Barriers to HIV testing among Cameroonian men: the role of stigma and the impact of Covid-19

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Barriers to HIV Testing among Cameroonian Men: The Role of Stigma and the Impact of COVID-19

By

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ABSTRACT

BACKGROUND

The combination of the COVID pandemic and HIV in SSA has created a serious threat to the inhabitants in the region and the world in general. There is great concern that the COVID lockdown and its associated consequences could lead to disruption in HIV programs. There are fewer men with HIV compared to the women but historically men do not test for HIV compared to the women as a result they experience more AIDS related mortality. In this study we examine the role of stigma and knowledge in HIV testing outcomes among men in Cameroon. Also, we investigate how the COVID-19 pandemic has affected HIV services at the BRH.

METHODS

For HIV testing outcomes we analyzed cross sectional data from CDHS 2018 with a representative data of 6978 men. The effects of COVID on HIV services was conducted through in-depth semi-structured interviews with 14 participants at the BRH.

RESULTS

Binary logistic regression indicated that personal prejudice stigma was associated with less testing (OR=0.604, CI=0.575-0.635) in ever tested. When we added the covariates, this association became slightly weaker (OR= 0.828, 95% CI= 0.780-0.879) and an increase for perceived societal stigma (OR=1.283, CI=1.223-1.347). For recent HIV, personal prejudice stigma was associated with higher testing (OR=1.253, CI=1.191-1.319) as well as for perceived
societal stigma (OR=1.253, CI=1.191-1.319). Knowledge also had a positive association in both outcomes even when combined with other key predictors of testing they were (OR=1.440, CI=1.337-1.550) and (OR=1.337, CI=1.239-1.443) for recent and ever been tested respectively.

DISCUSSION
Understanding how stigma and knowledge impact HIV testing outcomes in men and how to continue providing quality care during the COVID pandemic are essential. They guide policy and program initiatives aimed at engaging men in testing and care to reduce new infections and AIDS related mortality as well as viral load suppression. It is essential that there is as little interruption as possible in HIV related services even while lockdown restrictions are in order during the COVID pandemic. These two points are vital if we want to achieve the goal of ending the HIV epidemic by 2030.
AKNOWLEDGEMENTS

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Finally, words simply cannot express how grateful I am to my family and friends. Thank you always believing in and supporting me, but mostly for always listening and pretending that you knew or cared what this thesis was about.
DEDICATION

This dissertation is dedicated to the memory of my father, Daniel Menn Iyok who led by example that persistence and hard work pays off and to my mother, Lucy Iyok whose unwavering support was second to none through this program. To my Children, Imani and Pharryll Ayuk Elad for hanging there with me despite the long hours we spent in the Library. To my siblings (Sammy-pride Ayuk-Iyok, Senge-Mbongo Iyok, Jacqueline Besem Egbe-Iyok and Lina Ebob Iyok) words cannot express what you all mean to me and how you have supported me only God will repay you.

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<tr>
<td>GoC</td>
<td>The Government of Cameroon</td>
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<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
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<tr>
<td>ART</td>
<td>Antiretroviral Treatment</td>
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<td>ARV</td>
<td>Antiretroviral drug</td>
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<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
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<td>CDHS</td>
<td>Cameroon DHS</td>
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<td>DHS</td>
<td>Demographic and Health Survey</td>
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<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>PLHIV</td>
<td>People Living with HIV</td>
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<tr>
<td>AIDS</td>
<td>Acquired immune deficiency syndrome</td>
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<tr>
<td>PEPFAR</td>
<td>U.S. President's Emergency Plan for AIDS Relief</td>
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<tr>
<td>PLHIV</td>
<td>Persons living with HIV</td>
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<tr>
<td>PMTCT</td>
<td>Prevention of mother-to-child transmission of HIV</td>
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<tr>
<td>UNAIDS</td>
<td>United Nations Program on HIV/AIDS</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<td>CDHS</td>
<td>Cameroon Demographic Health Survey</td>
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<tr>
<td>STD</td>
<td>Sexually Transmitted Disease</td>
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<td>SDS</td>
<td>Social Distance Stigma</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<tr>
<td>SSA</td>
<td>Sub-Saharan Africa</td>
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<tr>
<td>SA</td>
<td>South Africa</td>
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<td>US</td>
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CHAPTER 1. INTRODUCTION

I. Background and Conceptual Framework

The acquired immunodeficiency syndrome (AIDS) due to the human immunodeficiency virus (HIV) is considered a global pandemic. The effects are particularly felt in developing countries and is one of the most stigmatizing global pandemics. Forty years into the epidemic, HIV/AIDS remains the leading cause of death in Cameroon. The fight to end HIV/AIDS is at the forefront in the sustainable development agenda. Considerable efforts have been made to reduce the incidence of HIV infections in the developing countries specifically in Sub-Saharan Africa (SSA) where rates are still relatively high. Achieving the UNAIDS’ 95-95-95 targets (i.e. diagnose 95% of all People living with HIV, 95% of people diagnosed with HIV are on antiretroviral therapy (ART) and 95% viral suppression of the individuals on ART (UNAIDS). The first 95 of the HIV cascades is HIV testing which is crucial in achieving the 95-95-95 targets. However, HIV testing uptake remains low among men in SSA and men have proven to be hard to reach in HIV testing and ART initiation (UNAIDS). Late diagnosis of HIV amongst men exposes the men and their partners to new HIV infections (Ha et al., 2019; "Understanding the fast "). Therefore, early detection among men is vital for their own health as it provides opportunities for early ART initiation.

HIV testing serves as the main gateway for linkage and retention to the HIV care continuum and is key to improving the lives of people living with HIV (PLHIV). Estimates from The Joint United Nations Program on HIV/AIDS (Global, 2020), indicate that globally, there are 38 million PLHIV at the end of 2019. There were about 1.7 million newly infected cases and
690,000 AIDS-related illnesses yet in 2019 about 7.1 people were unaware of their HIV status.

The World Health Organization (WHO) estimates that 1 in every twenty-five adults (3.9%) in SSA are living with HIV and this accounts for two thirds (25.7 million) of all PLHIV globally. This sub-region also accounts for approximately 70% of new infections and 74% of HIV-related mortality.

In Cameroon, there are about 540,000 PLHIV with a prevalence of 3.6% in people between 15-49 years old (Appendix A) and only 74% of the PLHIV/AIDS in Cameroon are aware of their HIV status (UNAIDS). Global efforts are ongoing to achieve the target set forth by UNAIDS. This strategy aims to change the trajectory of the epidemic with its emphasis on testing however, challenges remain in achieving this target. One of such challenges is low HIV testing among men. Attracting men remains one of the priorities of the 95-95-95 strategy as men have not responded well to testing initiatives compared to the women (UNAIDS). Fewer men are willing to consent to HIV testing services. Males in SSA are 20% less likely than females to know their HIV status, are 27% less likely to access treatment (UNAIDS) are more likely to drop out of care and have poorer adherence to ART (Heestermans, Browne, Aitken, Vervoort, & KlipsteinGrobusch, 2016). The overall lack of viral suppression among PLHIV in Cameroon further complicates the issue (Appendix B). This is because PLHIV and have not achieved viral suppression could infect their partners or children in the case of mother to child transmission.

At the same time, the world is dealing with another pandemic, the coronavirus pandemic. SARS-CoV-2, the virus that causes COVID -19 was first detected in China in December 2019 (Ojong, 2020). SSA the region hardest hit by HIV has also been greatly affected by COVID -19.
The fight against COVID-19 in SSA might threaten the continuous management of PLHIV. The COVID-19 pandemic has overwhelmed the world and has become a global threat forcing the WHO to declare COVID-19 a pandemic (Cucinotta & Vanelli, 2020). COVID-19 estimates as of April 30, 2021 indicate a total of 150,630,922 confirmed cases and 3,168,601 confirmed deaths worldwide (John Hopkins). There are about 4,550,156 confirmed cases, 121,556 confirmed deaths and 4,093,170 recoveries in Africa (A. CDC). Cameroon has 72,250 confirmed cases of COVID-19, 1,107 deaths so far and 64,572 recoveries (A. CDC). Compared to South Africa (SA), the number of cases in Cameroon are small however, Cameroon currently has the highest cases of COVID-19 in the Central African region (A. CDC) (Appendix C). On April 12, 2021 the Centers for Disease Control and prevention (CDC) raised Cameroon to a level 4 risk for travel due to COVID, which means that travelers should avoid all travel to Cameroon due to high incidence rates; over 100 new cases over the past 28 days per 100,000 population. (CDC)

PLHIV already have a weak immune system, which could make it difficult to fight another viral infection. In a study in New York State department of Health and the University at Albany School of public Health it was reported that PLHIV and diagnosed with COVID through June 7, 2020, had a diagnosis rate nearly 40% higher than that observed in the non-PLHIV population (Tesoriero et al., 2020). In addition, many people still do not know their HIV status making COVID-19 a deadly disease for population living with HIV. Therefore, it is crucial that people know their HIV status and patients adhere to their anti-retroviral medications as prescribed. The fight against COVID-19 could negatively impact HIV responses in the
SSA. The increasing number of positive cases of COVID-19 and the already weak healthcare systems in many of these countries that are being stretched due to heightened demands for more resources to fight the pandemic could be detrimental to other services, including HIV related services. The need to treat COVID-19 patients in an already overwhelmed system could deprioritize HIV services. The consequence is that the COVID-19 pandemic could disrupt access to testing, treatment and supply chains for individuals affected by HIV and greatly impact the ability to achieve current targets geared towards ending AIDS as a public health threat by 2030. Therefore, it is crucial that PLHIV in SSA should be on continuous management even in the midst of the COVID-19 pandemic.

Country Context

The research was carried out in Cameroon. Cameroon is considered a lower middle-income country (LMICs) with a generalized HIV epidemic. Cameroon is located in the Gulf of Guinea between latitudes 2° North and 13°, along the Atlantic Ocean, at the junction of Western and Central Africa with a west maritime (Appendix D). The World Bank and the Central Intelligence Agency (CIA) rate the Republic of Cameroon as a lower-middle-income country in SSA with a surface area of 475,440 square kilometers and a population of over 26 million people. The population is made up of blacks and mostly youth with only 2.7% of people aged more than 65 years (Appendix E). The country is a mixture of deserts and plains in the northern part, and in the West along the border with Nigeria are mountains such as the active volcano, Mount Cameroon – the highest point in West Africa. There are
about 250 ethnic groups that speak about 270 languages and dialects which makes it an exceptionally diverse country. The country is a union of two former United Nation (UN) Trust territories. The two territories were French Cameroon, which got their independence in 1960 and southern British Cameroon, which decided to join Cameroon after the 1961 UN-sponsored referendum. Therefore, the official languages of English and French.

Cameroon is slightly bigger than California and is four times the size of Pennsylvania (bank; book). Estimates show that 57% of the people live in urban areas and that the population is predominantly youth under the age of 25 with a median age of 18.5 year’s life expectancy is 55 years (book). Cameroon is often described as 'Africa in miniature' due to its cultural and agro-ecological diversity all in one country: deserts, mountains, coasts, rainforest, and savannah all present in one setting. It shares a border to the North with Chad, East with the Central African Republic (CAR), South with Equatorial Guinea, and Gabon and finally West with Nigeria. Cameroon has ten regions; the Northwest and the Southwest regions that border with Nigeria are Anglophone (English speaking). The remainder of the country is Francophone (French speaking) (see Map, Appendix F). The sociocultural context is unique with heterogeneous population made up of approximately 250 ethnic groups with an ethnic fractionation score of 0.89, making Cameroon much more diverse than the SSA average of 0.64 (Britannica). The ethnic/regional cleavages are salient, yet they impact the patterns of daily and overall political and economic functioning within the country. It may have an indirect or direct impact on HIV testing among the different ethnic groups. However, the Northern regions are less ethnically heterogeneous compared to the Southern region. The Northern region is made up of mostly Fulani and the Southern is mostly Bantu. The Anglophone regions make up about 11% of the population and 10% of the land area of the
country. Cameroon’s population is concentrated in the West and North while the interior is scantily populated. There are also the highlanders (Bamoun and Bamileke), who make up 38% of the country’s population. The coastal tropical forest people including Basssa and Douala make up 12% of the total population. Other ethnic communities (Fang, Bulu, Makaa, Ewondo) reside in the Southern tropical forest and comprise 18% of the people of Cameroon (Britannica). The Fulani and Kardi account for 14% and 18% respectively.

HIV Testing in Men and the HIV “blind spot”

The term, “HIV testing” is commonly used to describe both testing and counseling services. HIV testing is still the gateway to the HIV care and lockdown during the pandemic may affect the HIV care continuum, which has the diagnosis of infection as the first step. HIV counseling and testing is the foundation of prevention, care and treatment (De Cock, Marum, & Mbori-Ngacha, 2003; Denison, O’Reilly, Schmid, Kennedy, & Sweat, 2008). Knowledge of HIV status among individuals who are HIV positive is associated with a 60% reduction in higher risk behaviors that increase the chances of transmission (Crepaz et al., 2006). Identifying undiagnosed individuals through testing is vital in controlling the epidemic as linking infected individuals to treatment, care and support decreases infectivity (Dieffenbach & Fauci, 2009; Hull, Wu, & Montaner, 2012) (Kilmarx & Mutasa-Apollo, 2013; Limaye, Bingenheimer, Rimal, Krenn, & Vondrasek, 2013). Amidst the disease burden, it is important that the region continue its control efforts, even while resources may be diverted from HIV to mitigate the COVID-19 pandemic.
A full explanation for HIV testing is multifaceted and there have been significant efforts to boost testing with the introduction of a single rapid diagnostic home testing kit. The UN 9595-95 targets can only be achieved if at least 95% of the PLWHA are diagnosed and linked to care (Celum & Barnabas, 2019) and men play a crucial role in achieving this target. However, fewer efforts have directly targeted the men and the proportion of men who report testing for HIV is still deficient compared to the women (Fleming, Rosen, Wong, & Carrasco, 2019; Ha et al., 2019). Men in SSA are less likely to receive HIV care or treatment and achieve lower viral suppression when compared to women (Cornell et al., 2012). African men are less likely to test for HIV and are more likely to be living with HIV yet undiagnosed (Dovel, Yeatman, Watkins, & Poulin, 2015; Kigozi et al., 2009; Novitsky et al., 2015; Schell et al., 2016). Men in SSA are 20% less likely to know their status and 27% less likely to be in the care continuum (UNAIDS).

