever stopped taking their antiretroviral or decreased the dose without informing their prescriber because they felt worse as taking the antiretroviral. Similarly, 130(58.3%) sometimes forget to go with their antiretroviral in case of travelling outside their place of residence. Majority of participants 141(63.2%) sometimes stopped taking their antiretroviral when they felt healthy while 136(61%) felt distressed for strictly following their antiretroviral therapy. A vast majority 207(92.8%) did not have difficulty in remembering taking their antiretroviral whereas 167(74.9%) had taken their antiretroviral a day before participating in the study.

Table 4.2: Morisky Adherence Scale and Overall ART Adherence

	ART Adherence	
Variables	**No (%)**	**Yes (%)**
Do you sometimes forget to go for your antiretroviral?	99 (44.39)	124 (55.61)
In the last two weeks, was there any day when you did not take your antiretroviral?	99 (44.39)	124 (55.61)
Have you ever stopped taking your antiretroviral or decreased the dose without informing your prescriber because you felt worse when you took them?	144 (64.57)	79 (35.43)
In case of travelling outside your place of residence, do you sometimes forget to go with your antiretroviral?	130 (58.3)	93 (41.7)
When you feel you are healthy, do you sometimes stop taking your antiretroviral?	141 (63.23)	82 (36.77)
Have you ever felt distressed for strictly following your antiretroviral therapy?	87 (39.01)	136 (60.99)
Do you often have difficulty remembering taking your antiretroviral?	207 (92.83)	16 (7.17)
Did you take your antiretroviral yesterday?	56 (25.11)	167 (74.89)
SUMMARY		
ART adherence		
No	136 (60.99)	
Yes	87 (39.01)	
95% CI of adherence	(32.57, 45.75)	

%: row percentage. CI: confidence interval

4.3 Perceived Social Factors with ART Adherence

From Table 4.3, a total of 114(51.1%) agreed that social norms and structures did not limit their adherence to ART. About two thirds, 142(63.7%) agreed that faith-based judgments were not barriers to their ART adherence. Similarly, 161(72.2%) agreed that perceptions of society about homosexuality did not stigmatize ART adherence. In sharp contrast, 159(71.3%) disagreed that ART service creates disparity between homosexuals and heterosexuals. Nearly two thirds (140,

62.8%) agreed that ART adherence amongst MSM had nothing to do with fear of insult. Correspondingly, 160(71.8%) agreed that people do not assault MSM going for their ART.

Table 4.3: Perceived Social Factors associated with ART adherence

Characteristics	Frequency (N=223)	Percentage (%)
SOCIAL FACTORS		
Social norms and structures do not limit ART adherence		
Agree	114	51.12
Disagree	109	48.88
Faith-based judgments are not barriers to ART adherence		
Agree	142	63.68
Disagree	81	36.32
Perceptions of society about homosexuality do not stigmatize ART adherence		
Agree	161	72.2
Disagree	62	27.8
ART service creates disparity between homosexuals and heterosexuals		
Agree	64	28.7
Disagree	159	71.3
ART adherence amongst MSM has nothing to do with fear of insult		
Agree	140	62.78
Disagree	83	37.22
People do not assault MSM going for their ART		
Agree	160	71.75
Disagree	63	28.25

4.4 Perceived Legal Factors with ART Adherence

From Table 4.4, most participants 179(80.3%) agreed that criminalization of homosexuality did not prohibit ART adherence. However, 208(93.3%) disagreed that fear of arrest by police is a barrier to ART adherence whereas only 66(29.6%) agreed that absence of same sex rights in Ghana is not a barrier to ART adherence.

Table 4.4: Perceived Legal Factors associated with ART adherence

Characteristics	Frequency (N=223)	Percentage (%)
LEGAL FACTORS		
Criminalization of homosexuality does not prohibits ART adherence		
Agree	179	80.27
Disagree	44	19.73
Fear of arrest by Police is a barrier to ART adherence		
Agree	15	6.73
Disagree	208	93.27
Absence of same sex rights is a barrier to ART adherence		
Agree	66	29.6
Disagree	157	70.4

4.5 Perceived Health Service Delivery Factors with ART Adherence

From Table 4.5, Majority of participants 155(69.5%) disagreed that most health workers assist MSM for ART adherence. Most participants 210(94.2%) agreed that fear of gender discrimination limits sexual orientation disclosure for a holistic ART service. Similarly, sexual orientation disclosure was a barrier to ART adherence among 193(86.6%) participants.

Table 4.5: Perceived HSD Factors associated with ART adherence

Characteristics	Frequency (N=223)	Percentage (%)
HEALTH SERVICE DELIVERY FACTORS		
Most health workers assist MSM for ART adherence		
Agree	68	30.49
Disagree	155	69.51
Fear of gender discrimination limits sexual orientation disclosure for a holistic ART service		
Agree	210	94.17
Disagree	13	5.83
Sexual orientation disclosure is a barrier to ART adherence		
Agree	193	86.55
Disagree	30	13.45

HSD: Health Service Delivery

4.6 Demographic & Background Characteristics Associated with ART Adherence

From Table 4.6, 74(54.4%) of participants between 20 to 24 years of age did not adhere to ART, 46(36.8%) of participants between 25 to 29 years of age adhered to ART while a third of those

who were between 30 and 35 years 16(11.8%) inclusive did not adhere to ART. The overall age of MSM living with HIV was not significantly associated with ART adherence ($p>0.05$). Likewise, the educational status of HIV positive MSM persons was not significantly associated with ART adherence ($p>0.05$). Thus, participants with primary education 10(7.4%) did not adhere to ART whereas JHS (14.9%) adhered to ART. Whereas SHS 71(52.9%) adhered to ART, 41(30.2%) representing Tertiary education completed participants did not adhere. Overall, religion of MSM living with HIV was not significantly associated with ART adherence ($p>0.05$). Thus, Christians 99(72.8%) did not adhere to ART; Muslims 35(25.7%) did not adhere to ART while Traditional Religion 7(8.1%) adhered to ART. Majority 107(78.7%) were single, 11(8.1%) were married, 6(6.9%) were divorced/separated while 16(18.4%) were co-habiting. Whereas 59(58.6%) unemployed adhered to ART, 40(29.4%) self-employed did not adhere. Similarly, 20(14.7%) private sector employees and 17(12.5%) public servants respectively did not adhere to ART and overall, main occupation of HIV positive MSM was significantly not associated with ART adherence ($p>0.05$). Bisexuals 103(75.7%) did not adhere to ART while Gays 33(25.3%) adhered to ART but sexual orientation of HIV positive MSM in general was not significantly associated with ART adherence ($p>0.05$). Overall, sexual activity of HIV positive MSM was not significantly associated with ART adherence ($p>0.05$) but 95(73.6%) of participants who engaged MSM sexual activity for pleasure adhered to ART.

Strikingly, 32(23.5%) who used condom with their female sex partners did not adhere to ART while 104(78.2%) who did not use condom with their female sex partners adhered to ART. In contrast, 115(92%) participants who used condom in their most recent sexual activity adhered to ART while 21(15.4%) who did not use condom in their most recent sexual activity did not

adhere to ART. However, condom use in total was not positively associated with ART adherence ($p>0.05$). Majority of Ghanaian HIV positive MSM 128(97.5%) adhered to ART while 8(5.9%) foreign nationals did not adhere but in all, nationality of HIV positive MSM was not significantly associated with ART adherence ($p>0.05$). On the other hand, most recent ART appointment of participants showed significant association with ART adherence ($p<0.001$). Majority 110(97.7%) who adhered to ART did not miss their most recent ART appointments.

Table 4.6: Demographic and Background Characteristics associated with ART Adherence

Variables	Totals	ART adherence		χ^2	P-value
		No (%)	Yes (%)		
PERSONAL FACTORS					
Age in years				0.4597	0.795
20-24yrs	121	74 (54.41)	47 (54.02)		
25-29yrs	78	32 (33.82)	46 (36.78)		
30-35yrs	24	16 (11.76)	8 (9.20)		
Highest education completed				1.4093	0.703
Primary	15	10 (7.35)	5 (5.75)		
JHS	27	13 (10.29)	14 (14.94)		
SHS	117	46 (52.21)	71 (52.87)		
Tertiary	64	41 (30.15)	23 (26.44)		
Religion				5.9235	0.052
Christianity	158	99 (72.79)	59 (67.82)		
Islam	56	35 (25.74)	21 (24.14)		
Traditional	9	2 (1.47)	7 (8.05)		
Marital status				7.1651	0.067
Single	169	107 (78.68)	62 (71.26)		
Married	14	11 (8.09)	3 (3.45)		
Divorced/separated	9	3 (2.21)	6 (6.90)		
Cohabitating	31	15 (11.03)	16 (18.39)		
Main occupation				5.1997	0.158
Public servant	25	17 (12.50)	8 (9.20)		
Private sector employee	31	20 (14.71)	11 (12.64)		
Unemployed	110	51 (43.38)	59 (58.62)		
Self-employed	57	40 (29.41)	17 (19.54)		
Sexual orientation				0.0299	0.863
Bisexual	168	103 (75.74)	65 (74.71)		
Gay	55	22 (24.26)	33 (25.29)		
Sexual activity				0.624	0.732
Male sex worker	17	7 (7.35)	10 (8.05)		
Pleasure	159	64 (69.85)	95 (73.56)		
Both	47	31 (22.79)	16 (18.39)		
Nationality					0.323
Ghanaian	213	85 (94.12)	128 (97.52)		
Foreigner	10	8 (5.88)	2 (2.30)		
Condom use during most recent sexual activity				2.6428	0.104
Yes	195	80 (84.56)	115 (91.95)		
No	28	21 (15.44)	7 (8.05)		
Female sex partner				0.0859	0.769
Yes	51	32 (23.53)	19 (21.84)		
No	172	68 (76.47)	104 (78.16)		
Missed most recent ART appointment				13.6697	0.001***
Yes	28	26 (19.12)	2 (2.30)		
No	195	85 (80.88)	110 (97.70)		

χ: Pearson's Chi-square. *: P-value<0.05. **: P-value<0.01. ***: P-value<0.001.

4.7 Social Factors associated with ART Adherence

From Table 4.7, 66(55.2%) agreed that social norms and structures did not limit ART adherence. Social norms and structures was not positively associated with ART adherence ($p>0.05$). Similarly, 84(66.7%) agreed that faith-based judgments were not barriers to ART adherence. Faith-based judgment was not significantly associated with ART adherence ($p>0.05$). Participants 97(73.6%) agreed that perceptions of society about homosexuality did not stigmatize ART adherence. Perceptions of society about homosexuality was not significantly associated with ART adherence ($p>0.05$). However, 87(82.8%) disagreed that ART service created disparity between homosexuals and heterosexuals, which showed significant association with ART adherence ($p<0.002$). Participants 79(70.1%) agreed that ART adherence amongst MSM has nothing to do with fear of insult. There was no significant association between ART adherence and fear of insult ($p>0.05$). This was not different from 94(75.9%) who agreed that people do not assault MSM going for their ART service delivery. Assault was not significantly associated with ART adherence ($p>0.05$).

Table 4.7: Social Factors associated with ART adherence

Variables	Totals	ART adherence		χ^2	P-value
		No (%)	Yes (%)		
SOCIAL FACTORS					
Social norms and structures do not limit ART adherence				0.94	0.341
Agree	114	48 (48.53)	66 (55.17)		
Disagree	109	70 (51.47)	39 (44.83)		
Faith-based judgments are not barriers to ART adherence				0.55	0.458
Agree	142	58 (61.76)	84 (66.67)		
Disagree	81	52 (38.24)	29 (33.33)		
Perceptions of society about homosexuality do not stigmatize ART adherence				0.133	0.716
Agree	161	64 (71.32)	97 (73.56)		
Disagree	62	39 (28.68)	23 (26.44)		
ART service creates disparity between homosexuals and heterosexuals				9.153	0.002**
Agree	64	49 (36.03)	15 (17.24)		
Disagree	159	72 (63.97)	87 (82.76)		
ART adherence amongst MSM has nothing to do with fear of insult				3.284	0.07
Agree	140	61 (58.09)	79 (70.11)		
Disagree	83	57 (41.91)	26 (29.89)		
People do not assault MSM going for their ART adherence				1.191	0.275
Agree	160	66 (69.12)	94 (75.86)		
Disagree	63	42 (30.88)	21 (24.14)		

χ: Pearson's Chi-square. *: P-value<0.05. **: P-value<0.01. ***: P-value<0.001.

4.8 Legal Factors associated with ART Adherence

Majority 127(93.4%) disagreed that fear of arrest by police was a barrier to ART. This was not significantly associated with ART adherence (p>0.05). Conversely, 103(87.4%) agreed that criminalization of homosexuality does not prohibits ART adherence and this was positively associated (p< 0.033). Participants 99(72.8%) disagreed that absence of same sex rights was a barrier to ART adherence. Absence of same sex rights was not significantly associated with ART adherence (p>0.05).

Table 4.8: Legal Factors associated with ART adherence

Variables	Totals	ART adherence		χ^2	P-value
		No (%)	Yes (%)		
LEGAL FACTORS					
Fear of arrest by Police is a barrier to ART				0.01	0.935
Agree	15	6 (6.62)	9 (6.90)		
Disagree	208	127 (93.38)	81 (93.10)		
Criminalization of homosexuality does not prohibits ART adherence				4.52	0.033*
Agree	179	76 (75.74)	103 (87.36)		
Disagree	44	33 (24.26)	11 (12.64)		
Absence of same sex rights is a barrier to ART adherence				0.96	0.328
Agree	66	29 (27.21)	37 (33.33)		
Disagree	157	99 (72.79)	58 (66.67)		

χ: Pearson's Chi-square. *: P-value<0.05. **: P-value<0.01. ***: P-value<0.001.

4.9 Health Service Delivery Factors associated with ART Adherence

From Table 4.9, 132(62.9%) agreed that fear of gender discrimination limits sexual orientation disclosure for a holistic ART service and their agreement showed significant association with ART adherence (p<0.021). However, 92/155 (72.4%) disagreed that most health workers assist MSM in ART adherence, though their disagreement had no significant association with ART adherence (p>0.05). Majority 115(89.7%) agreed that sexual orientation disclosure was a barrier to ART adherence but this was not significantly associated (p>0.05).

Table 4.9: Health Service Delivery Factors associated with ART adherence

Variables	Totals	ART adherence		χ^2	P-value
		No (%)	Yes (%)		
HEALTH SERVICE DELIVERY FACTORS					
Fear of gender discrimination limits sexual orientation disclosure for a holistic ART service				5.29	0.021*
Agree	210	132 (62.86)	78 (37.14)		
Disagree	13	4 (30.77)	9 (69.23)		
Most health workers assist MSM in ART adherence				0.56	0.451
Agree	68	44 (32.35)	24 (27.59)		
Disagree	155	63 (67.65)	92 (72.41)		
Sexual orientation disclosure is a barrier to ART adherence				1.18	0.277
Agree	193	78 (84.56)	115 (89.66)		
Disagree	30	21 (15.44)	9 (10.34)		

χ: Pearson's Chi-square. *: P-value<0.05. **: P-value<0.01. ***: P-value<0.001.