All these factors add to the gender disparities observed in HIV testing between men and women. This low HIV testing among men contributes to the overall AIDS-related mortality in the sub region. Although women have a higher overall HIV prevalence, AIDS related mortality is higher in men compared to women (Stephenson, Elfstrom, & Winter, 2013). The 2017 UNAIDS report “Reaching Out to Men and Boys: Addressing a Blind Spot in the Response to HIV” highlights some of the barriers to men’s uptake of HIV testing, prevention and treatment (UNAIDS).

A recent estimate of AIDS-related deaths in SA from 2004-2015 reported 2.5 million deaths among men compared to 1.2 million deaths among women (Mills et al., 2012). In addition, SA men are less likely to test for HIV compared to the women: 32% of the men living with HIV are unaware of their status compared to 19% of women (Johnson,
This suboptimal HIV testing, knowledge and treatment-related outcomes in men as vital in closing the gaps in HIV response and has been termed the ‘HIV blind spot’- phenomenon in the HIV care continuum that puts men at a disadvantage in terms of testing.

Some of the factors contributing to this low testing in men indicate that community-level HIV knowledge is associated with men’s HIV testing (Stephenson et al., 2013). Stigma has also been implicated as a potential reason why men do not test for HIV. In another study in SA, men were less likely than women to test for HIV and were more likely to test for HIV if they did not report any stigma (Fleming, Colvin, Peacock, & Dworkin, 2016; Sileo, Fielding-Miller, Dworkin, & Fleming, 2018). Male-centered strategies must consider prevailing social norms in communities in SSA, which may cause men to avoid seeking services at health care facilities leading to fewer men who get tested (Dovel et al., 2015). Men have different motivations for testing compared to women, and they are more responsive to social norms. Identifying contextual influences of testing behaviors is key to creating HIV testing program efforts and addressing gender gaps in testing (Babalola, 2007; Obermeyer & Osborn, 2007). Lack of testing in men may be attributed to the expected economic loss, sexual desirability and loss of social standing within their community. This increases the fear of stigma and promotes a mindset that testing when "still healthy" is undesirable. Research indicates that women's risk for HIV infection is highest in marriage and in heterosexual relationships (Dunkle et al., 2008).

Therefore, it is vital to examine married men and sexually active boys to address issues related to HIV testing uptake and not only focus on men who have sex with men (MSM). Strategies are needed to close the gaps in HIV testing which requires making HIV testing an
increased priority and taking full advantage of innovative service strategies and new technologies.

Several studies carried out in SSA have shown low uptake of HIV testing in the poorest and least educated population groups (Kirakoya-Samadoulougou, Jean, & Maheu-Giroux, 2017; Staveteig, Wang, Head, Bradley, & Nybro, 2013). However, we do not know if these inequalities increased or decreased during the intensification of HIV testing activities. In this study, we used data from Cameroon demographic health survey (CDHS), a population-based surveys to assess temporal trends and socioeconomic inequalities in the uptake of HIV testing among Cameroonian men.

HIV and Stigma

Since the 2000 International AIDS Conference in S. Africa, titled Break the Silence, stigma has been identified as a dominant confounding problem in the HIV/AIDS pandemic. Stigma towards PLHIV is likely to be at the core of low testing uptake in communities in the SSA region (Fleming et al., 2019). HIV related stigma is a complex social process which refers to negative or irrational judgments, attitudes or behaviors towards PLHIV or at risk of contracting HIV. Health-related stigma as "a social process or related personal experience characterized by exclusion, rejection, blame, or devaluation which results from experience or reasonable anticipation of an adverse social judgment about a person or group identified with a particular health problem" (Weiss & Ramakrishna, 2006) P.280. It can have negative consequences on the health and wellbeing of PLHIV as it may discourage some individuals from getting tested, accessing care or staying in care. Studies by (Hatzenbuehler, 2016; Tobin-West &
Lawson, 2013) suggest that individuals who perceive HIV stigma are less likely to get tested. Stigma HIV has also been associated with low utilization of public health facilities. Low HIV testing coverage is the proportion of a given population eligible for an intervention that actually receives the intervention (Cornell, Cox, & Wilkinson, 2015; Cornell, McIntyre, & Myer, 2011). Stigma has been conceptualized as having multiple dimensions however, we will focus on the perspective of the target of stigmatization. There are three manifestations of stigma that affects the stigmatized: 1) Internalized stigma, 2) anticipated stigma, 3) enacted or experienced stigma (Earnshaw & Chaudoir, 2009). The different mechanisms of HIV stigma are conceptually and statistically independent of each other but deeply relevant to the experiences of PLHIV. We will discuss each of these types of stigma as it relates to HIV/AIDS and testing outcomes.

First, we take a look at internalized HIV-related stigma which refers to when an individual accepts and adopts negative attitudes or stigmatizing beliefs and feelings held in society about PLHIV and applies these beliefs to themselves (Yigit et al., 2020). Internalized stigma has been linked to negative impact on psychological wellbeing. The role of social support has been linked to internalized stigma and psychological distress for PLHIV. The more central HIV is to an individual’s identity, the more internalized stigma and increased negative impact of their psychological wellbeing. However, this is only true for people with low levels of social support but acts as a buffer for individuals with strong social support systems (Brener et al., 2020). The possible consequences of internalized stigma include depression, lack of motivation and helplessness all which prevents individuals from testing.
Anticipated stigma or felt stigma is defined as the knowledge, expectations and anticipation that stigma could occur under certain circumstances and the prospect of accompanying feelings of dread and fear in anticipation of social rejection (Herek, Gillis, & Cogan, 2009). The anticipated HIV related stigma – the expectation that an individual will experience prejudice and some form of discrimination in the future upon others learning of their HIV positive status. The prospect of testing positive for HIV may prevent some men from getting tested even before any stigmatization from their communities. The anticipation of being stigmatized pushes them away from testing and could greatly impact ART adherence, as PLHIV may evade testing as well as other services and treatment programs. In addition, it has been noted that individuals with higher anticipated stigma may have fewer social support systems and less trust in healthcare staff which are all linked to poor mental health status (Starks, Rendina, Breslow, Parsons, & Golub, 2013; Turan, 2017). Anticipated stigma is a barrier to prevention including testing especially in MSM therefore, urgent approaches need to be adopted to reduce anticipated stigma and increase HIV testing in men.

Enacted stigma also known as experienced or external stigma is the generalized term that encompasses what the public actually does to a person who is believed to have a stigmatizing condition (Duko et al., 2019). To combat this public or societal stigma, several African settings have adopted and implemented the “Treat-all” programs as an HIV prevention and treatment strategy. This is in line with the WHO guidelines which encourages regular HIV testing and ART is offered immediately for those who test positive, regardless of immunological status and disease symptom (WHO, 2015). The goal of Treat-all is to normalize HIV, from a fatal to a chronic, more manageable condition so stigma can
be reduced by managing the symptoms enabling HIV concealment. This idea has led to a
dramatic decrease of HIV stigma in Haiti and may work in African settings as well
(Abadía-Barrero & Castro, 2006). Although the benefits of testing are well known,
HIV/AIDS (HAR) stigma remains a significant barrier to testing.

This study is focused on 2 different subtypes of enacted stigma; personal prejudice
stigma and perceived societal stigma. Personal prejudice stigma deals with personal
feelings towards PLHIV while perceived societal stigma deals with feelings of the society
towards PLHIV. Individuals experience stigma differently and we know that men and
women perceive and experience HIV related stigma differently. Further research is
therefore needed to get a comprehensive association between individual characteristics and
HIV-related stigma if we evaluate each characteristic associated with each of the
dimensions of HIV-related stigma independently.

HIV knowledge in Men

To achieve the 95-95-95 targets set forth by UNAIDS and to end the HIV pandemic by
2030, eliminating stigma and comprehensive HIV knowledge are cornerstones for the
prevention, control, and treatment of HIV/AIDS. Inaccurate knowledge about the
transmission of HIV/AIDS adds to the stigmatizing statements and negative attitudes which
prevents individuals from getting tested. One of the significant contributors for the spread
of HIV/AIDS is inadequate HIV/AIDS transmission knowledge: assessing respondent’s
knowledge about prevention and modes of HIV transmission. According to CDHS,2018,
about 70% of men 15-49 are aware of the importance of condom use during sex and
limiting sex to one uninfected partner. This knowledge increases with education however,
only 42% of men with no education are aware of both prevention methods compared to 85% of the men with more than secondary education (survey, 2018).

Several studies indicate that men in SSA are knowledgeable of (Ezeanolue et al., 2017; Harichund, Moshabella, Kunene, & Abdool Karim, 2019; Sharma & Nam, 2019). More than 95% of the men indicated that testing is important but did not use that knowledge to increase testing uptake. Although men were aware of HIV testing, they had a flawed understanding of risks involved with HIV transmission and some believe that an HIV positive test result is a sign of imminent death (Leblanc & Andes, 2015; Mambanga, Sirwali, & Tshitangano, 2016). In addition, some men do not test for HIV because they use their wives or partners’ HIV status as proxy indicators of their own HIV status (De Allegri et al., 2015). Knowledge about HIV increases awareness and propels individuals to engage in health seeking behaviors such as testing and engaging in care and treatment.
The decision-making process of HIV testing is not straightforward due to stigma and social norms attached to testing in males and this complexity needs to be acknowledged when we examine ways to increase HIV testing among Cameroonian men. Research has shown that multilevel group interventions with more than one strategy targeting both PLWHA and the general population would be more effective in reducing HIV stigma and subsequently increasing HIV testing (Thapa et al., 2017). The conceptual framework is
intended to identify factors that influence HIV testing behaviors that could guide design and implementation of integrated and effective HIV testing services that support testing decision-making among Cameroonian men.

Our framework seeks to highlight multiple types of structural and individual determinants of HIV testing decision-making and risk behavior. The conceptual framework (Figure 1) consists of: (1) Socio-demographic and economic factors (2) HIV knowledge (3) stigma (4) HIV testing as the outcomes.

**HIV and the COVID-19 pandemic**

The COVID-19 pandemic began in December 2019 in China. Three weeks later, there were confirmed cases in ten different countries. Alarmed by the rapid global spread and case fatalities of the disease, the WHO characterized COVID-19 as a pandemic on February 11th 2020. At this point, there were more than 118,000 cases in 114 countries, with 4,291 deaths (Ojong, 2020). The spread was out of control and by May 1st of 2020, there were over three million confirmed cases and over 200,000 deaths in 185 countries. The greatest concern is the ability for the virus to spread to countries with weaker health systems which may be ill-prepared to deal with a pandemic of this magnitude.

As of February 2020, only two countries in SSA (Senegal and SA) had the capacity to test for COVID-19 however, that number grew to 40 countries in March of 2020. The burden of COVID-19 in Africa is compounded by the scarcity of health care personnel, shortage of personal protective equipment (PPE) and ventilators (NY Times, 2020). SSA has a perpetual double public Health burden from infectious and non-communicable
diseases (CDC, 2019). Suddenly, COVID-19 was at the top of the list of pre-existing communicable diseases like malaria, HIV/AIDS and viral hepatitis. The WHO estimates that there are fewer than 2,000 ventilators in 41 African countries. In Cameroon on March 29, 2020 the country had a total of 73 mechanical ventilators for 23 million inhabitants with a case fatality rate of 60% among severe COVID-19 patients. Today Cameroon has only 601 intensive care unit beds for its 25 million inhabitants (CDC; Metogo et al., 2019). The state of the health care system in SSA is concerning because a strong health care system is fundamental in handling confirmed cases. This concern is shared by the WHO’s Regional office for Africa:

“There is a critical shortage of treatment facilities for critical cases of COVID-19 in Africa [. . .] The total number of beds in intensive care units (ICU) available for use during COVID-19 in 43 countries in Africa is fewer than 5000. This is about five beds per one million people in the reported countries compared to 4000 beds per one million people in Europe [. . .] In 41 countries . . . functional ventilators in public health services are fewer than 2000.”

The first case of COVID-19 was reported in Cameroon on March 6th, 2020 in Yaoundé, the capital of Cameroon by a French national who flew into the country on February 26th, 2020 on an Air France flight from Paris to Douala. Two days later, one of the acquaintances of the first confirmed case also tested positive. Since March 6th, the virus has spread from city to city all over Cameroon with the first alert announced on March 17th, with over 13 drastic measures put in place; wearing a mask in all public places, systematic hand washing, physical distancing, awareness campaigns, closures of school and businesses and even international borders.
The general restriction of movement has greatly affected almost every aspect of life for many Cameroonian. Disruptions caused by the COVID-19 pandemic have affected HIV services in many countries around the world. However, the effects of these disruptions have far reaching consequences. COVID-19 has already caused interruptions in immunization schedules (Wallace et al., 2020). Lockdown and other measures to combat the spread of COVID-19 may affect prevention and management of other infectious diseases and other non-communicable diseases (NCDs). NCDs are of concern due to high morbidity and mortality associated with it in SSA. For example, the WHO cautions that lack of mosquito nets and treatment could result in up to 18 million additional cases of malaria and up to 30,000 additional deaths in SSA. People living with HIV may be at increased risk for severe COVID-19 infections especially in regions where HIV is poorly controlled. Although SSA has not been hit as hard as the west, the disruptions have been heavily felt and projected to have long lasting effects. At first, several mathematical models forecasted substantial increase the incidence of COVID-19 across Africa. One estimate projected between 300,000 to 30 million people dying, (Wallace et al., 2020) however, newer models have estimated lower mortality rates. There have been variations in burdens and outcomes related to the COVID-19 pandemic across Africa specifically, eight out of the 54 African nations – Cameroon, SA, Nigeria, Egypt, Ghana, Algeria, Morocco and Sudan-account for two-thirds of all known cases in the continent. In addition, only three out of the 54 African countries-SA, Egypt and Algeria account for over half of all the COVID-19 cases and deaths in Africa (Africa CDC; (Twahirwa Rwema et al., 2020). Africa CDC estimates as of May 1st, 2020 that Cameroon has the highest number of confirmed cases in the Central African subregion.
It is likely that SARS-CoV-2 will remain in circulation across the continent of Africa for the foreseeable future; therefore, the incorporation of mitigation strategies for sustainable interventions with evolving trajectory is critical. Even so, the effects of the pandemic are beginning to emerge in the HIV care continuum. A survey of PLWHA in SA through a social media platform found that 13% of people did not have access to medications needed for their chronic conditions during the lockdown (Haasbroek, Stemmet, & Oelofse; Jewell et al., 2020).