4.10 Factors that Influence ART Adherence

The simple and multiple logistic regression models were used to assess factors that influence ART adherence among MSM living with HIV. From the multiple logistic models as shown in Table 4.10, the demographic and background characteristics were selected as factors associated with ART adherence for a presentation on statistical test of significant association. The odds of unemployed HIV positive MSM adhering to ART was 5.84 times compared to HIV positive MSM who were employed in the public sector (AOR: 5.84, 95% CI: 1.11-30.81). Overall, the main occupation of HIV positive MSM showed a significant influence on their ART adherence ($p \leq 0.010$). Also, the odds of HIV positive MSM who were a private sector employees adhering to ART was 19% less compared to that of HIV positive MSM who were a public sector employees (AOR: 0.81, 95% CI: 0.17-3.91) but the odds of that of HIV positive MSM who were self-employed adhering to ART was 28% more compared to that of the HIV positive MSM who were a public sector employees (AOR: 1.28, 95% CI: 0.3-5.39). Also, the odds of a foreigner adhering to ART was 0.1 times compared to the odds of a Ghanaian adhering to ART (AOR: 0.1, 95% CI: 0.01-0.73). The nationality of the HIV positive MSM showed a significant influence on their ART adherence ($p \leq 0.024$). HIV positive MSM who reported to have never missed ART appointment had a 17.87 odds of adhering to ART compared to those who reported to have ever missed ART appointment (AOR: 17.87, 95% CI: 3.21-99.55). Missing ART appointment showed a significant influence on HIV positive MSM ART adherence ($p<0.001$).

Table 4.10: Factors that Influence ART Adherence

	Simple logistic model		Multiple Logistic model	
Variables	**UOR (95% CI)**	**P-value**	**AOR (95% CI)**	**P-value**
Age in years		0.7954		0.6328
20-24yrs	Ref		Ref	
25-29yrs	1.1 (0.61, 1.96)		0.93 (0.36, 2.41)	
30-35yrs	0.79 (0.31, 1.98)		1.76 (0.44, 7.03)	
Highest education completed		0.7063		0.4547
Primary	Ref		Ref	
JHS	1.86 (0.5, 6.9)		3.75 (0.61, 23.25)	
SHS	1.3 (0.42, 4.03)		1.72 (0.36, 8.23)	
Tertiary	1.12 (0.34, 3.68)		1.92 (0.37, 10.09)	
Religion		0.0944		0.7259
Christianity	Ref		Ref	
Islam	1.01 (0.54, 1.89)		1.22 (0.52, 2.83)	
Traditional	5.87 (1.18, 29.21)		2.24 (0.24, 20.75)	
Marital status		0.0815		0.1446
Single	Ref		Ref	
Married	0.47 (0.13, 1.75)		0.83 (0.11, 6.23)	
Divorced/separated	3.45 (0.83, 14.29)		5.51 (0.81, 37.64)	
Cohabitating	1.84 (0.85, 3.98)		3.72 (0.78, 17.75)	
Main occupation		0.1617		0.0104*
Public servant	Ref		Ref	
Private sector employee	1.17 (0.38, 3.57)		0.81 (0.17, 3.91)	
Unemployed	1.84 (0.73, 4.61)		5.84 (1.11, 30.81)	
Self-employed	0.9 (0.33, 2.49)		1.28 (0.3, 5.39)	
Sexual orientation		0.863		0.634
Bisexual	Ref		Ref	
Gay	1.06 (0.57, 1.97)		0.72 (0.18, 2.83)	
Sexual activity		0.7327		0.0769
Male sex worker	Ref		Ref	
Pleasure	0.96 (0.35, 2.66)		0.44 (0.11, 1.71)	
Both	0.74 (0.24, 2.3)		0.19 (0.04, 0.85)	
Nationality		0.224		0.024*
Ghanaian	Ref		Ref	
Foreigner	0.38 (0.08, 1.82)		0.1 (0.01, 0.73)	
Condom use during most recent sexual activity		0.11		0.296
Yes	Ref		Ref	
No	0.48 (0.19, 1.18)		0.52 (0.15, 1.77)	
Female sex partner		0.769		0.735
Yes	Ref		Ref	
No	1.1 (0.58, 2.1)		0.81 (0.23, 2.8)	
Missed most recent ART appointment		0.002**		0.001**
Yes	Ref		Ref	
No	10.05 (2.32, 43.51)		17.87 (3.21, 99.55)	

UOR: unadjusted odds ratio. AOR: adjusted odds ratio. ref: reference category. *: P-value<0.05. **: P-value<0.01. ***: P-value<0.001

From Table 4.11, the social factors associated with ART adherence were selected for a simple and multiple logistics regression test of significant association. Most of the associations did not reveal any statistically significant associations. However, the odds of adherence for HIV positive MSM who disagreed that ART service creates disparity between homosexuals and heterosexual were 6.9 times the odds compared to those who agreed (AOR: 6.90, 95% CI: 2.39-19.97). Also, HIV positive MSM who disagreed that ART adherence had nothing to do with fear of insult had a 54% decreased odds of adhering to ART compared to those who agreed (AOR:0.46, 95% CI: 0.21-1.00).

Table 4.11: Factors that Influence ART Adherence

	Simple logistic model		Multiple Logistic model	
Variables	**UOR (95% CI)**	**P-value**	**AOR (95% CI)**	**P-value**
Social norms and structures do not limit ART adherence		0.333		0.177
Agree	Ref		ref	
Disagree	0.77 (0.45, 1.31)		0.59 (0.28, 1.27)	
Faith-based judgments are not barriers to ART adherence		0.458		0.963
Agree	Ref		ref	
Disagree	0.81 (0.46, 1.42)		1.02 (0.48, 2.17)	
Perceptions of society about homosexuality do not stigmatize ART adherence		0.716		0.769
Agree	Ref		ref	
Disagree	0.89 (0.49, 1.64)		1.15 (0.45, 2.95)	
ART service creates disparity between homosexuals and heterosexuals		0.003**		<0.001***
Agree	Ref		ref	
Disagree	2.7 (1.4, 5.22)		6.9 (2.39, 19.97)	
ART adherence amongst MSM has nothing to do with fear of insult		0.071		0.049*
Agree	Ref		ref	
Disagree	0.59 (0.33, 1.05)		0.46 (0.21, 1)	
People do not assault MSM going for their ART		0.276		0.068
Agree	Ref		ref	
Disagree	0.71 (0.39, 1.31)		0.44 (0.18, 1.06)	

UOR: unadjusted odds ratio. AOR: adjusted odds ratio. ref: reference category. *: P-value<0.05. **: P-value<0.01. ***: P-value<0.001

Table 4.12 covers simple and multiple logistics regression statistics on legal and health service delivery factors associated with ART adherence. These variables were selected as factors associated with ART adherence for a statistical test of significant associations but just one variable revealed statistically significant association. The HIV positive MSM who disagreed that criminalization of homosexuality did not prohibit ART adherence had lower odds of adhering to ART compared to those who agreed (AOR: 0.63, 95% CI: 0.22-1.76). Similarly, HIV positive MSM who disagreed that fear of gender discrimination limited sexual orientation disclosure for a holistic ART service delivery were 16.43 more likely to adhere to ART compared to those who agreed (AOR: 16.43, 95% CI: 2.65-101.81).

Table 4.12: Factors that Influence ART Adherence

	Simple logistic model		Multiple Logistic model	
Variables	**UOR (95% CI)**	**P-value**	**AOR (95% CI)**	**P-value**
Fear of arrest by Police		0.935		0.313
Agree	Ref		ref	
Disagree	0.96 (0.33, 2.79)		0.41 (0.07, 2.32)	
Criminalization of homosexuality does not prohibits ART adherence		0.036*		0.375
Agree	Ref		ref	
Disagree	0.45 (0.21, 0.95)		0.63 (0.22, 1.76)	
Absence of same sex rights is a barrier to ART adherence		0.329		0.423
Agree	Ref		ref	
Disagree	0.75 (0.42, 1.34)		0.71 (0.31, 1.64)	
Most health workers assist MSM in ART adherence		0.451		0.602
Agree	Ref		ref	
Disagree	1.26 (0.69, 2.27)		1.23 (0.56, 2.72)	
Fear of gender discrimination limits sexual orientation disclosure for a holistic ART service delivery		0.03*		0.003**
Agree	Ref		ref	
Disagree	3.81 (1.13, 12.78)		16.43 (2.65, 101.81)	
Sexual orientation disclosure is a barrier to ART adherence		0.28		0.385
Agree	Ref		ref	
Disagree	0.63 (0.27, 1.45)		0.58 (0.17, 1.98)	

UOR: unadjusted odds ratio. AOR: adjusted odds ratio. ref: reference category. *: P-value<0.05. **: P-value<0.01. ***: P-value<0.001

CHAPTER 5: DISCUSSIONS

Adherence to antiretroviral therapy in long-term HIV care after early or late initiation of ART is important not only to reduce individual HIV positive MSM related morbidity and mortality but also as a means to guarantee prevention of new HIV infections strategies. In this study of factors associated with ART adherence amongst MSM in selected facilities in the Greater Accra region of Ghana, we found that just a third (39%) of participants adhered to ART. This means that majority of HIV positive MSM in the Greater Accra region did not adhere to ART. The low ART adherence found among HIV positive MSM in this study is in congruous with what Asmare et al. (2014) found among sero-positive HIV patients in Ethiopia. This confirms previous report by Gichuru et al (2013) that MSM struggle with antiretroviral therapy (ART) adherence, and have worse clinical outcomes compared to other high-risk individuals including female sex workers and men with multiple sex partners.

Unlike results found in (Fay et al. 2011) that societal stigma against MSM was shown as a factor limiting both the provision and uptake of HIV services, social norms and structures found in this study did not stigmatize MSM living with HIV from adhering to ART. The reasons for this disproportion may include the role played by civil society organizations (CSOs) in Ghana with HIV programming for MSM. A typical example is the intervention of using HIV positive MSM ‗case managers' for ART enrollment by Maritime Life Precious Foundation (MLPF). The report by Poteat et al (2011) in Senegal that stigma influences provision and uptake of HIV prevention, treatment, and care services in the context of MSM arrest cannot be generalized because this study showed majority (93.3%) of positive MSM in Ghana say, ―fear of arrest by the police" was not a barrier to ART adherence. The reason for the disconnection between police arrest and ART

adherence might be based on report (Attipoe, 2004), which revealed that nearly 80% of MSM would not go to a government health clinic if they thought they had an STI for fear of mistreatment, harassment, or arrest.

Previous studies have shown that MSM were stigmatized by usual attitudes and laws against same sex in many African countries (Fay et al. 2011). Similarly, criminalization of same sex makes it risky for men to have honest conversations about their risks for HIV infection. This reduces the extent to which the most appropriate recommendations for health services can be prepared (Semugoma et al. 2012). Conversely, most (87.4%) participants‘ perception of criminalization of homosexuality as evidenced in this study was that, it did not prohibit their ART adherence. Correspondingly, assaulting HIV positive MSM going for ART had no influence on ART adherence. This confirms results from (GMS, 2017) that 93.1% were physically not assaulted for being MSM in Ghana. Region specific estimates found in (GMS, 2017) showed that majority of MSM never experienced refusal of services based on sexual orientation. This study however confirmed that ART service creates no disparity between homosexuals and heterosexuals. This is so because the Ghana Health Service Patient Charter in general ensures equality for all in service delivery and that clients‘ health information management records does not have space for sexual orientation, whether or not one is a homosexual.

Literature on double stigma including HIV and homosexuality which discourage MSM from disclosing their sexual orientation to their healthcare providers (Fay et al. 2011) was confirmed 210(94.2%) by this study. Similarly, the sexual orientation disclosure found to be associated with

ART adherence (86.6%) in this study was as a result of Ghana Health Service Patient Charter, which discourages health care provider from discriminating in service delivery. The fact that clients' health information management records in Ghana does not require patients' sexual orientation for care delivery, health care providers do not inquire whether or not a client is a homosexual. However, HIV positive MSM are compelled to disclose their sexual orientation when they have Sexually Transmitted Infections and Opportunistic Infections or AIDS.

5.1 STRENGTHS TO THE STUDY

The overarching advantage of cross sectional design for this study was that in spite of the limited period for the study, researcher was able to collect and compare data on three separate MSM focused HIV programming facilities in the Greater Accra region at the same time. In addition, data collection was less expensive in terms of time and cost (Gray, 2004). The 150 sample size calculated using the Cochran's (1963) formula was increased to 233 because of the key role played by the _case managers' of the selected facilities. This means that more of the HIV positive MSM on ART at the selected facilities were willing to participate in the study. Also, the role played by the _case managers' of the selected facilities positively contributed to the success of this study. The researcher found that the HIV positive MSM on ART at the selected facilities had confidence and trust in their _case managers' and therefore responded swiftly to their calls during the study. The _case managers' used participants' social media platforms and mobile phone calls to convince them for their participation in the study.

5.2 LIMITATIONS TO THE STUDY

The success of the study was not without challenges. The main limitations to the study are discussed in the following. First, organizing and arranging for participants at the selected facilities from the initial stage without the _case managers' took the researcher about one month due to confidentiality issues. Consequently, participants had to be organized at the ART _strengths-based' case management clinics from their various individual residences to administer the questionnaires. Many of the participants preferred to administer the questionnaires in the presence of their _case managers' without seeing the researcher. This negatively affected the study because the researcher could not tell if the participants who refused to have personal contacts with him were truly MSM aged 18 years and more with HIV on ART for the last 12 months prior to the study.

Another limitation to the study included self-reported methods for data collection on antiretroviral adherence with its associated factors. The health information records of participants chanced on at some of the referred ART _strengths-based' case management clinics could not be examined because of confidentiality issues. The study therefore could not get balanced information on their self-reported adherence. This also could affect the outcome of the study since self-reported adherence could be inaccurate and misrepresented. Finally, participants' perception of criminalization of homosexuality as not prohibiting their ART adherence was not fully assessed. This is because the quantitative method for data collection restricted the participants to YES or NO answers and AGREES or DISAGREE responses respectively. Participants' perception could have been better measured if the study had employed mixed method, at least, in-depth interview could have provided a detailed responses on their perception.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1. CONCLUSIONS

This study demonstrated that ART adherence amongst MSM in the Greater Accra region was low. Fear of gender discrimination limiting sexual orientation disclosure for a holistic ART service were found to be a factor associated with the low ART adherence. This can impede strategies to achieve the 2nd and 3rd 90 of the UNAIDS 90-90-90 HIV treatment targets among MSM. Also, criminalization of homosexuality as perceived to be associated with ART adherence was unsupported, and the perceived ART service disparity between homosexuals and heterosexuals was not associated with ART adherence.