Some reports suggest that in May of 2020, only 30-50% of patients collected their medications (Haasbroek et al.). A World Health Organization (WHO) survey in May of 2020, done in 5 countries in SSA, showed three months or less of ART supply stock availability for major first line drugs with the main reason being the failure of suppliers to deliver on time. The qualitative study consists of: (1) Informants (2) Data gathering methods – in-depth interviews (3) process support -data analysis (4) questions and topic (5) strategies -narratives. These were used to develop reoccurring themes in the interviews to draw reasonable conclusions.

The Bamenda Regional Hospital AIDS Treatment Center

This research was conducted at the Bamenda Regional Hospital’s (BRHs) AIDS treatment center in the city of Bamenda, Cameroon. The hospital was opened in 1956 by Sir Roberts the then British High Commissioner based in Nigeria. The Hospital was given the status of a third level reference health institution for the NW region serving over 2 million inhabitants of Bamenda and its environs. Bamenda is the capital of the Northwest
(NW) region of Cameroon. The center has been in existence since 2002 to cater to the high rates of HIV in the region. Currently the BRHs receives over 5,000 to 6,000 active patients per year for routine HIV care including follow-up by doctors and other health personnel and over 14,000 active and inactive patients. All HIV positive individuals who seek care at the hospital are enrolled in the day care hospital for comprehensive HIV care. A multidisciplinary professional team provides care and ART is provided to infected individuals based on their CD4 count and the WHO central guide. Bamenda has one of the highest rates of HIV in the country (4.0%) (survey, 2018) and has been highly affected by the COVID-19 pandemic. In addition, the HIV center is one of the largest HIV centers in the country as it is located in the one of the largest cities in Cameroon. According to the UN World Urbanization Prospects for 2021, Bamenda has a population of about 553,000 inhabitants. It is the fifth largest city and the largest English-speaking city therefore, translation of consent documents was not necessary.

**Impact of Civil Conflict**

The Boko Haram insurgency spread from Nigeria to Cameroon and has reduced the availability and accessibility of health services; at least eight of the thirty health districts in the Far North region were severely affected and other health facilities were forced to close their doors as health workers fled for safety. Subsequently, there was an increase in the spread of communicable diseases (Awosusi, 2017).

In addition, Cameroon is facing another crisis. Since 2016, there has been armed conflict in the English-speaking regions of Cameroon, which is the North West (NW) and
the South West (SW) regions. Cameroon, a country once known for its stability has been faced with violence since 2016. The conflict began with teachers and lawyers in these two regions over perceived marginalization, which turned into an armed conflict termed the ‘Anglophone Crisis’. The SW region has had the greatest burden of the crisis with 15 of the 18 health districts being severely affected (Haddison, Ngono, Kouamen, & Kagina, 2018). Therefore, due to security concerns the DHS teams were not allowed to visit some zones in the South West region.

II. STATEMENT OF PROBLEM

Cameroon has the second largest HIV epidemic after Nigeria in the West and Central African sub-region. Prevalence varies significantly according to specific groups of the population and also geographical location in the country. Despite expansion of HIV testing and ART treatment services in Cameroon, HIV testing among men is still low. For example, when we compare HIV testing among men and women in Cameroon, it is estimated that fewer men have never been tested compared to women (43% versus 29% respectively). Also, it is estimated that there are fewer men who get tested and actually receive their results (55% versus 70% respectively). Although DHS 2018 data among men aged 15-49, it shows some improvement in testing uptake; however, men still lag behind women in HIV testing. In addition, men are a majority within other key populations at higher risk of HIV infections. For example, men make up about 80% of the approximately 11.8 million intravenous (IV) drug users; and 13.1% of IV drug users worldwide were living with HIV (World drug report 2017). Even though access to ART has been expanded considerably throughout the region, ARM remains high among men and the ‘HIV blind
spot’ gap persists making all men not just MSM a key population. A major cause of this high mortality among men is the late presentation of patients for diagnosis and treatment. This not only exposes more women (Ehrhardt, Sawires, McGovern, Peacock, & Weston, 2009), it exposes other men in same sex relationships to new HIV infections by untested HIV-positive men. As the world pushes to reach the high levels of HIV service coverage required to end AIDS as a public health threat, this ‘HIV blind spot’ in the response to HIV can no longer be ignored.

HIV remains a major public health issue in SSA, there are concerns that possible disruptions in HIV programs due to the COVID-19 pandemic could affect HIV related mortality and increase new infections (Jiang, Zhou, & Tang, 2020; Lai & Yu, 2020; Mhango, Chitungo, & Dzinamarira, 2020). The impact of the COVID-19 pandemic may overburden already weakened health systems and deter those most at risk from accessing critical health care services for treatment and prevention. (Mhango et al., 2020) Adverse effects of the COVID-19 pandemic on health care services has begun to emerge. However, the restrictions come with unintended consequences in terms of HIV testing and care. Healthcare workers are focused on COVID 19 treatment and care, while the general public are quarantined or scared to seek medical attention for other illnesses due to the threat of acquiring the virus. The restrictive measures and threat of COVID-19 have curtailed access to provider-initiated and community testing as well as other services. The COVID-19 pandemic presents several barriers and challenges to the HIV care continuum-(95-95-95). The negative effects of the COVID-19 pandemic on access to health services has begun to emerge such as closure of many facilities, shortage of staff due to illness and reluctance by individuals to see healthcare workers at the center for fear of exposure to SARS-COV 2.
Although SSA is the least affected region globally due to COVID, we focus on the region because of its disproportionately large population of PLHIV. In addition, information as of March 7, 2021 indicates that the COVID-19 cases are on the rise in many SSA countries including Cameroon. On Friday March 5, 2021 the Prime Minister of Cameroon pointing to "a deterioration in the epidemiological situation" in the country, Dion Ngute Dion Ngute stated. He pointed out that "In the space of one week, more than 3,000 new cases have been recorded, bringing the total number of people who have tested positive to Covid-19 to 38,988." (AFP) He criticized the population’s ‘laxness” in applying COVID-19 mitigation measures and has decided to strictly enforce the use of masks in public places, banned gatherings of more than 50 people and land and sea borders will also remain closed.

According to UN, 2019, there are over one billion people in SSA with a growth rate of 2.3. By the end of 2020 the population is estimated to be about 1.1 million and in the coming decades the region will account for most of the world’s population while the population of other regions will be declining (Aaron O'Neill, 2021). Nonetheless, with this growing population, the region still remains the epicenter of the HIV epidemic. Currently there are almost 26 million PLWHA in the region with an estimated 1.7 new infections per day and 61% of all new infections and are in SSA (de Mendoza, 2019). According to UNAIDS 2019 factsheet for Central and Western Africa, it is estimated that only 64% of PLWH knew their status, 79% were accessing treatment, and 76% had viral suppression with 280,000 deaths. In addition, prior HIV research suggests that the burden of pandemics tend to shift over time to poorer populations and countries due to their comparatively weak health care systems and other related factors. The joint United Nations program on HIV/AIDS has set goals of 95 percent in each of three categories for testing, treatment and
remaining in treatment. However, Cameroon has only achieved 56 percent, 93 percent, 80 percent, respectively in these three categories.

In addition, unmitigated spread of COVID-19 creates pressure on the already weak healthcare systems in Cameroon with high mortality linked to the triple burden of disease (HIV, tuberculosis and non-communicable diseases) and high cost of healthcare. The system may be overwhelmed and unknowingly fail to or fall short in providing necessary health services. Quarantine, social distancing, community containment measures limit movement which may hinder timely linkage to HIV care and prevention. Hospital and center visits could be restricted and allocation of resources for HIV care could be diminished. The effects of the travel restrictions on PLWHA in SSA could have even greater consequences as individuals must often travel long distances to access treatment and care due to limited availability of specialize HIV services, efforts to mitigate stigma and preference for higher tiered facilities. When PLWHA lack the care that they need they are at risk of developing AIDS related complications. This not only threatens attainment of the goal set forth by UNAIDS to end AIDS by 2030, but could lead to increased ARM and new infections. We do not know how long the pandemic will last but these considerations have a role to play therefore, programs that aim at reducing the impact of lockdowns should consider alternative methods to address and control and address the HIV epidemic, and save lives.

III. PURPOSE OF THE STUDY

The purpose of this study is twofold; first we examine the possible factors that may lead to low HIV testing uptake among men in Cameroon. The main drivers of low testing we propose are stigma and lack of knowledge of HIV transmission. These factors could be the
main reasons behind the high rate of HIV transmission which has led to higher HIV/AIDS related mortality and new infections. The first part of the research was addressed using secondary data collected by the Demographic Health Survey (DHS) in 2018. Secondly, we describe the perceptions of individuals and staff at the HIV center. This was accomplished through primary data collection using in-depth interviews at the Bamenda HIV center and use the data to inform HIV related services in SSA or other low to medium income countries (LMICs) during the pandemic.

The issue of stigma and HIV testing was recognized as a major confounding problem in the HIV/AIDS pandemic since the 2000 International AIDS Conference in Durban, SA, titled Break the Silence. There is an urgent need to increase our understanding of the relationship between stigma and knowledge of HIV transmission, so that stigmatizing attitudes could be reduced and more people and testing uptake will increase. This is crucial, especially considering the global vision to end the AIDS epidemic by 2030 as established by UNAIDS. Unfortunately, SSA is not on track, as the numbers of new infections are not declining as fast as expected to exceed AIDS-related deaths. These findings are verified by UNAIDS, 2018 which notes the rise of new HIV infections in 50 countries. (Assefa, Hill, Van Damme, Dean, & Gilks, 2020). AIDS-related deaths are not falling as much as expected and threatening to undo some of the gains in the fight against HIV/AIDS.

A recent analysis by UNAIDS has revealed the potential impact of the COVID-19 pandemic in LMICs around the world. It is estimated that supplies of antiretroviral medicines used to treat HIV could be between 10 and 25% higher than the normal prices, due to the lockdowns imposed to stop the spread of COVID-19. Some modelling estimates indicate that a six-month complete disruption in HIV treatment could lead to over 500,000
additional deaths due to AIDS related illnesses. In addition, if services to prevent mother to child transmission were similarly halted for a six-month period as well, the estimates in new child HIV infections would be as high as 162% increase in high HIV prevalence nations like Malawi (Dzinamarira, 2019). Therefore, it is critical that there is continuation of services despite the pandemic.

Our study would be crucial in understanding HIV testing among men and how services are affected during the COVID-19 pandemic, then recommending effective interventions. These recommendations could help reduce the incidence and prevalence of HIV transmission in Cameroon and disrupt the trajectory of the negative effects that are beginning to emerge. The original contribution of this study is the development of themes and plans for successful program interventions for HIV testing among men and HIV related services at centers amid the COVID 19 pandemic. These themes can be adopted and applied to other SSA countries with similar healthcare challenges. Recognizing and responding with innovative male-sensitive interventions are vital to reaching UNAIDS targets and ending the epidemic by 2030. In the studies that follow will examine HIV testing predictors and potential pathways and provide in-depth perspective on the effect of HIV services and the COVID-19 pandemic in Cameroon. In particular, these studies will:

1. To examine how stigma and HIV transmission knowledge are associated with testing for HIV among men in Cameroon aged 15-64.
CHAPTER 2.

IV. REVIEW OF THE LITERATURE

The goal of this literature review is to examine HIV testing in Cameroonian men and provide background on the importance of testing all men and not just MSM. It is focused on three areas in the literature that are most relevant to this study: Personal prejudice stigma, perceived societal stigma and HIV knowledge. Also included in this discussion are some considerations from the literature for overcoming stigma and HIV knowledge gap. Finally, this study seeks to develop theory in the framework of HIV testing in men, a summary of how to create sustainable interventions among men in the SSA region is included.

There is substantial research on HIV testing in women, in large part due to prenatal testing and large funding from organizations such as UNAIDS, PEPFAAR and USAID. These organizations continue to fund substantive data collection related to HIV testing and the barriers to testing uptake. The majority of published works include a focus toward preventing HIV infections in women and mother-to-child transmission as well as Men who have sex with men (MSM). While previous studies offer valuable insight in HIV testing, they do not fully address HIV testing in heterosexual men. A limited body of knowledge exists regarding what contributes to HIV testing in heterosexual men in Cameroon. Some researchers do not view heterosexual men in SSA as a key population in HIV response despite the body of evidence on their inequitable access to HIV prevention, testing and ART adherence (Colvin, 2019). Heterosexual men in SSA, in spite of this, are believed to be a key population disproportionately affected by HIV and they represent an important group to
engage in HIV testing and prevention services. However, there is a discrepancy in Cornell’s research that men should not be viewed as a key population.