6.2. RECOMMENDATIONS

Further research work is required by public health researchers to investigate why ART adherence amongst MSM was low in the Greater Accra region. Intensive ART adherence education and counseling should be provided by Ghana AIDS Commission and partnered Civil Society Organizations (CSOs) with HIV programming for MSM. The Ghana AIDS Commission should promote rigorous CSOs Advocacy and intervention on eliminating fear of gender discrimination associated with sexual orientation disclosure and ART adherence.

REFERENCES

Abdulai, M. (2016). Understanding the Barriers and Facilitators across the HIV Continuum of Care Among Key Populations in Ghana.

Addo, N.A., Yawson, A.E., Addo, A.S., Dornoo, B.T., & Seneadza, H. N. A. (2014). A Review of National Programme Data on the HIV Epidemic in Ghana: 2005-2010.

AED-SHARP. (2007). MSM Behavioral and HIV Biomarker Survey: Key Findings. Accessed online August 7, 2009: www.aedsharp.org.

Althoff, K.N., Gange, S.J., Klein, M. B. et al. (2010). Late presentation for human immunodeficiency virus care in the United States and Canada. Clin Infect Dis. 50(11):1512-1520. Available at: http://www.ncbi.nlm.nih.gov/pubmed/20415573.

Altman, D., Aggleton, P., Williams, M., Kong, T., Reddy, V., H., & D., et al. (2012). Men who have sex with men: stigma and discrimination. Lancet; 380:439–445.

Alvarez-Uria, G. (2013). Factors associated with delayed entry into HIV medical care after HIV diagnosis in a resource-limited setting: Data from a cohort study in India.

Arnold, L. (2011). Promoting culturally competent care for the lesbian, gay, bisexual, and transgender population. Am J Public Health; 91:1731.

Asmare, M., Aychiluhem, M., Ayana, M. & Jara, D. (2014). Level of ART Adherence and Associated Factors among HIV Sero- Positive Adult on Highly Active Antiretroviral Therapy in Debre Markos Referral Hospital, Northwest Ethiopia.

Attipoe, D. (2004). Revealing the Pandora Box or Playing the Ostrich? A Situational Appraisal of Men Having Sex with Men in the Accra Metropolitan Area and its Environs–Ghana. West Africa Project to Combat HIV/AIDS and STIs. Accessed online August 7, 2009: www.freewebs.com/a.

Avila, D., Althoff, K.N., Mugglin, C., et al. (2015). Immunodeficiency at the start of combination antiretroviral therapy in low-, middle-, and high-income countries. J. Acquir. Immune Defic. Syndr. 2014; 65:e8– e16. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24419071. [PubMed: 24419071] ** Comprehensi.

Bangsberg, D.R., Perry, S., Charlebois, E.D., Clark, R.A., Robertston, M., Zolopa, A. R. et al. (2001). Non-adherence to highly active antiretroviral therapy predicts progression to AIDS. Aids. 2001;15:1181–3.

Bansi, L.K., Sabin, C., Delpech, V., Hill, T., Fisher, M., et al. (2009). Trends over calendar time in antiretroviral treatment success and failure in HIV clinic populations. HIV Medicine 11: 432–438.

Baral, S., F. Sifakis, F. Cleghorn, & Beyrer, C. (2007). Elevated risk for HIV infection among men who have sex with men in low- and middle-income countries 2000–2006, a systematic review. PLoS Medicine 4(12): e339.

Baral, S., Sifakis, F., Cleghorn, F., & Beyrer, C. (2007). Elevated risk for HIV infection among men who have sex with men in low- and middle-income countries 2000-2006: a systematic review. PLoS Med ; 4:e339.

Baral, S., Trapence, G., Motimedi, F., Umar, E., Iipinge, S., Dausab, F. et al. (2009). HIV prevalence, risks for HIV infection, and human rights among men who have sex with men (MSM) in Malawi, Namibia, and Botswana. PloS one; 4:e4997.

Beyrer, C, Wirtz, A., Walker, D., Johns, B., Sifakis, F. & Baral, S. (2011). The global HIV epidemics among men who have sex with men: epidemiology, prevention, access to care and human rights. Washington, DC: World Bank Publications.

Beyrer, C. (2014). Strategies to manage the HIV epidemic in gay, bisexual, and other men who

have sex with men. Curr Opin Infect Dis; 27:1–8.

Beyrer, C., Baral, S., & Griensven, F. van. (2012). Global epidemiology of HIV infection in men who have sex with men. *The Lancet*, *380*(9839), 367–377. https://doi.org/10.1016/S0140-6736(12)60821-6.Global

Bil-Jaruzelska, A., Sigurd, M., Oppegaard, N., Berntsen, Ø.I., Flatås, M., Rindal, E., Sarpong, P. S. & Stenwig, E. (2017). Forms of Discrimination of LGBT People in Ghana, Uganda, Russia and Norway. Conference Paper. A report by ISFiT Research Group.

Birrell PJ, Gill ON, Delpech VC, et al. (2013). HIV incidence in men who have sex with men in England and Wales 2001–10: a nationwide population study. Lancet Infect, *13*, 3,13–18.

Cambiano, V., Rodger, A.J. & Phillips, A. N. (2011). ‗Test-and-treat': the end of the HIV epidemic? Curr Opinion Infect Dis 24: 19–26.

Carpenter et al. (n.d.). Antiretroviral Therapy for HIV Infection in 1997: Updated Recommendations of the International AIDS Society-USA Panel. Ovid: Carpenter: JAMA, *277*, 24.

Chesney, M.A., Ickovics, J.R., Chambers, D.B., Gifford, A.L., Neidig, J., Zwickl, B. & W. A. (2000). Self-reported adherence to antiretroviral medications among participants in HIV clinical trials: the AACTG adherence instruments. Patient Care Committee & Adherence Working Group of the Outcomes Committee of the Adult AIDS Clinical Trials Group (AACTG).

Christensen, T. H. (2008). Óðinn – En guddommelig shaman. Religionvidenskabeligt Tidsskrift, (51).

CIA. (2016). The World Factbook.

Clark, F. (2014). Discrimination against LGBT people triggers health concerns. The Lancet, 383(9916): 500–502.

Cobbinah, M.-D. (2011). ―Bœcause of You'": Blackmail and Extortion of Gay and Bisexual Men in Ghana. In Thoreson, R. & Cook, S., eds. Nowhere to Turn: Blackmail and Extortion of LGBT People in Sub-Saharan Africa. Brooklyn: Minuteman Press. 60-73.

Cock, K. (2009). ‗Preventing HIV transmission with antiretrovirals' Bulletin of the World Health Organization; 87:488-488.

Commission., C. R. (2011). Report of the Constitution Review Commission: From A Political to A Developmental Constitution.

Corbetta, P. (2003). Social Research: Theory, Methods and Techniques. London: SAGE.

Crespo-Fiero, M. (1997). Compliance/adherence and care management in HIV disease.

De Cock, K.M., Jaffe, H.W. & Curran, J. W. (2012). The evolving epidemiology of HIV/AIDS. AIDS. 2012; 26:1205–1213.

DeGruttola, V., Smith, D.M., Little, S.J & Miller, V. (2010). Developing and evaluating comprehensive HIV infection control strategies: issues and challenges. Clin Infect Dis; 50 (Suppl 3):S102–107.

Egger, M., Hirschel, B., Francioli, P., et al. (1997). Impact of new antiretroviral combination therapies in HIV infected patients in Switzerland: prospective multicentre study. BMJ; 315:1194–1199. [PubMed: 9393221].

Ekem-Ferguson, G., Owusu, M.K. A., Wosornu, S. et al. (2018). Using HIV+ MSM case managers as a strategy to achieve the 2nd and 3rd 90 of the UNAIDS 90-90-90 HIV treatment targets among MSM. Maritime Life Precious Foundation. Effia-Nkwanta Regional Hospital; Takoradi. JSI Research & Training Institute, Inc.