There is growing evidence describing determinants of testing among men, however, much of the research has been conducted in high-resource settings and the focus is usually on men who have sex with men (MSM). Studies in LMICs have focused on women’s testing behavior through VCT, or determinants of uptake of testing among women during antenatal care services. There has been less focus on the determinants of HIV testing among men in resource poor settings. Understanding factors associated with HIV testing in men is not only supporting men’s sexual health; it also helps the health of the family as a whole specifically issues related to transmission of HIV among partners.

Public health responses have not fully addressed these gaps; therefore, literature remains sparse. In the past, men have been portrayed largely as the vectors of disease, however, recent evidence suggests that men care about their health and will engage in the HIV care continuum when services are appropriately targeted (van Rooyen et al., 2019). This viewpoint argues for a reframing of the approach to heterosexual men as it relates to the HIV epidemic in SSA. There is a triple dividend when men are able to access HIV prevention and treatment services; they protect themselves, they protect their sexual partners and they protect their families. It is unlikely for a man to transmit HIV to their partners when he is HIV negative or virally suppressed. When fewer women are infected by men, fewer children are at risk of acquiring HIV from their mothers.

Global disparities in HIV prevalence theory are driven by social and structural factors, including HIV stigma. Stigma has been an organizing principle in social psychology as bias and consequence for human health. It is the driving force behind
variations in the prevention and treatment of diseases and health outcomes. The etiology of stigma may differ between cultural settings; however, the manifestations and psychosocial consequences are similar across different cultures and socioeconomic groups (Weiss, 2008). Many examples of barriers for HIV testing in the literature exist with the most common being stigma and lack of HIV transmission knowledge. These barriers are crucial in the decision to test and is often made within the broader relationship context. HIV testing barriers have mostly focused on psychosocial factors within the individual. (Obermeyer & Osborn, 2007). However, according to (Williams & Mann, 2017), stigma operates mainly at the level of groups and systems within communities. There is heterogeneity in the way HARS is experienced across different communities, and, likely, the interventions and mechanisms that work to reduce stigma and increase testing may also vary. This implies that there are potentially different pathways that may lead an individual to test or not to test for HIV.

The scale-up of ART may have weakened the association between HIV and imminent death, social exclusion, and economic hardship. The concept of treatment as prevention has created enthusiasm for an AIDS-free generation; however, success is highly dependent on early diagnosis and linking positive individuals to care (Sidibe et al., 2014). The extent to which levels of stigma may have changed during the era of ART scale-up in the general population in SSA remains unknown; nevertheless, studies show that HARS is associated with reduced uptake of voluntary HIV testing (Kalichman & Simbayi, 2003). Examine different factors associated with HIV-related stigma could be beneficial to rebuild or build up interventions and integrate anti stigma strategies in HIV prevention and care guidelines. Tackling HIV/AIDS-related stigma (HARS) is vital to effectively identify,
prevent and care for PLHIV, which will greatly help to contain and manage the HIV epidemic. Therefore, we examine HIV-related stigma, and identify factors associated with stigmatization among men as a possible reason for low testing uptake in that population.

Search Strategy
The search strategy for this study commenced with establishing a literature review component, which guided the keywords used to search the databases. Keywords included, but were not limited to HIV testing, HIV in men, Cameroon HIV testing, men, HIV testing in SSA, HIV testing in Cameroonian men and Africa and the HIV epidemic. The Elsevier, Google Scholar, EBSCOHOST, and PubMed databases were searched. This chapter is organized into three sections: personal prejudice stigma, perceived societal stigma and HIV knowledge and a summary. Sources of information included peer-reviewed journal articles, government and organization statistics, dissertations and theses. The majority were published within the last 5 years. Older sources included were to provide the reader a perspective of the past and current work in the field of HIV.

Personal prejudice stigma
Although there has also been marked progress in HIV treatments worldwide, it worth noting that treating HIV starts with diagnosing HIV, making the first 95 is critical in ending the HIV epidemic. HIV stigma is most certainly a factor at play in failing to achieve the first 95. HIV stigma is a ubiquitous and pervasive barrier to every point along the HIV continuum of care. Societal devaluation of people with HIV adds to the burden of receiving an HIV diagnosis Prejudice, towards PLHIV creates a social context in which personal
concerns for safety, shame, social exclusion accompanies the prospect of getting an HIV test. People who endorse prejudicial attitudes towards PLHIV are themselves less likely to get an HIV test. Anticipating future stigma is linked to lower rates of testing uptake in different populations as individual fear exclusion from their communities. Personal prejudice is a view or judgment that someone has for another person or a group of people based on their real or perceived group membership and can shape the way that people interact with others.

The fear of anticipated, HIV stigma and internalized HIV stigma has been linked with poor ART retention and adherence and may be especially influential for men in SSA mainly due to the role of men in the African communities (Abadía-Barrero & Castro, 2006). The men may feel that they may be devalued as a leader in their home and even in their communities as the thought of getting a positive HIV diagnosis may mean loss of job and economic power over their families and communities as a whole and prevents men from getting tested. They immediately fear the worse for themselves because they have seen how individuals living with HIV have been treated by their communities. This perpetuates the cycle of men not testing and presenting with end stage AIDS symptoms which could lead to mortality.

In contrast to most findings, one study showed that women who held more stigmatizing attitudes regarding people living with HIV were more likely to report having been HIV tested (Treves-Kagan et al., 2015). This is probably due to the fact that women are caregivers and tend to take care of their families and HIV testing could be a way of caring for themselves so they can better care for their families.
Perceived societal norms

Certain cultural and societal norms and practices contribute to HAR stigma and prevent individuals from getting tested. There is an increased realization of the importance of societal norms and an individual's immediate environment (family, community, peer group) in shaping their behaviors. Social norms can be spoken or unspoken and they are influential rules or expectations of conduct and thoughts based on shared beliefs within a specific environment. These authors note that our attitudes and perceptions of community beliefs shape our social behavior. To the best of our knowledge, this is the first study that has examined HIV related stigma among men and its associated factors in Cameroon using the 2018 CDHS. Therefore, the aim of the study is to examine how stigma and HIV knowledge affect HIV testing among men using a nationally representative sample.

PLHIV are more vulnerable to stigma and are also less likely to have access to social resources or social networks. Coping with stigma is hard emotional work and can create distances between people in a given community; these distances make it difficult for opportunities to engage in vital social support. Research by (Bogart et al., 2008) notes that stigmatized individuals lack access to social support because of social avoidance and alienation from one's social group. This has profound consequences in public health, as social support is associated with significant health benefits.

HARS and discrimination remains a significant obstacle in the fight against HIV/AIDS (Jacobi et al., 2013). This is partly due to its association with particular risk groups and risk behaviors. There have been diverse efforts put in place by the Cameroon health system to combat HARS and discrimination. The contribution of structural factors
(stigma, discrimination, violence) in relation to HIV among female sex workers internationally has been well documented (Baral et al., 2019; Fearon et al., 2019). However, little scientific research has examined the structural determinants of stigma in heterosexual Cameroonian men and how this stigma can be overcome. Community health approach to investigate factors associated with HIV and sexual health have mostly focused on health infrastructure and delivery of care in the community and how this approach shapes individual health outcomes or how community perception of stigma shapes different behaviors (Kranzer et al., 2008). Also, it is important to examine contextual influences on HIV related outcomes. However, insufficient studies in addressing community-level determinants of men's HIV testing uptake has resulted in a gap in our knowledge of how community-level factors could be harnessed to improve the health of men and their sexual partners (Gabrysch, Edwards, Glynn, & Cities, 2008; Msisha, Kapiga, Earls, & Subramanian, 2008). People prefer to maintain "social distance" when they perceive danger from people that appear to have diseases that carry negative societal consequences such as HIV. Stigma starts when salient differences are recognized, labeled, and connected to stereotypes or social identities among people. Over time this leads to a separation between "us" and "them," resulting in discrimination and a loss of status in the community. This separation is more evident among a network of close relationships. Social networks meet various needs by activating social ties or the 'help-seeking processes' (Renzulli & Aldrich, 2005). The system to which a person belongs usually shapes their attitudes and behaviors towards a specific situation or condition. However, this is not just limited to close family as it extends to the broader social contexts including neighborhood, community, and region. Therefore, it is crucial to evaluate this broad perspective of social influence because even distant connections have been shown to impact health.
It is particularly relevant in predicting stigma and HIV testing uptake as understanding the benefits of knowing one's HIV status and where one can get tested are not enough to lead an individual to test. A person's willingness to test is influenced by the attitudes of the people within their environment (Babalola, 2007). Increased contact with a highly stigmatizing community could lower stigma because stereotypes and in-group ignorance about an out-group are countered by first-hand experiences, making this an effective stigma intervention. There is a strong negative relationship between stigma level within a community and a person's willingness to test for HIV. In one study, readiness to test while living in a mid-level stigmatizing community was associated with a 43% reduction in the desire to test. (Babaloba, 2007). In a study of 13 countries in SSA, it was reported that those who did not know someone with HIV or someone who may have died from AIDS were less likely to report having tested and received the results of their HIV test. This trend was consistent in both men and women across all 13 countries as the uptake of testing and results collection was significantly lower among those expressing stigmatizing attitudes towards PLHIV (Cremin, Cauchemez, Garnett, & Gregson, 2012). For example, in a study on treatment adherence in Malawi, it was noted that discrimination and prejudice directly from others (enacted stigma) are the main drivers of treatment interruption among ART patients (Tabatabai et al., 2014). To thoroughly examine stigma in Cameroon, we need to understand the cultural, demographic and regional characteristics of the communities and how these characteristics shape the perception of stigma. Based on general knowledge of Cameroon and reviewed literature, stigma will be highest in areas with low HIV prevalence which are mostly in the Northern regions while high prevalence areas in the Southern regions will have less stigma. The Anglophones are more tolerant of mental illness, HIV, and other stigmatizing conditions. However, the Francophones hold
more stigmatizing attitudes and many seek treatment in other areas for fear of stigma. In fact, in some regions, people refuse to use the words "HIV" or "AIDS" due to shame. HIV/AIDS is considered a highly transmissible and deadly disease. In the community, PLHIV are associated with having lived a promiscuous lifestyle, or are viewed as homosexuals, intravenous drug users and emaciated people dying of AIDS. These narratives have not proven helpful because when a person has symptoms of AIDS, the patient and family members would rather say the sickness is a result of poison. The poison is commonly referred to as "musong," which can be loosely translated as “slow poison,” allegedly obtained from corpses and used by the Bassa tribe in the Littoral region. It is better to say their sickness is due to a poisonous substance, not HIV, a narrative and belief more prevalent in specific locations. Stigma may be higher in rural areas with limited knowledge and access to health facilities.

HIV knowledge

Besides stigma, the lack of knowledge regarding HIV/AIDS transmission is the cornerstone in the fight against the disease. Education of HIV transmission may be associated with less risky behaviors. Adequate knowledge about the virus is an effective means of promoting positive attitudes and engaging in safe practices. It helps the individuals decide whether or not to test. Being knowledgeable on transmission allows individuals to overcome misconceptions that could prevent positive behavioral changes, improve a healthy lifestyle, and reduce HAR stigma. (Plautz & Meekers, 2007). Knowledge creates awareness of perceived risks associated with not testing for HIV. According to (Egbe, Nge, Ngouekam, Asonganyi, & Nsagha, 2020) HIV/AIDS is still
mystified and regarded by some as punishment from the "gods" for being promiscuous or as a result of prior offenses. Therefore, there could be more stigma, as people may want to separate themselves from those they believe have been cursed. As a result, stigma will be more pronounced in the Southern regions where strong superstitious beliefs may force people to maintain societal stigma.

According to UNAIDS 64 countries reported that about 40% of males and 36% of females have accurate and comprehensive knowledge of AIDS. The intended target rate for HIV knowledge set forth by UNAIDS is 96%. In addition, UNAIDS also reveals that some national level HIV/AIDS prevention programs intended to provide comprehensive information are not effective, resulting in gaps on basic facts about HIV. For example, a study done in Mozambique by (Prata, Morris, Mazive, Vahidnia, & Stehr, 2006) they point that HIV transmission knowledge is high but lacking in some aspects such as condom use and other prevention practices. This agrees with a study in the Northwest region of Cameroon by (NkuoAkenji, Anyangwe, & Fomboh, 2017) where school students demonstrated low knowledge of correct condom use, which may explain why this group has low condom use.

Another assessment of knowledge among secondary school students in Cameroon was performed by (Nkuo-Akenji et al., 2017) in which they investigated knowledge of HIV transmission. In this study, half of the students had negative views about PLHIV. An increase in knowledge also resulted in participants’ ability to engage in safer sex practices, which indicates that participants demonstrated awareness of routes of transmission. However, there were still misconceptions about transmission, such as the beliefs that infection could be transmitted through a mosquito bite (23%), having sex with an
uninfected partner (15.5%), non-condom usage (14.7%), sharing a meal with an infected person (7.8%) and abstinence (9.5%). Although only a small portion of participants held these misconceptions, it could lead to such risky behaviors exposing them to infection.

Similarly, a study was done in Cameroon by (Njozing, Edin, & Hurtig, 2010) which looked at the facilitators and barriers to HIV testing in the Northwest region of Cameroon, they indicated that misunderstandings still exist in 67% of the participants regarding the etiology and treatment of HIV. Although some participants regarded HIV as a 'normal' and treatable infection, many people still do not believe that HIV/AIDS exists unless they or a close family member/friend becomes infected. Some regard HIV as a spell or witchcraft that can be treated through prayers by men and women of God or traditional healers. Others perceive HIV as an untreated disease, discouraging people from testing since they believe there is only one outcome of HIV-- death. Therefore, they would instead remain ignorant than test for a lethal injection, a false impression propagated by traditional healers who may dissuade the public from seeking conventional treatment because they claim to have the cure for any illness on the face of the earth, including HIV.

In addition, some people in rural areas are illiterate and are not exposed to health information on billboards and posters. Many people remain uninformed about modes of transmission of HIV and meanwhile may be dominated by myths of HIV/AIDS, something that is "new" or "strange" and difficult to comprehend. Ignorance of the condition may still be responsible for the persistence of risky sexual behaviors and low testing. It may be hard for some people to change as for some sexual pleasure that may outweigh the risks, and people remain doubtful of HIV transmission. (UNAIDS pop survey). Therefore, this paper examines knowledge of HIV transmission and its association with readiness for HIV testing.
among men in Cameroon. Existing literature predicts that there will be a decline in HAR stigma with increased understanding of the disease and treatment options (Brown, Macintyre, & Trujillo, 2003; Genberg et al., 2008; Visser, Makin, Vandormael, Sikkema, & Forsyth, 2009). This question aims to examine if knowledge of HIV transmission will increase in HIV testing among men.

**Summary**

More research is needed to further understand and address barriers to HIV testing in men. The problems facing men are multifaceted and must be looked at using a holistic approach to come up with effective intervention strategies. Discovering new insights into overcoming these barriers in men is important in fully addressing HIV testing in men and reducing HIV/AIDS related mortality among men in Cameroon. This study examines how HIV testing uptake can be increased among men in Cameroon but will also be serve other countries in the subregion. The overall effect will be that more men will be aware of their HIV status and there will be fewer HIV/AIDS related mortality. HIV testing strategies needs to address how men are viewed within their communities, how individuals perceive PLHIV and HIV transmission knowledge.

Although researchers have largely focused on HIV testing in women and other key populations (MSM, prostitutes and intravenous drug users), the topics covered in the literature review addressed what keeps Cameroonian men from getting tested. To the best of my knowledge, there is no known research that has examined HIV testing among Cameroonian men using the most up to date DHS survey data for Cameroon. This study is
an opportunity to fill the knowledge gap that exists today regarding what motivates men to actually get tested. The goal of this study was to examine HIV testing among men in the different regions of Cameroon. An overview of the quantitative approach, using binary logistic regression models is provided in Chapter III.

V. Aims, Hypotheses and Expectations

The primary research aims and hypothesis of this project is as follows:
(i). To examine how stigma and HIV transmission knowledge are associated with testing for HIV among men in Cameroon aged 15-64.

H0: Neither stigma nor HIV transmission knowledge are associated with testing among men aged 15-64 in Cameroon.

H1: Cameroonian men with greater perceived stigma about PLWHA are less likely to have been tested for HIV (ever or recently).

H2: Cameroonian men with greater HIV transmission knowledge are more likely to have been tested for HIV (ever or recently).
Chapter 3:
VI. DESIGN-METHODS FOR HIV STIGMA AND TESTING OUTCOMES.

DATA

The 2018 Cameroon Demographic and Health Survey (CDHS) was implemented by the National Institute of Statistics (NIS), while working in partnership with the Ministry of Public Health. Funding for the survey came from the Government of Cameroon, the United Nations Population Fund (UNFPA), the United States Agency for International Development (USAID), the Global Fund through the National Malaria Control Program (PNLP) and the U.S. President’s Malaria Initiative (PMI). Technical assistance was provided by the ICF through the DHS Program, which is funded by USAID. The DHS surveys have standardized questions including questions which allows for analysis of attitudes and behaviors for many countries, Cameroon included.

Approval for the DHS survey came from the National Ethics Committee in the Ministry of Health in Cameroon and by the National Ethics Committee of the ORC Macro at Calverton in the USA. Before participation all participants received and gave informed consent and all information was collected confidentially. Permission to use data was obtained from the DHS program (https://dhsprogram.com/data/available-datasets.cfm). A request was made on the DHS website and access was granted for Cameroon 2018 data. The State University of NY at Albany IRB reviewed the study and determined that there were no ethical concerns to be taken into consideration as the data are completely anonymized and the DHS program has handled ethical issues prior to and during data collection. Data collection was done by visiting households to conduct face-to-face
interviews to obtain information on demographic characteristics, marital status, sexual
behavior, HIV testing; among other data. We pooled individual level data from male
respondents aged 15-64 years. Analysis will be restricted only to males who have heard of
HIV which drew 6808 total study participants as seen in table 1. The DHS program
webpage indicates that procedures and questionnaire for the survey protocols are reviewed
by the Institutional Review Board (IRB) of the ICF international (a consulting firm contracted by
USAID) and also by the local IRB in the host country. This ensures that the informed
consent is sought before each interview and the respondent can decide to accept or decline
to participate. Statements on the consent form cover topics such as participants rights,
purpose of the study, potential risks and benefits and emphasis on voluntary participation.
Confidentiality is maintained at all times between the interviewers and other team members
and respondents’ questionnaires are deidentified by a series of numbers (e.g. household
number) and destroyed after the data is processed. Further details about the methodology
can be found on the DHS website.

This is the fifth survey for Cameroon since 1999 and is designed to provide data for
monitoring the population and health situation in Cameroon. The main objective of the
survey was to provide reliable estimates of marriage, fertility levels, family planning,
nutrition, domestic violence, maternal and infant mortality, breastfeeding, HIV/AIDS and
other sexually transmitted infections (STI) that could be used by policy makers and
stakeholders to improve on existing public health programs in the country. CDHS had a
National sample of 13,160 households of which 6,860 households in 245 urban clusters and
6,300 households in 225 rural cluster was planned for the survey. This sample was
distributed to ensure adequate representation of urban versus rural areas and the 12 regions. Cameroon has 10 regions but DHS divided it up to 12 regions (Adamawa, North, Far North, South West, North West, West, Littoral, Central, East and South), Yaoundé and Douala (the two largest cities in Cameroon and are considered to have no rural parts).

Two strata were created; rural and urban. A 2-stage stratified area survey was implemented. The first stage had two degrees; in the first degree 470 zone of enumeration were drawn systematically with a probability proportion to their size in household from the list of clusters from 2005 and updated in 2014, in the second-degree mapping and enumeration of households was done from December 13, 2017 to March 25, 2018 to draw up the updated list of households in each zone of enumeration to be used as base for the second degree. The second stage selected a sample of 28 households by cluster with systematic draw at equal probability. In addition, a subsample of 1 in 2 household of all households in sample, all men 15-64 were eligible to be surveyed for a total of 6978 men. The individual man questionnaire was used on the male participants. The content of these questionnaires is based on the model questionnaires developed by the DHS program and adapted to the specific needs of Cameroon through a process of participatory discussions and consultations during several meetings bringing together all stakeholders.
SAMPLE MEASURES

This is a cross-sectional study in Cameroon using data from DHS measuring stigma and knowledge and their relationship to HIV testing and recent HIV test. There were questions for this study were all selected from the CDHS 2018 data.

Fig 2. Overview of the study sample

Variables Measurement

Dependent variable: This study has two dependent variables measured by using survey questions asked to respondents who have ever heard of HIV. The primary dependent
variables of interest are two category nominal measure of uptake of HIV testing. We used
two different measures of HIV testing, focusing on recency of HIV testing (defined as the
uptake of HIV test within the 2 or more years) and having ever tested for HIV.

Ever tested for HIV- This variable refers to whether the me has ever been tested for HIV.
The response to this question will allow us to make associations and draw conclusions on
the characteristics of men who are more likely to be tested or vice versa. A dichotomous
variable coded as “1” when a respondent reported that she was tested for HIV and “0” when
the respondent reported no (0= No and 1=yes).

Recent HIV test- This variable refers to if the respondent has had a recent HIV test. The
responses for this variable are 95=2 or more years, 98=don’t know. These were recoded to
0=don’t know and 1=2 or more years.

Independent variables: As shown in the conceptual framework, and by a study by Lakhe,
Mbaye, Sylla & Ndour, 2020 p. 4) on HIV screening in Senegal we selected explanatory
variables related to sociodemographic and economic factors, stigma and HIV knowledge.
Also, as seen in Ajayi, Awopegba, Adeagbo & Ushie, 2020) on low coverage of HIV
testing among Nigerian adolescents and young adults. Respondents agreeing (i.e.
responded to the affirmative towards the survey items addressing prejudice) were
considered to be prejudiced and respondents agreeing (i.e. responded to the affirmative
towards the survey items addressing knowledge) were considered to be knowledgeable of
HIV transmission.
HIV Stigma

To measure the degree of stigma we used two different scales. Each with three questions pertaining to personal prejudice against PLWHA and societal stigma against PLWHA. These variables were selected based on literature reviewed and their applications in other research studies (Lakhe et. al, 2020; Ajayi et al., 2020). Men who responded to the affirmative toward the stigma questions may discriminate highly towards PLHIV while people who responded to the negative may be less likely to discriminate towards PLHIV.

Personal Prejudice against PLWHA: This refers to the degree to which one personally thinks less of those who have HIV. It is prejudice that comes from labeling an individual as part of a group of people they consider to be socially unacceptable because they are HIV positive. The questions in Personal prejudice against PLHIV are geared toward enacted stigma. It is characterized by episodes of prejudice against individuals with a societally or culturally stigmatized condition merely for being imperfect usually with devalued characteristics (Molina, Choi, Cella, & Rao, 2013; Scambler, 2009). It includes not being patronized, being avoided or treated unkindly. The questions were recoded to indicate more stigmatizing attitudes and knowledge of HIV transmission. The items for stigma were coded as “1” if they reported any HIV stigmatizing behaviors and “0” otherwise. The first question is “Would be ashamed if someone in the family had HIV?”. It targets whether an individual will be ashamed and perpetuate avoidance stigma. This question was measured on a 3-point Likert scale; 0=disagree, 1= agree, 8= don’t know/not sure/depends. The (3-point scale responses were recoded to a dichotomy: agree = 1 [agree]; no, don’t know, not sure, it depends = 0 [no]). The next two questions are “Would you buy fresh vegetables from a shopkeeper or vendor if you knew that this person had the AIDS virus?” and
“Children with HIV should be allowed to attend school with children without HIV?” They are meant to elicit not being patronized by not buying vegetable and the children being treated unkindly and differently from other children at school because of their HIV status. These two questions have the same responses but the responses were different from the responses in the first question. However, it was also on a 3-point Likert scale; 0=No, 1=Yes, 8= don’t know. The (3-point scale responses were recoded to a dichotomy: yes = 1 [yes]; no, don’t know, not sure, it depends= 0 [no]). We made new variables by summing the recoded version of the three items and then get a Cronbach’s alpha of 0.604 indicating an acceptable level of reliability and agreement among these questions which has been used in other research studies (Gebregziabher, Dai, Vrana-Diaz, Teklehaimanot, & Sweat, 2018; Ha et al., 2019; Kelly, Weiser, & Tsai, 2016)

Societal stigma against PLWHA: This refers to the degree to which one perceives that society discriminates against people with HIV. The questions in societal stigma against PLWHA are geared toward anticipated stigma. It is the individual’s belief that they might encounter negative societal stereotypes from others within the society in which they live in if their stigmatizing condition is disclosed. The questions to elicit anticipated stigma are “People hesitate to take HIV test because reaction of other people if positive?”, “People talk badly about people with or believed to have HIV?” and People with or believed to have HIV lose respect from other people?” Response to the first question elicits social devaluation or denied privileges, the second question elicits gossiping and the last question elicits loss of respect within the community. These three questions have the same responses on a 3-point Likert scale; 0=No, 1= Yes, 8= don’t know/not sure/it depends. The
(3-point scale responses were recoded to a dichotomy: yes = 1 [yes]; no, don’t know /not sure it depends = 0 [no]). We made new variables by summing the recoded version of the three items and then get a Cronbach’s alpha of 0.767 indicating a strong level of reliability and agreement among these questions which has been used in other research studies (Gebregziabher et al., 2018; Ha et al., 2019; Kelly et al., 2016) and are selected from CDHS 2018 data.

Knowledge: The knowledge of HIV was constructed to measure the men’s awareness about HIV transmission and how to prevent transmission. Three relevant questions were used to assess the men’s knowledge of HIV. The first question asks the men if they use condoms every time they have sex and it probed whether the men are aware of behaviors that could prevent HIV transmission. The second question is similar to asks respondents whether they could avoid the HIV/AIDS virus by having one uninfected partner who has no other partners. The last question asks the respondents whether a healthy-looking person may have AIDS virus. This variable is made up of three question from CDHS. The items were recoded for knowledge as 1” if they reported the correct answer to a knowledge item and “0” otherwise. The questions are “Reduce risk of getting HIV: always use condoms during sex”, “Reduce risk of getting HIV: have 1 sex partner only, who has no other partners” and “A healthy looking person can have HIV?” These three questions have the same responses on a 3-point Likert scale; 0=No, 1= Yes, 8= don’t know. The (3-point scale responses were recoded to a dichotomy: yes = 1 [yes]; no, don’t know = 0 [no]). We made new variables by summing the recoded version of the three items and then get a Cronbach’s alpha of 0.647 indicating an acceptable level of reliability and agreement
among these questions which has been used in other research studies (Gebregziabher et al., 2018; Ha et al., 2019; Kelly et al., 2016)

Covariates: Based on the literature, we have identified sociodemographic and economic variables to add to HIV stigma and HIV transmission knowledge to help us make better predictions HIV testing among Cameroonian men (Ajayi, Awopegba, Adeagbo, & Ushie, 2020; Lakhe, Mbaye, Sylla, & Ndour, 2020). The covariates include age, wealth index, place of residence, region, educational attainment, work and marital status which will be added as confounders in the logistic regression. Region Age (current age of the respondent); wealth index in quintile (poorest, poorer, middle, richer, richest) and place of residence (urban, rural). Another related variable was region grouped into four geographic zones based on a combination of geography, ethnicity and languages spoken in the different regions of the country. For the analysis, we used the geographic zones rather than the administrative regions. The four zones are as follow:

I. Grand North made up of the Adamawa, North and Far North regions.

II. Grand West made up of the South West, North West and Western regions

III. Grand South made up of Doula, the Littoral and Southern regions

IV. Grand Central made up of Yaoundé, the Center and Eastern regions

Factors related to socio-demographics such as Marital status (Never in a union, currently in a union/living with a female, formerly in a union/living with a female); level of education (no education, primary, secondary, higher). Factor related to economy such as currently employed (no, yes).
Data Analysis