Factors Influencing Low Access To. (2012).

Farahani, M., Price, N., El-Halabi, S., et al. (2016). Trends and determinants of survival for over 200 000 patients on antiretroviral treatment in the Botswana National Program: 2002–2013. AIDS; 30:477–485. [Accessed 17 April 2016] Available at: http://www.pubmedcentral.nih.gov/ articlerender.fcgi?artid=4711.

Fay, H., Baral, S.D., Trapence, G., Motimedi, F., Umar, E., Iipinge, S. et al. (2011). Stigma, healthcare access, and HIV knowledge among men who have sex with men in Malawi, Namibia, and Botswana. AIDS Behav; 15:1088–1097.

Ferguson, M.N., Donnelly, A.C., Hooper, J., Ghani, C.A., Fraser, C., Bartley, M.L., Rode, A.R., Vernazza, P., Lapins, D., Mayer L.S. & Anderson, M. R. (2005). Adherence to antiretroviral therapy and its impact on clinical outcome in HIV-infected patients.

GAC. (2016). National HIV and AIDS Strategic Plan. *Ghana AIDS Commission (GAC))*, 115.

Gardner, E.M., Burman, W.J., Steiner, J.F., Anderson, P.L. & Bangsberg, D. R. (2009). Antiretroviral medication adherence and the development of class-specific antiretroviral resistance. Aids. 2009 Jun 1;23(9):1035–46. cited.

Gichuru, E., Thiong'o, A., Macharia, M., Okuku, H.S., et al. (2013). Graham SM, Mugo P, Adherence to antiretroviral therapy and clinical outcomes among young adults reporting high-risk sexual behavior, including men who have sex with men, in coastal Kenya. AIDS Behav ; 17:1255–1265.

GMS. (2011). Ghana Men Study Round I.

GMS. (2017). Ghana Men Study Round II.

Gray, D. E. (2004). Doing Research in the Real World. London : SAGE.

Halkitis, P. & Kirton, C. (1999). Self-strategies as means of enhancing adherence to HIV

antiretroviral therapies: A Rogerian approach.

Halkitis, N. P. (1998). Helping HIV-positive Gay Men on Antiretroviral Therapy - Maintain their medication adherence.

Health Protection Agency. (2013). HIV and AIDS surveillance. Available: http://www. hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/HIV/. Accessed January 2013.

Ho, D.D., Neumann, U.A., Perelson, S.A., Chen, W., Leonard, M.J. & Markowitz, M. (1995). Rapid turnover of plasma virions and CD4 lymphocytes in HIV-1 infection. Nature, *373*, 123–126. https://doi.org/10.1038/373123a0

HSS. (2017). HIV Sentinel Survey Report.

Institute, N. Y. S. D. of H. A. (2015). New York State Department of Health AIDS Institute.

Keuroghlian, S.A., Kamen, S.C., Neri, E., Lee, S., Liu, R. & Gore-Felton, C. (2011). Trauma, Dissociation, and Antiretroviral Adherence among Persons Living with HIV/AIDS.

Korley, A. (2016). School Of Public Health, Department of Epidemiology and Disease Control, University of Ghana, Legon: Factors Associated with Care Continuum of HIV/AIDS patients receiving Antiretroviral Therapy., (10552364).

Kweku, P. (2013). Report: Socio-Political Situation of LGBT people in Ghana, AMSHeR, 14 March 2014.

Makadon, H., Stall, R., Goldhammer, H. & Landers, S. (2008). Sexual and gender minority health: what we know and what needs to be done? Am J Public Health; 98:989–995.

Mensah, D. . (2012). James Town youth vow to eliminate gays from their midst.

Merrigan, M., Azeez, A., Afolabi, B., et al. (2011). HIV prevalence and risk behaviours among men having sex with men in Nigeria. Sex Transm Infect. 2011; 87:65–70.

Millett, G.A., Flores, S.A., Peterson, J.L. & Bakeman, R. (2007). Explaining disparities in HIV

infection among black and white men who have sex with men: a meta-analysis of HIV risk behaviors. AIDS; 21:2083–2091.

Millett, G.A., Peterson, J.L., Flores, S.A., Hart, T.A., Jeffries, W. L., & Wilson, P.A., et al. (2012). Comparisons of disparities and risks of HIV infection in black and other men who have sex with men in Canada, UK, and USA: a meta-analysis. Lancet; 380:341–348.

Millett, G.A., Peterson, J.L., Wolitski, R.J. & Stall, R. (2006). Greater risk for HIV infection of black men who have sex with men: a critical literature review. Am J Public Health; 96:1007– 1019.

Montaner, J.S.G., Lima, V.D., Barrios, R., et al. (2010). Association of highly active antiretroviral therapy coverage, population viral load, and yearly new HIV diagnoses in British Columbia, Canada: a population-based study.

Moore, R.D. & Keruly, J. C. (2007). CD4+ cell count 6 years after commencement of highly active antiretroviral therapy in persons with sustained virologic suppression. Clin Infect Dis. 44(3):441-446. Available at: https://www.ncbi.nlm.nih.gov/ pubmed/17205456.

Nelson, L. E., Wilton, L., Agyarko-Poku, T., Zhang, N., Aluoch, M., Thach, C. T., … Adu-Sarkodie, Y. (2015). The Association of HIV Stigma and HIV/STD Knowledge With Sexual Risk Behaviors Among Adolescent and Adult Men Who Have Sex With Men in Ghana, West Africa. *Research in Nursing & Health*, *38*(3), 194–206. https://doi.org/10.1002/nur.21650

O'Connor, J.L., Gardner, E.M., Mannheimer, S.B., Lifson, A.R., Esser, S., Telzak, E. E. et al. (2013). Factors associated with adherence amongst 5295 people receivingantiretroviral therapy as part of an international trial. J Infect Dis;208:40–9.

Okall, D.O., Ondenge, K., Nyambura, M., Otieno, F.O., Hardnett, F., Turner, K., et al. (2014).

Men who have sex with men in Kisumu, Kenya: comfort in accessing health services and willingness to participate in HIV prevention studies. J Homosex; 61:1712– 1726.

Paper, C., & Flat, M. D. (2017). Forms of discrimination of LGBT people in, (March).

Paterson, D.L., Swindells, S., Mohr, J., Brester, M., Vergis, E.N., Squier, C., Wagener, M.M. & Singh, N. (2000). Adherence to protease inhibitor therapy and outcomes in patients with HIV infection.

Prosecutors, P. (2015). Dakar Declaration on Factoring Key Populations in the Response to HIV and AIDS in ECOWAS Member States, 1–6.

Rubin, J. H. & Rubin, S. I. (2012). Qualitative interviewing: The Art of Hearing from Data. Thousand Oaks : SAGE .

Safren, S.A., Biello, K.B., Smeaton, L., Mimiaga, M.J., Walawander, A., Lama, J. R. et al. (2014). Psychosocial predictors of non-adherence and treatment failure in a large scale multi-national trial of antiretroviral therapy for HIV: data from the ACTG A5175/PEARLS Trial. PLoS One;9:e104178.

Samji, H., Cescon, A., Hogg, R. S. et al. (2013). Closing the gap: increases in life expectancy among treated HIV-positive individuals in the United States and Canada. PloS one. 8(12):e81355. Available at: http://www.ncbi.nlm.nih.gov/ pubmed/24367482.

Samuelsen, H., Norgaard, O. & Ostergaard, L. R. (2012). Social and cultural aspects of HIV and AIDS in West Africa: a narrative review of qualitative research.