The analysis was limited only to men who reported having heard of HIV. The analysis aimed to assess two types of HIV stigma (Personal prejudice stigma and Perceived Societal stigma) and knowledge are associated with the odds of having been tested for HIV (ever or recently). Descriptive analysis was conducted to assess characteristics of the study sample. In univariate analysis, we generated percentages for categorical variables and means and standard deviations (SD) for continuous variables. In addition, we generated five binary logistic regression models weighted according to the DHS Guide to Statistics for weighting individual cases for each outcome. We assessed the association between HIV testing and its determinants by calculating the odds ratio (OR) with 95% confidence interval (CI). Five simple binary logistic regression analysis were carried out for each outcome to assess the relationships; 1) ever been tested and independent variables. 2) recent HIV test and independent variables. Four dummy variables were entered to code for region with the Grand North as the reference group. The first step was run a bivariate binary logistic regression for key predictors of personal prejudice and societal stigma. Then three multivariate binary logistic regression models followed. This was achieved by inputting salient sociodemographic characteristics (region, age, work status, marital status, place of residence, education and wealth status). The first two multivariate binary logistic regressions were testing for personal prejudice, societal stigma and the covariates. The last multivariate binary logistic regression added all three key predictors – personal prejudice stigma, societal norms stigma and knowledge. The association estimates were calculated as odds ratio (OR) with 95% Confidence interval (CI). All analysis for this dissertation was performed using IBM Statistical Package for Social Sciences (SPSS) version 27.0.
Chapter 4: Results

Socio-demographic characteristics

The weighted social and demographic characteristics of the study respondents are presented in Table 1. While nearly 7,000 men between 15 and 64 years of age participated in the 2018 CDHS, data analysis is limited to respondents who reported ‘ever hearing of HIV or AIDS’ (N=6978). The average age of study participants is 31.8 years of age (SD=13.1). Most of the men have been tested for HIV (60.2%), but only 41.6% had recently tested for HIV (in the last 24 months) was lower. The average length of time since their most recent HIV test was 29.5 months (SD=40.36) indicating a wide distribution (i.e. some people had the test done recently and some had the test a long time ago). The median time for HIV testing among the men was 6 months. As high as 80% of the men were employed at the time of the study and more than half of the participants live in the urban areas of Cameroon (53.5%). Majority of the men in the study are from the grand Central region 30.2% and the Grand North had the least number of men with 16.0%. There were fewer men who were currently in a union (46.1%), with 52.7% reporting ‘secondary education’ to only 9.8% reporting ‘no education’ and 10.5% with ‘higher education’. Wealth status also varied, from 12.3% falling in the poorest wealth quintile to 22.6% falling within the richest indicating that our sample is strongly associated with wealth.
<table>
<thead>
<tr>
<th></th>
<th>N* (%) or mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men who have heard of HIV</td>
<td>6808</td>
</tr>
<tr>
<td>HIV testing</td>
<td></td>
</tr>
<tr>
<td>Ever been tested for HIV (vs. never been tested)</td>
<td>4098 (60.2%)</td>
</tr>
<tr>
<td>Recent HIV test (2 or more years) (vs. older HIV test)</td>
<td>2830 (41.6%)</td>
</tr>
<tr>
<td>Mean age (in years)</td>
<td>31.8 (13.1)</td>
</tr>
<tr>
<td>Working (vs. not working)</td>
<td>5437 (80%)</td>
</tr>
<tr>
<td>Urban residence (vs. rural)</td>
<td>3639 (53.5%)</td>
</tr>
<tr>
<td>Region</td>
<td></td>
</tr>
<tr>
<td>Grand West</td>
<td>1826 (26.2%)</td>
</tr>
<tr>
<td>Grand North</td>
<td>1114 (16.0%)</td>
</tr>
<tr>
<td>Grand South</td>
<td>1933</td>
</tr>
<tr>
<td>Grand Central (27.7%)</td>
<td>2105 (30.2%)</td>
</tr>
<tr>
<td>Current marital status</td>
<td></td>
</tr>
<tr>
<td>Currently in a union (Vs. Not in a union)</td>
<td>3215 (46.1%)</td>
</tr>
<tr>
<td>Highest educational level</td>
<td></td>
</tr>
<tr>
<td>No education</td>
<td>687 (9.8%)</td>
</tr>
<tr>
<td>Primary</td>
<td>1877 (26.9%)</td>
</tr>
<tr>
<td>Secondary</td>
<td>3679 (52.7%)</td>
</tr>
<tr>
<td>Higher</td>
<td>735 (10.5%)</td>
</tr>
<tr>
<td>Wealth index</td>
<td></td>
</tr>
<tr>
<td>Poorest</td>
<td>859 (12.3%)</td>
</tr>
<tr>
<td>Poorer</td>
<td>1379 (19.8%)</td>
</tr>
</tbody>
</table>
Among the items measuring HIV stigma based on personal prejudice towards PLWHV, as shown in Table 2, the most common attitude was a hesitancy or refusal to “buy fresh vegetables from a shopkeeper or vendor if you knew that this person had the AIDS virus?” (36%). Slightly fewer respondents reported that they “Would be ashamed if someone in the family had HIV?” and that “Children with HIV should be allowed to attend school with children without HIV?” (24.1% and 24.3% respectively). The average level of stigma on this measure is 0.844 (range from 0-3) which indicates that the average person endorsed less than one variable pertaining to their personal attitudes towards PLHIV. The Cronbach’s alpha is 0.604 indicating an acceptable level of reliability and agreement among the three items.

The level of personal prejudice stigma ranges from 0-3 (table 3). The higher your score, the more personal prejudice stigma an individual will have towards PLWHV. Majority of the individuals reported that they hold no stigmatizing qualities (49.9%), about 24.9% responded that they had at least one stigmatizing quality, 16.0% had at least two stigmatizing qualities and only 9.1% responded that they have at least 3 personal stigmatizing qualities based on the questions used to measure personal prejudice stigma.
The items measuring perceived societal stigma towards PLWHV, the most common was “hesitation to take HIV test because reaction of other people if positive?” (82.3%). Slightly fewer respondents agreed that “People talk badly about people with or believed to have HIV?” (80.4%). Fewer still indicated that “People with or believed to have HIV lose respect from other people?” (76.7%). The average level of societal stigma is 2.39, indicating that, on average among men, negative perceived societal stigmas appear to be stronger than personal prejudices. The Cronbach’s alpha is 0.767 indicating a good level of reliability and agreement among these questions.

The level of perceived societal stigma ranges from 0-3 (table 3). The higher your score, the more perceived societal stigma an individual will have towards PLWHV. Majority of the individuals reported that society holds strong stigmatizing qualities towards PLWHV (67.5%), about 13.5% responded that society holds at least two stigmatizing qualities against PLWHV. However, only 9.8% had at least one stigmatizing quality and 9.2% had no perceived societal stigma against PLWHV.

HIV prevention and transmission knowledge were high for all the knowledge questions; “Always use condoms during sex?” (80.3%), “have 1 sex partner, who has no other partners?” (84.85%) and “a healthy-looking person can have HIV?” (83.1%). The Cronbach’s alpha of 0.647 indicates an acceptable level of reliability and agreement among these questions. The SD (0.866) is smaller than the mean (2.48) indicates consistency in the responses to the knowledge questions.

The level of knowledge ranges from 0-3 (table 3). The higher your score, the more knowledgeable an individual is about HIV prevention. Majority of the individuals were
very knowledgeable about HIV (67.8%), about 18.2% responded that they are aware of at least two ways to prevent HIV infection, 8.5% responded that they are aware of at least one way to prevent HIV and only 5.5% responded that they have no knowledge of how to prevent HIV infection.
<table>
<thead>
<tr>
<th></th>
<th>Alpha</th>
<th>Valid N</th>
<th>Missing N</th>
<th>Range</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stigma – Personal prejudice against PLWHA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Would be ashamed if someone in the family had HIV?</td>
<td>-</td>
<td>6808</td>
<td>0</td>
<td>0-1</td>
<td>0.241</td>
<td>0.428</td>
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<tr>
<td>- Would not buy fresh vegetables from a shopkeeper or vendor if you knew that this person had the AIDS virus?</td>
<td>-</td>
<td>6808</td>
<td>0</td>
<td>0-1</td>
<td>0.360</td>
<td>0.480</td>
</tr>
<tr>
<td>- Children with HIV should not be allowed to attend school with children without HIV?</td>
<td>-</td>
<td>6808</td>
<td>0</td>
<td>0-1</td>
<td>0.243</td>
<td>0.429</td>
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<tr>
<td>Total Stigma – Personal prejudice</td>
<td>0.604</td>
<td>6808</td>
<td>6808</td>
<td>0-3</td>
<td>0.844</td>
<td>1.00</td>
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<tr>
<td>Stigma – Perceived Societal stigma against PLWHA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- People hesitate to take HIV test because reaction of other people if positive?</td>
<td>-</td>
<td>6808</td>
<td>0</td>
<td>0-1</td>
<td>0.823</td>
<td>0.382</td>
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<tr>
<td>- People talk badly about people with or believed to have HIV?</td>
<td>-</td>
<td>6808</td>
<td>0</td>
<td>0-1</td>
<td>0.804</td>
<td>0.397</td>
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<tr>
<td>- People with or believed to have HIV lose respect from other people?</td>
<td>-</td>
<td>6808</td>
<td>0</td>
<td>0-1</td>
<td>0.767</td>
<td>0.423</td>
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<tr>
<td>Total Stigma – Perceived societal stigma</td>
<td>0.767</td>
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<td>6808</td>
<td>0-3</td>
<td>2.39</td>
<td>0.994</td>
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<td>Knowledge</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Always use condoms during sex</td>
<td>-</td>
<td>6808</td>
<td>0</td>
<td>0-1</td>
<td>0.804</td>
<td>0.397</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>6808</td>
<td>0</td>
<td>0-1</td>
<td>0.848</td>
<td>0.359</td>
</tr>
<tr>
<td>-------------------------------------</td>
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<td>--------</td>
<td>--------</td>
<td>--------</td>
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</tr>
<tr>
<td>have 1 sex partner, who has no other partners</td>
<td>-</td>
<td>6808</td>
<td>0</td>
<td>0-1</td>
<td>0.831</td>
<td>0.375</td>
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<tr>
<td>A healthy looking person can have HIV</td>
<td>-</td>
<td>6808</td>
<td>0</td>
<td>0-1</td>
<td>0.831</td>
<td>0.375</td>
</tr>
<tr>
<td>Total Knowledge</td>
<td>0.647</td>
<td>6808</td>
<td>6808</td>
<td>0-3</td>
<td>2.48</td>
<td>0.866</td>
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Table 3. Frequencies of Key Predictors

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td><strong>Stigma – Personal prejudice against PLWHA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>3397</td>
<td>49.9</td>
</tr>
<tr>
<td>1</td>
<td>1697</td>
<td>24.9</td>
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<tr>
<td>2</td>
<td>1092</td>
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</tr>
<tr>
<td>3</td>
<td>622</td>
<td>9.1</td>
</tr>
<tr>
<td><strong>Stigma – Perceived Societal stigma against PLWHA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>627</td>
<td>9.2</td>
</tr>
<tr>
<td>1</td>
<td>668</td>
<td>9.8</td>
</tr>
<tr>
<td>2</td>
<td>918</td>
<td>13.5</td>
</tr>
<tr>
<td>3</td>
<td>4595</td>
<td>67.5</td>
</tr>
<tr>
<td><strong>Total Knowledge</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>375</td>
<td>5.5</td>
</tr>
<tr>
<td>1</td>
<td>580</td>
<td>8.5</td>
</tr>
<tr>
<td>2</td>
<td>1236</td>
<td>18.2</td>
</tr>
<tr>
<td>3</td>
<td>4618</td>
<td>67.8</td>
</tr>
</tbody>
</table>

Determinants of HIV testing

Binary Logistic Regression Analyses: The independent variables, age at the time of the survey, wealth index, place of residence, region, educational attainment, work and marital status, knowledge and stigma were entered into the binary logistic regression models.

Factors associated with “Ever been tested for HIV.”

All factors tested for associations with “Ever been Tested for HIV” were all found to be significant, except for place of residence (i.e. urban or rural).
Personal prejudice Stigma: The results from Model 1, Table 4 shows that for every unit increase in personal prejudice, the odds of ever been tested decrease by 39.6% (OR=0.604, CI=0.575-0.635). When we added the covariates, this association became slightly weaker (OR= 0.828, 95% CI= 0.780-0.879). Several covariates are significantly associated with ever been tested. For example, men in the Grand West (OR=1.584, 95% CI=1.309-1.917), Grand South (OR= 1.473, 95% CI=1.235-1.756), and Grand Central (OR= 1.460, 95% CI=1.240-1.719) zones are each more likely to have ever been tested compared to men who reside in the Grand North. Men who are married or men in a union are 67.4% (OR= 1.647, 95% CI=1.464-1.914) more likely to have ever been tested than those who are not married or in a union. Those who are currently working are 2.1 times (OR= 2.148, 95% CI=1.847-2.498) more likely to have had an HIV test than those are not working. The odds of ever been tested nearly double with each additional level of education (OR= 1.966, 95% CI=1.795-2.152), and increase by 34.9% (OR= 1.354, 95% CI=1.267-1.448) with each additional unit of wealth. For every unit of knowledge, the odds of having had an HIV test increases by 50.9% (OR= 1.509, 95% CI=1.407-1.619).

Perceived Societal Stigma: The results from Model 2, Table 4 show that for every unit increase in PSS, the odds of ever been tested increases by 28.3% (OR=1.283, CI=1.223-1.347). When we added the covariates, this association became slightly weaker (OR= 1.131 95% CI= 1.064-1.201). Several covariates are significantly associated with ever been tested. For example, men in the Grand West (OR=1.695, 95% CI=1.398-2.043), Grand South (OR= 1.666, 95% CI=1.401-1.981), and Grand Central (OR= 1.541, 95% CI=1.311-1.811) zones are each more likely to have ever been tested compared to men who reside in the Grand North. Men
who are married or men in a union are 70.3\% (OR=1.703, 95\% CI=1.495-1.956) more likely to have ever been tested than those who are not married or in a union. Those who are currently working are 2.1 times (OR=2.136, 95\% CI=1.837-2.484) more likely to have had an HIV test than those who are not working. The odds of ever been tested increases with each additional level of education (OR=1.369, 95\% CI=1.281-1.463), and increase by 36.9\% (OR=1.369, 95\% CI=1.281-1.463) with each additional unit of wealth. For every unit of knowledge, the odds of having had an HIV test increases by 47.2\% (OR=1.472, 95\% CI=1.368-1.584).

Personal prejudice stigma, perceived societal stigma, knowledge and all covariates

When all the three key predictors of HIV testing and the covariates are added to the model it showed similar trends to the first four models. Each of the covariates, except urban/rural residence, remain significantly associated with having ever been tested. Personal prejudice stigma remains associated with a reduction in the odds of ever having been tested (OR=0.830, CI=0.782-0.881). Perceived societal stigma, by contrast, remains associated with increased odds of ever having been tested (OR=1.127, CI=1.061-1.197).
Model 1 - Table 4: Odds Ratio and 95% Confidence Interval from Binary Logistic Regression Models: stigma and knowledge as predictors of ever been tested for HIV. (N=6808)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever been tested, personal prejudice, bivariate</td>
<td>OR/95% CI</td>
<td>OR/95% CI</td>
<td>OR/95% CI</td>
<td>OR/95% CI</td>
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<td>Region</td>
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<td>Grand North (ref)</td>
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<tr>
<td>Grand West</td>
<td>1.584 (1.309-1.917)</td>
<td>1.695 (1.398-2.043)</td>
<td>1.615 (1.334-1.955)</td>
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<tr>
<td>Grand South</td>
<td>1.473 (1.235-1.756)</td>
<td>1.666 (1.401-1.981)</td>
<td>1.503 (1.260-1.794)</td>
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<tr>
<td>Grand Central</td>
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<td>1.541 (1.311-1.811)</td>
<td>1.462 (1.242-1.721)</td>
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<td>Residence</td>
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<td>Rural (ref)</td>
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<tr>
<td>Urban</td>
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<td>0.926 (0.797-1.077)</td>
<td>0.915 (0.787-1.064)</td>
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<td>Never or formerly married (ref)</td>
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<tr>
<td>Currently married/union</td>
<td>1.674 (1.464-1.914)</td>
<td>1.703 (1.495-1.956)</td>
<td>1.678 (1.467-1.919)</td>
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<td>Employment</td>
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<tr>
<td>Not Working (ref)</td>
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<tr>
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<td>2.148 (1.847-2.498)</td>
<td>2.136 (1.837-2.484)</td>
<td>2.148 (1.847-2.499)</td>
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<td>Education</td>
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<tr>
<td>Wealth Index</td>
<td>1.354 (1.267-1.448)</td>
<td>1.369 (1.281-1.463)</td>
<td>1.355 (1.267-1.448)</td>
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</tr>
</tbody>
</table>
Factors associated with “Recent HIV test.”

All factors tested for associations with “Recent HIV Test” were all found to be significant, except for place of residence (i.e. urban or rural) and age.

Personal prejudice Stigma: The results from Model 2, Table 5 shows that for every unit increase in personal prejudice, the odds of having a recent HIV test decrease by 38.8% (OR=0.612, 95% CI=0.580-0.645). When we added the covariates, this association became slightly weaker (OR= 0.803, 95% CI= 0.756-0.853). Several covariates are significantly associated with recent HIV test. For example, men in the Grand West (OR=1.305, 95% CI=1.805-1.571), Grand South (OR= 1.866, 95% CI=1.575-2.210), and Grand Central (OR= 1.277, 95% CI=1.086-1.502) zones are each more likely to have had a recent HIV test compared to men who reside in the Grand North. Men who are married or men in a union are only 25.2% (OR= 1.252, 95% CI=1.112-1.409) more likely to have ever been tested than those who are not married or in a union. Those who are currently working are almost 2 times (OR= 1.829, 95% CI=1.581-2.116) more likely to have had a recent HIV test than those who are unemployed. The odds of recent HIV test increases with each additional level of education (OR= 1.594, 95% CI=1.465-1.734), and increase by 31.9% (OR= 1.319, 95% CI=1.086-1.571) for each additional level of education.
CI=1.239-1.404) with each additional unit of wealth. For every unit of knowledge, the odds of having had an HIV test increases by 40.3% (OR= 1.319, 95% CI=1.304-1.509).

Perceived Societal Stigma: The results from Model 2, Table 5 show that for every unit increase in PSS, the odds of having had a recent HIV test increase by 25.3% (OR=1.191-1.319).

When we added the covariates, this association became slightly weaker (OR= 1.140 95% CI= 1.075-1.209). Several covariates are significantly associated with ever been tested. For example, men in the Grand West (OR=1.398, 95% CI=1.163-1.682), Grand South (OR=2.099, 95% CI=1.775-2.483), and Grand Central (OR= 1.358, 95% CI=1.157-1.595) zones are each more likely to have had a recent HIV test compared to men who reside in the Grand North. Men who are married or men in a union are 28.0% (OR= 1.280, 95% CI=1.137-1.440) more likely to have ever been tested than those who are not married or in a union. Those who are currently working are almost 2 times (OR= 1.819, 95% CI=1.575-2.104) more likely to have had a recent HIV test than those who are not working. The odds of having a recent HIV test increases with each additional level of education (OR= 1.675, 95% CI=1.541-1.820), and increase by 33.7% (OR= 1.337, 95% CI=1.256-1.423) with each additional unit of wealth. For every unit of knowledge, the odds of having had a recent HIV test increases by 37.2% (OR= 1.372, 95% CI=1.271-1.480).
Personal prejudice stigma, perceived societal stigma, knowledge and all covariates

When all the three key predictors of HIV testing and the covariates are added to the model it showed similar trends to the first four models. Each of the covariates, except urban/rural residence, remain significantly associated with having ever been tested. Personal prejudice stigma remains associated with a reduction in the odds of ever having been tested (OR=0.805, 95% CI=0.758-0.855). Perceived societal stigma, by contrast, remains associated with increased odds of ever having been tested (OR=1.134, CI=1.070-1.203).
<table>
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<th>VARIABLES</th>
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<th>Model 4</th>
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<td>Recent HIV test, personal prejudice, bivariate</td>
<td><strong>OR/95% CI</strong></td>
<td><strong>OR/95% CI</strong></td>
<td><strong>OR/95% CI</strong></td>
<td><strong>OR/95% CI</strong></td>
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<td>Grand West</td>
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<td>1.398 (1.163-1.682)</td>
<td>1.331 (1.105-1.603)</td>
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<td>0.987 (0.857-1.137)</td>
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<td>Currently married/union</td>
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<td>(1.003-1.014)</td>
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<td>0.805</td>
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<td>Perceived Societal Stigma</td>
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<td>1.140</td>
<td>(1.075-1.209)</td>
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<td>1.372</td>
<td>1.337</td>
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<td>(1.304-1.509)</td>
<td>(1.271-1.480)</td>
<td>(1.239-1.443)</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 5:

VII. DISCUSSION

A gender gap exists in HIV testing in SSA. Our study found out that testing among men in Cameroon is lower among those who are single, have a lower level of education, unemployed, poor, older or live in a certain geographical area of the country. However, there was no significant finding based on their residence. These results are consistent with a similar study carried out in six countries in SSA (Quinn, Kadengye, Johnson, Baggaley, & Dalal, 2019).

Stigma and lack of HIV knowledge have a well-documented role in inhibiting engagement across the HIV prevention and care continuums however, greater understanding is vital among men who tend to be less engaged in the HIV care continuum. (Cornell et al., 2011; Cornell et al., 2015; Fleming et al., 2019; Doval et al., 2015). This is critical to meeting global epidemic targets set forth by UNAIDS and other global entities (Ha et al., 2019). The purpose of this study was to examine how HIV stigma and knowledge affects HIV testing among men in Cameroon; ever tested or recent HIV testing were the two outcomes. This chapter includes a discussion of major findings as related to the literature on HIV testing in men and what implications may be valuable to develop effective strategies to increase HIV testing among men. Also included is a discussion on connections to this study we examine key covariates in relationship to having ever been tested and having had a recent HIV test.
As hypothesized, personal prejudice stigma was found to be a barrier to HIV testing among men, while perceived societal stigma was not found to be a barrier. Then, you could say that perceived societal stigma, in fact, was positively associated with HIV testing.

The study found that endorsement of personal prejudice stigma was associated with 19.5% reduced odds of recent HIV testing and 17% reduced odds of ever been tested for HIV. The measure of Personal prejudice stigma captured how the men felt they would personally react to PLHIV. This may suggest that men may refuse to test to avoid similar treatment by others and is similar to a study a stigma reduction and male-targeted HIV testing intervention carried out in Mozambique. (Ha et al., 2019).

In contrast to personal prejudice stigma, the study found that endorsement of perceived societal stigma was associated with 13.4% increased odds of recent HIV testing and 12.7% increased odds of ever been tested for HIV. The measure of perceived societal stigma captured how the men felt the society will react to PLHIV and personal prejudice stigma is negatively related to testing while societal stigma shows a positive relationship.

The difference in the likelihood of testing among these two types of stigma is probably related to cultural and societal norms around PLHIV. Men in Cameroon typically do not decide to test on their own mainly due to masculine norms that create barriers to HIV testing such as gendered communication, social pressures to be strong and self-reliant emotional, inexpression and fear that an HIV positive diagnosis would threaten traditional social roles (provider, father, husband). They are forced into testing usually through their primary care providers when they present with an illness such as malaria. The primary care physician will typically order a malaria test and also order an HIV test. A study which looked at couple counselling and testing for HIV at antenatal centers in Cameroon noted
that a ‘medical prescription’ from health personnel could be helpful to encourage partners to get tested (Mlay, Lugina, & Becker, 2008). This is also true in Rwanda where invitations for HIV testing from a respected individual could increase the likelihood of (Wall et al., 2012).

Since men with more prejudice are less likely to be tested, this could explain the low testing rates among men but more societal prejudice. This is consistent with several studies that show that men usually do not test early and they have a higher HIV related mortality (Doval et al., 2015; Fleming et al., 2016; Ha et al., 2019). Our findings indicate that there is less PPS (mean=0.844) and more PSS (mean=2.39). This could be attributed to the fact that men may not want to accept that they may perpetrate stigma in anyway but since they know it exists they may rather say that it is not a personal problem but make it to be more a societal problem. Cameroonian are very aware of HIV through several HIV programs in the communities. This creates an increased awareness of HIV testing within the society.

You could also note that the occurrence of high levels of societal stigma was relatively common, and that further research is needed to understand why this type of stigma may be positively associated with HIV testing. The occurrence of high levels of societal stigma was relatively common, and that further research is needed to understand why this type of stigma may be positively associated with HIV testing.

There was no significance in HIV testing among the men living in either the rural or urban areas in Cameroon. This shows that availability of testing services has not influenced the testing behavior of the men in Cameroon based on CDHS 2018. As similar trend was noted in Nepal by Sharma & Nam, 2019, where there were no observed differences in the either the rural and urban areas of Nepal when they looked at the role of knowledge,
sociodemographic and behavioral factors on lifetime HIB testing in the adult population. However, further investigation is needed to confirm if there are similar trends in the female population in Cameroon.

The study also shows that the older the men, the more likely they are to get tested for HIV both recent testing and prior HIV testing compared to younger men. This is consistent with other studies conducted in high HIV-prevalence Africa countries which also shows an increase in the odds of testing for HIV as the ages of the respondents increases. One such study was done in Cameroon where younger MSM in Cameroon were less likely to report ever been tested for HIV and recent HIV testing within the past 12 months compared to older men. (Park et al., 2014). In addition, having a higher level of education had a significant association with increased odds of getting tested. Based on a study by (Takarinda et al., 2016), a higher level was also associated with the likelihood of being tested and it was also noted that education is the most important cross-cutting issue associated with increased use of HIV services, less risky behaviors and increase likelihood of engaging in other health seeking behaviors. The WHO considers education as an important social determinant of health of a community and a country. Therefore, it makes sense for the government of Cameroon to invest more in education to benefit a higher utilization of HIV related services, thereby decreasing the HIV prevalence in Cameroon and hopefully on target to end AIDS by 2030.

Employment status was highly associated with HIV testing OR of 2.148 and 1.828 for ever tested and recent HIV testing respectively. This in contrast to a study in Nepal where an individual’s occupation was not associated with HIV testing. However, the same study found out that employed participants were more likely to test for HIV something
which is more consistent with other studies (Sharma & Nam, 2019). This makes sense as employment is generally related to income levels as well as social networking and exposure to information which could possibly push the men to get an HIV test.

Our findings also show that HIV testing uptake is low among men who are in the lower wealth quartile, uneducated, unemployed and not in a union. Men in Cameroon who are richer have a higher chance of testing for HIV compared to men who are poorer. This was true for ever tested and recent HIV test, indicating a positive association and consistent in previous studies for men only and not for the women (Sharma & Nam, 2019) as wealth has a stronger effect on women.

Also, there is significant regional variation in HIV testing among Cameroonian men. The rate of ever been tested for HIV testing was highest in the Grand West however, rates of recent HIV testing were highest in the Grand South. This could be because the grand west has a lower rate of HIV especially the western region (1.6%) which may mean that people in the Grand west may had an HIV test at some point in their life. On the other hand, a higher recent HIV test for men in the grand south could be more likely a result of increased awareness of HIV. This region could have benefited from HIV education and testing campaigns as the Grand south is made up of Douala, the rest of Littoral and the South which alone has a 5.8% prevalence of HIV compared to Douala and the rest of littoral which are at 2.4% each (Cameroon DHS, 2018). The Cameroon government may have concentrated their prevention efforts in the region with the highest prevalence of HIV.