Scanlon M., and V. R. (2013). Current strategies for improving access and adherence to antiretroviral therapies in resource-limited settings‘ HIV/AIDS - Research and Palliative Care, *2013:5*, 1—17.

Semugoma, P., Beyrer, C. & Baral, S. (2012). Assessing the effects of antihomosexuality

legislation in Uganda on HIV prevention, treatment, and care services. SAHARA J; 9:173–176.

Sheehy, M., Tun, W., Vu, .L, et al. (2013). High levels of bisexual behavior and factors associated with bisexual behavior among men having sex with men (MSM) in Nigeria. AIDS Care. 2013; 26:116–122.

Silveira, M.P., Draschler, Mde.L., Leite, J.C., Pinheiro, C.A. & da Silveira, V. L. (2002). Predictors of undetectable plasma viral load in HIV-positive adults receiving antiretroviral therapy in Southern Brazil.

Singh, N., Berman, M.S, Swindells, S., Justis, C.J., Mohr, A.J., Squier, C. & Wagener, M. M. (1999). Adherence of Human Immunodeficiency Virus–Infected Patients to Antiretroviral Therapy.

Smith, A.D., Tapsoba, P., Peshu, N., Sanders, E.J., Jaffe, H. W. (2009). Men who have sex with men and HIV/AIDS in sub-Saharan Africa. Lancet; 374:416–422.

Trust, H. D. (2015). Criminalization of Homosexuality.

UNAIDS. (2010). Global Report Fact Sheet, Sub-Saharan Africa.

UNAIDS. (2013). Global report: UNAODS report on the global epidemic.

UNAIDS. (2014a). Global AIDS Response Progress Reporting.

UNAIDS. (2014b). UNAIDS. 90-90-90. An ambitious treatment target to help end the AIDS epidemic 2014. Geneva: UNAIDS; 2014.

UNAIDS. (2016a). _15 by 15‘ - a global target achieved. Geneva: 2015. Available at: http://www.unaids.org/en/resources/documents/2015/15_by_15_a_global_target_achieved.

UNAIDS. (2016b). 90–90–90 - An ambitious treatment target to help end the AIDS epidemic. Geneva: UNAIDS; 2014. p. 1 33.Available at:

http://www.unaids.org/en/resources/documents/2014/90-90-90 .

UNAIDS. (2016c). Global AIDS update. Vol. 2016, Geneva: UNAIDS.

UNHRC. (2012). Report of the Working Group on the Universal Periodic Review, 13 December 2012, UN Doc A/HRC/22/6.

Vernazza, P.L., Troiani, L., Flepp, M. J. et al. (2000). Potent antiretroviral treatment of HIV-infection results in suppression of the seminal shedding of HIV. The Swiss HIV Cohort Study. AIDS. 14(2):117-121. Available at: https://www.ncbi.nlm.nih.gov/pubmed/10708281.

Vuylsteke, B., Semde, G., Sika, L., et al. (2012). High prevalence of HIV and sexually transmitted infections among male sex workers in Abidjan, Côte d'Ivoire: need for services tailored to their needs. Sex Transm Infect. 2012; 88:288–293.

APPENDICES

Appendix A: QUESTIONNAIRE FOR PARTICIPANTS

Dear participants,

I am a student in the School of Public Health, University of Ghana, and I am conducting a research on the topic FACTORS ASSOCIATED WITH ANTIRETROVIRAL THERAPY ADHERENCE AMONGST MSM IN SELECTED FACILITIES. This research is in partial fulfillment of the requirement for the award of Master of Public Health Degree. The research seeks to assess factors associated with Antiretroviral Therapy (ART) Adherence amongst MSM in selected facilities.

You have been selected to participate in this study because population of interest for this study are men who have sex with men (MSM) and are HIV positive on ART. For this study, MSM is defined as Male aged 18 years and above who have had sexual relationship (either oral or anal) with another Male in the last 12 months preceding this study, either in exchange for money or other commodities or for pleasure.

Your participation is entirely voluntary, and will involve answering semi-structured questions which will take about 15 minutes of your time. You are assured that all information you will provide to these questions will be treated confidential, and that your name is not required. Please respond to the questions by giving honest and accurate answers as they will contribute to the success of this study. Kindly skip where not applicable.

Thank you.

Section A: Demographic Characteristics

(Please Tick all boxes that apply OR write answers where applicable**)**

AGE at last birthday: ……

HIGHEST EDUCATION COMPLETED:

(**1**) Primary [ ] (**2**) JHS [ ] (**3**) SHS [ ] (**4**) Tertiary [ ]

RELIGION:

(**1**) Christianity [ ] (**2**) Islam [ ] (**3**) Traditional [ ]

(**4**) Other (**Please specify**) …….

MARITAL STATUS:

(**1**) Single [ ] (**2**) Married [ ] (**3**) Divorced/Separated [ ] (**4**) Widow [ ] (**5**) Co-habiting [ ]

MAIN OCCUPATION:

(**1**) Public Servant [ ] (**2**) Private Sector Employee [ ] (**3**) Unemployed [ ]

(**4**) Self-employed [ ]

SEXUAL ORIENTATION:

(**1**) Bisexual [ ] (**2**) Gay [ ]

SEXUAL ACTIVITY

(**1**) Male Sex Worker [ ] (**2**) Pleasure [ ] (**3**) Both [ ]

NATIONALITY:

(**1**) Ghanaian [ ] (**2**) Foreigner [ ] **Please Specify**……

RISKY SEXUAL BEHAVIOR:

1. Did you use condom during your most recent sex? (**1**) Yes [ ] (**2**) No [ ]

2. If no to **1** above, why did you not use condom? **Please state reasons**…….

   ……

3. Do you have a female partner apart from your gay partner? (**1**) Yes [ ] (**2**) No [ ]

4. If yes to **3** above, do you always use condom when having sex with her?
   (**1**) Yes [ ] (**2**) No [ ]

5. If no, to **options** 1 OR 2 of **question** 4 above, **please state reasons**……

……

ART APPOINTMENT:

1. Have you ever missed your appointment for ART? (**1**) Yes [ ] (**2**) No [ ]

2. If yes to **1** above, **please state reasons** ……

The Morisky scale on adherence of 8 items was adapted to measure adherence and non-adherence respectively. Please use the coded response categories: (1= **Yes**, 0 = **No**), to CHECK in the spaces provided below that applies to the questions you ADHERE or otherwise.

Section B: ANTIRETROVIRAL ADHERENCE

(Please Tick all boxes that apply).

Key: (Yes =1, No =0)

No.	**Item**	**Yes**	**No**
1	Do you sometimes forget to go for your antiretroviral?		
2	In the last two weeks, was there any day when you did not take your antiretroviral?		
3	Have you ever stopped taking your antiretroviral or decreased the dose without informing your prescriber because you felt worse when you took them?		
4	In case of travelling outside your place of residence, do you sometimes forget to go with your antiretroviral?		
5	When you feel you are healthy, do you sometimes stop taking your antiretroviral?		
6	Have you ever felt distressed for strictly following your antiretroviral therapy?		
7	Do you often have difficulty remembering taking your antiretroviral?		
8	Did you take your antiretroviral yesterday?		

Section C: Social Factors associated with ART adherence

(Please Tick all boxes that apply).

Key: (Agree =1, Disagree =2)

No.	Statement	Agree	Disagree
1.	Social norms and structures on homosexuality do not limit ART adherence.		
2.	Faith-based judgments are not barriers to ART adherence.		
3.	Perceptions of society about homosexuality do not stigmatize ART adherence.		
4.	ART service creates disparity between homosexuals and heterosexuals.		
5.	ART adherence with MSM has nothing to do with fear of insult.		
6.	In fact, people do not have time to assault MSM going for ART service.		

Section D: Legal Factors associated with ART adherence

(Please Tick all boxes that apply).

Key: (Agree =1, Disagree =2)

No.	Statement	Agree	Disagree
1.	You are afraid police would arrest you on your for ART service.		
2.	Irrespective of punitive laws on homosexuality, you are confident to meet your ART appointments because health care is a right.		
3.	Same sex rights and privileges create public support for ART adherence.		

Section E: Health Service Delivery Factors associated with ART Adherence

(Please Tick all boxes that apply).

Key: (Agree =1, Disagree =2)

No.	Statement	Agree	Disagree
1.	Most health workers assist MSM for ART adherence.		
2.	MSM have poor health seeking behavior because they have no rights in Ghana. This is a barrier to their ART adherence.		
3.	Fear of gender discrimination limits sexual orientation disclosure for a holistic ART service.		
4.	You wish ART service was delivered by people who understand your sexual orientation.		

Appendix B: PARTICIPANT INFORMATION SHEET

STUDY TITLE: FACTORS ASSOCIATED WITH ART ADHERENCE AMONGST MSM IN SELECTED FACILITIES.

Introduction:

My name is Bismark Jampim Abrokwah of Greater Accra Regional Hospital pursuing Master of Public Health weekend program at the Department of Population, Family and Reproductive Health, School of Public Health, College of Health Sciences, University of Ghana. My contact detail is care of Greater Accra Regional Hospital, P.O. Box 473, Accra. My cell phone contact is 0540619077 OR 0273491172 and email contact is abrokwahjampim@gmail.com

NATURE OF RESEARCH:

In response to the barriers key populations face in accessing HIV services, a number of evidence-based interventions such as drop-in-centers are increasing for improved retention in HIV care and treatment services. Knowledge in the factors associated with ART Adherence amongst MSM is a key in these interventions and strategies to end HIV and AIDS in 2030. This study seeks to assess factors associated with ART adherence amongst MSM in selected facilities. The study is descriptive in nature and would involve participants responding to closed ended self-administered questionnaire.

PARTICIPANT INVOLVEMENT:

- **Duration/Time Involved** Practically, the study will last for three months beginning from May to July 2018. Participants‘ involvement is scheduled in June 2018, and they would be required to answer questions in the closed ended self-administered questionnaire. A minimum of 15 minutes would be required from each participant to answer the questions.
- **Potential Risks** The study does not possess any clinical risks to participants except that projected psychological and emotional discomfort may occur to participants due to the

structure and nature of the questionnaire, however, the investigator seeks to explain the questionnaire to participants to the extent that this projected discomfort is averted.

- **Benefits** Participants will not receive any direct benefits either in monetary terms or certificate. However, findings from this study will be a meaningful contribution to the GAC 2016 National HIV & AIDS Strategic Plan of ending AIDS in 2020. Knowledge in the proportion of ART Adherence amongst MSM is essential in the response to HIV and AIDS endemic in Ghana. Also, knowledge in barriers to ART Adherence amongst MSM will help stakeholders, policymakers, service providers and researchers of HIV and AIDS to re-strategize for improved interventions and service delivery.
- **Costs** The study would not be of any financial cost to participants as it is solely funded by the investigator.
- **Compensation** There would be no remuneration or compensation to participants. Participants are at liberty to participate or otherwise.
- **Confidentiality** All information provided in this study will be secured and stored at the School of Public Health, University of Ghana. Other researchers may find and use the data; however, participant‘s name or any other identifying information will be removed from the data to keep confidentiality.
- **Voluntary participation/withdrawal** Participation in this study is voluntary and participants may withdraw at any time without any penalty. Participants can choose not to participate or to answer any individual question or all the questions. Participant‘s participation may be terminated if they feel too uncomfortable talking about the subject, become tired, or find the study too intrusive.

- **Feedback** The study findings although for academic, would be shared with all SELECTED participated FACILITIES.
- **Funding information** The investigator has a sole financial responsibility for this study. The investigator has no funding option outside his individual strength.

CONTACTS FOR FURTHER CLARIFICATIONS:

Further clarifications on this study would be communicated on a request to either the investigator, Bismark Jampim Abrokwah on a phone contact 0540619077/0273491172 or Madam Hannah Frimpong, the administrator, Ghana Health Service – Ethics Review Committee of the Research and Development Division on a phone contact 0507041223.

Appendix C: CONSENT FORM

SECTION A: RESEARCHER'S NAME AND ADDRESS

Abrokwah Jampim Bismark

Department of Population, Family and Reproductive Health

School of Public Health, University of Ghana

P. O. Box LG 13

Legon – Accra.

Mobile Number: 0540619077/0273491172

Email Address: abrokwahjampim@gmail.com

Introduction

I am a student in the School of Public Health, University of Ghana and I am conducting a research on the topic FACTORS ASSOCIATED WITH ANTIRETROVIRAL THERAPY ADHERENCE AMONGST MSM IN SELECTED FACILITIES.

SECTION B: CONSENT TO PARTICIPATE IN RESEARCH

General Information about Research

This research is in partial fulfillment of the requirement for the award of Master of Public Health Degree. The research seeks to assess factors associated with Antiretroviral Therapy (ART) Adherence amongst MSM in selected facilities.

Procedure

The population of interest targeted in this research are Men who have Sex with Men (MSM) who are on ART in selected health related facilities for at least 12 months. MSM who are on ART less than 12 months from the period of this study are not included. Closed ended self-administered questionnaire would be used to collect data on factors associated with ART Adherence amongst MSM in selected facilities. Participants for the closed ended self-

administered questionnaire interview would be selected through simple random sampling method. Questionnaire administration will last for not more than 15 minutes per participant. The period for entire research will last for three months starting from May 2018.

Benefits of the study

You will have no direct benefit from participating in the study. You will not receive payment for participating. However, the information will enable HIV and AIDS health service delivery and stakeholders to revise strategies on ART Adherence amongst MSM in Accra and Ghana in general.

Risk of the Study

There are no direct risks associated with this study except that, participants may share some personal or confidential information or they may feel uncomfortable talking about some of the issues outlined.

Confidentiality

All information provided in this study will be secured and stored at the School of Public Health, University of Ghana. Other researchers may find and use the data; however, participant‘s name or any other identifying information will be removed from the data to keep confidentiality.

Compensation

There will be no compensation packages for participants or participants, except the benefits to be derived as stated above.

Withdrawal from the Study

- Participation in this study is voluntary and participants may withdraw at any time without any penalty.
- Participants can choose not to participate or to answer any individual question or all the questions.

- Participants will be reliably informed, or their legal representatives would be informed in a timely manner on any available information provided when needs be for their continuation or withdrawal.
- Participant's participation may be terminated if they feel too uncomfortable talking about the subject, become tired, or find the study too intrusive.

Contact for Additional Information

If you have any additional questions or complaints please call on Prof. K. Torpey/Mr. Samuel Dery, 0264868703.

SECTION C: VOLUNTEER AGREEMENT

I have read or have had someone read all the above, asked questions, received answers regarding participation in this study, and I am willing to give my consent to participate in this study. I will not have waived any of my rights by signing this consent form. Upon signing this consent form, I have agreed to be a participant.

_____

Name of Volunteer

_____ _____

Signature or mark of volunteer Date

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the research.

_____

Name of witness

_____ _____

Signature of witness Date

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

_____

Name of Person Who Obtained Consent

_____ _____

Signature of Person Who Obtained Consent Date