It is also worth noting that in this study being married or in a union is positively associated with the odds of recent HIV testing as well as ever being tested for HIV. In a
study by Orne-Gliemann et al, 2013) shows that married men in Cameroon are more likely to test for HIV than men who are single. The study observed that the men were more likely to be tested for HIV during their partners pregnancy. In addition, the men in Cameroon were more likely to get tested when their partners suggested HIV testing. It is also consistent with CDHS where the HIV prevalence in men who are divorced or separated is higher at 3.2% compared to men who are married or in a union at 2.8%. Although this is not a very big difference it still goes to show that HIV testing in men and HIV prevalence in men are linked to the marital status among Cameroonian men interviewed in the 2018 CDHS.

In the binary logistic regression analysis, increase HIV knowledge was associated with increased likelihood or recent HIV test or ever tested for HIV. However, this is in contrast to another study in Nepal which showed a positive association between testing and knowledge only in women and not in men in Nepal, Zimbabwe and Burkina Faso based on their DHS Survey (Sharma & Nam, 2019; Takarinda et al., 2016; Kirakoya-Samadoulougou, Jean, & Maheu-Giroux, 2017). This signifies that imparting HIV knowledge works well on the men in Cameroon and maybe not so well for the men in other parts of the world.

Further studies will need to be carried out to see if this is a common trend in SSA as opposed to Asia so that cultural appropriate interventions could be created. Social determinants of health were also associated with poor HIV knowledge among the males similar to what we found in this study as men with low HIV knowledge end to be of the lower wealth and education quartile (Khanal, Adhikari, & Karkee, 2011). Therefore, along
with investing on education and economic status of Cameroon the government should invest in public health intervention programs that will be integrated HIV testing services into the public health system. To succeed at halting the epidemic, programs must improve outreach efforts to men and inviting men to participate in antenatal has been shown to increase their uptake of HIV testing (Katz et al., 2009) VII. Limitations and Strengths

The biggest strength of our study is the large population size of almost 7,000 participants and the fact that it covers all ten regions of the country and offers the possibility to generalize the results. The sites were randomly selected and DHS has a large sample size combined with comprehensive coverage and statistical reliability. It allows for in-country and cross-country comparisons of sociodemographic processes. In this study, the DHS allowed us to make comparisons at the regional level in Cameroon as well as make predictions of social distance stigma and power imbalances among men. Our evaluation of socio-economic characteristics that may influence HIV testing uptake among men in Cameroon. This new knowledge guide stake holders and policy makers on more effective HIV testing uptake strategies in settings such as Cameroon.

Interpretation of our findings is subjected to some limitations, first, we used secondary data from DHS which was designed primarily to conduct national surveys and collect data in fertility, maternal health family planning, HIV/AIDS, infant, and child health, not HIV testing behaviors. second, responses are based on self-reporting although this is a major event that participants should recall, we cannot rule out social desirability and recall bias. Third the standardization of the survey makes it hard to capture country-specific factors and many of these factors, which makes Cameroon unique, e.g., ethnicity, indigenous medicine, tribal affiliation, religion, political climate, etc. Fourth is the problem
of the validity of large-scale surveys such as DHS. Reviews can be judged based on two
criteria: reliability and validity. Security refers to the consistency of the instrument; a
reliable tool will consistently yield the same answers. Based on the large sample size,
random sampling technique used, and standardized questionnaire, DHS surveys tend to be
safe as an accurate instrument will measure what it is set to measure. DHS may have low
validity due to due interviewer bias. The economic characteristics and cultural environment
of participants, which have been shown in previous studies to be relevant to HIV infection,
were not collected in this study. However, in explaining our results we took into
consideration the economic and socio-cultural situation of each of the 10 regions which
have been well established in previous studies. Last, the results of this study need to be
considered in light of several limitations. Firstly, the CDHS 2018 does not provide
complete data for some areas in the South West region due the conflict in that region and
results may not fully capture associations in the Grand West. This may not be a major
problem because the South West was combined with the Northwest and Western regions
before we did the analysis. Secondly, owning to the cross-sectional design, the study could
not assess the causal relationship between any of the independent variables and HIV testing.

VIII. SIGNIFICANCE OF STUDY

This study is significant as it adds to the body of evidence by examining the barriers to
the historically low rates of HIV testing in men. To the best of my knowledge it is the first
study done in Cameroon using the 2018 DHS data to assess regional HIV testing outcomes
in men only. In addition, using an up to data country wide population data from allows the
government and key stakeholders to be able to develop the appropriate male-centered
interventions that will increase HIV testing uptake in men. By targeting testing which is the first 95 of the 95-95-95 fast track agenda, it focuses on the entry point to prevention, care and treatment of HIV/AIDS. There is a strong push to increase testing because without testing individuals will be unaware of their HIV status and may continue to infect others which will may potentially hinder the progress that has been made to end the HIV epidemic by 2030.
PART TWO: COVID-19 AND HIV AT THE BAMENDA REGIONAL HOSPITAL

CHAPTER 6:
IX. LITERATURE REVIEW- COVID-19 AND HIV SERVICES AT THE BRH.

The goal of this literature review is to examine the effects of COVID-19 and provide background as to the importance of continuity in care even during the COVID-19 pandemic. It is focused on three groups in the literature that are most relevant to this study: The COVID-19 pandemic in Cameroon. Also included in this discussion are some considerations from the literature for overcoming stigma and HIV knowledge gap.

Search Strategy
The search strategy for this study commenced with establishing a literature review component, which guided the keywords used to search the databases. Keywords included, but were not limited to COVID-19: SARS, COVID-19 in Cameroon, COVID-19 in Africa, Covid-19 pandemic, COVID-19 symptoms and HIV and COVID-19. The Elsevier, Google Scholar, EBSCOHOST, and PubMed databases were searched. Sources of information included peerreviewed journal articles, government and organization statistics, dissertations and theses. The majority were published within the last year.

The COVID-19 pandemic in Cameroon

The current Coronavirus disease (COVID-19) pandemic started in December 2019 in Wuhan China. At first, a significant proportion of those affected were at the city’s Huanan
Seafood Wholesale market (Harapan et al., 2020; Twahirwa Rwema et al., 2020). Three weeks later, there were confirmed cases in the US, Nepal, Thailand, France, Australia, Malaysia, Singapore, Vietnam, South Korea and Taiwan. Alarmed by the unprecedented rapid worldwide spread and case fatalities of the disease, the WHO characterized COVID-19 as a pandemic on February 11th 2020. By this time there were over 118,000 cases in 114 countries, with 4,291 deaths. The spread was out of control and by May 1st of 2020, there were over three million confirmed cases and over 200,000 deaths in 185 countries. The greatest concern is the potential for the virus to spread to countries with weaker health systems which are ill-prepared to deal with a pandemic of this magnitude.

In Cameroon, the first case of COVID-19 was reported on March 6th, 2020 in Yaoundé, Cameroon by a French national who flew into the country on February 26th, 2020 on an Air France flight from Paris to Douala. Two days later, one of the acquaintances of the first confirmed case also tested positive for the virus. That same day, the Minister of Public Health, Manaouda Malachie, travelled to Douala, the economic capital of Cameroon to reassure employers of the effective measures being put in place to contain the epidemic and avoid new importation of the virus into the country (Ojong, 2020). Since March 6th, the virus has spread from city to city all over Cameroon with the first alert announced on March 17th, with over 13 drastic measures put in place; wearing a mask in all public places, systematic hand washing, physical distancing, awareness campaigns, closures of school and businesses and even international borders. The general restriction of movement has greatly affected almost every aspect of life for many Cameroonians.

There were not as many articles to review on Ebola in Cameroon that would provide me the gaps in the literature that would be used as a research focus. Literature was scanty
and most even those I was able to find are only about a year old. There were far more reviews available in China the western countries such as the United Kingdom, U.S and Italy. Since the African countries have fewer studies it difficult to present a comprehensive literature review at this time. Although global research on COVID-19 was very active within the first three months following the outbreak with a record 3487 contributions made up of 2062 journals and 1425 preprinted published the silence of the African research community has been unprecedented – contributing only 0.6% (22 contributions) to COVID research (Gwenzi & Rzymski, 2021). However, based on experience from HIV and other epidemics like Ebola, dengue and malaria in Africa, I am sure that in a few years there will be more studies. To the best of my knowledge and from discussions with the research team in Cameroon, this is the first study on the effects of COVID19 on HIV testing in North West region and even in Cameroon as a whole.

HIV and the COVID-19 pandemic

There are about 37·9 million PLHIV who are at risk of infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes COVID-19 (Granich, Gilks, Dye, De Cock, & Williams, 2009). Although governments, community partners and international organizations are working to sustain HIV service provision for PLHIV, the COVID-19 pandemic presents several barriers and challenges to the HIV care continuum. First, the implementation of quarantine, community containment and social distancing have reduced access to routine HIV services which threatens completion of UNAIDS first 95-95-95 target (95% of all PLHIV will know their status) global by 2030. In addition, there is a
reduced availability of HIV testing kits in some areas and testing continues to be a major challenge in many of these areas. Therefore, increased efforts are needed to increase access and facilitate testing. Secondly, the COVID-19 pandemic could hinder timely linkage to HIV care and treatment. It could deter or delay initiation of ART for PLHIV as hospitals are busy treating COVID patients. Also, globally resources for HIV may be diminished or diverted to focus on COVID, this is especially true in LMICs like Cameroon with limited resources and circumstances surrounding the HIV care continuum could deteriorate. Third, the COVID-19 pandemic could also hold up ART continuation for those who are already in care. Implementation of city-wide lockdowns could prevent or restrict hospital visits.

People living with HIV may be at increased risk for severe COVID-19 infections especially in regions where HIV is poorly controlled. One of such regions is SSA. The region has suffered the double burden of communicable and non-communicable diseases and more recently been hit with the pandemic. Although SSA has not been hit as hard as the west, the disruptions have been heavily felt and projected to have long lasting effects (Jewell et al., 2020).

Currently the CDC identifies older adults and individuals with underlying medical conditions such as heart disease, respiratory illnesses, diabetes, chronic kidney disease, sickle cell, obesity and transplant recipients. A study done by the New York State Department of health’s AIDS institute and the University at Albany school of Public Health on elevated COVID-19 outcomes among persons living with diagnosed HIV (PLDHHV). They found that PLWDH were more frequently diagnosed with COVID-19 than non-PLWDH
In addition, the CDC has listed PLWDH with a low CD4 cell count or not on ART as a possible risk factor for severe illness from COVID-19 (Sigel et al., 2020). Not much research has been done to firmly establish the extent to which PLWDH may be affected by severe COVID illness. Although emerging literature show similar outcomes for PLWDH compared to non PLWDH, it is worth noting that majority of these studies have been small and limited to admitted patients. A few recent studies have shown an increase in the severity of COVID-19 among hospitalized patients but still no population-based studies in Cameroon.

A severe COVID-19 epidemic in LMICS with weak health care systems puts the entire region in a state of panic coupled with inadequate surveillance, lack of healthcare personnel and limited laboratory capacity. As of February 2020, only two countries in SSA (Senegal and S. Africa) had the capacity to test for COVID-19 but that number grew to 40 countries in March of 2020. In addition, the burden of COVID-19 in Africa is compounded by the paucity of health care personnel, shortage of personal protective equipment (PPE) and ventilators. SSA has a constant double public Health threat from infectious and non-communicable diseases (CDC, 2019). Suddenly COVID-19 was at the top of the list of pre-existing communicable diseases like malaria, HIV/AIDS and viral hepatitis in Africa. The WHO estimates that there are less than 2,000 ventilators in 41 African countries. For example, Mali has only 56 ventilators for 19 million inhabitants. Similar trends were observed in Cameroon on March 29, 2020; a total of 73 mechanical ventilators were available for 23 million inhabitants and a case fatality rate of 60% among severe COVID-
19 patients (Reliefweb, 2020). Furthermore, as of April 2020, there were only four ventilators in the whole of South Sudan, a country of 11 million inhabitants and the Central African Republic only had three ventilators for its 5 million people (Maclean & Marks, 2020). Today Cameroon has only 601 intensive care unit beds for its 25 million inhabitants (CDC, 2019). The state of the health care system in SSA is of great concern because a strong health care system is vital in handling confirmed cases. Cameroon like many other countries in SSA has a weak healthcare system, as evidenced by the WHO’s Regional office for Africa:

“There is a critical shortage of treatment facilities for critical cases of COVID-19 in Africa [...] The total number of beds in intensive care units (ICU) available for use during COVID-19 in 43 countries in Africa is fewer than 5000. This is about five beds per one million people in the reported countries compared to 4000 beds per one million people in Europe [...] In 41 countries [...] functional ventilators in public health services are fewer than 2000.”

The general restriction of movement has greatly affected almost every aspect of life for many Cameroonians. Disruptions caused by the COVID-19 pandemic have affected HIV services in many countries around the world. However, the effects of these disruptions have far reaching consequences. COVID-19 has already caused interruptions in immunization schedules (Wallace et al., 2020). Lockdown and other measures to combat the spread of COVID-19 may affect prevention and management of other infectious diseases and other non-communicable diseases (NCDs). NCDs are of concern due to high morbidity and mortality associated with it in SSA. For example, the WHO cautions that lack of mosquito nets and treatment could result in up to 18 million additional cases of
malaria and up to 30,000 additional deaths in SSA. In China, a survey done among PLHIV in February, 2020 estimated that 32.6% were at risk of ART discontinuation and 48.6% did not know where to get ART in the near future (Jiang, Zhou, & Tang, 2020). PLHIV facing ART discontinuation are at risk of psychological pressure and ultimately deterioration in their physical health.

PLHIV may be at increased risk for severe COVID-19 infections especially in regions where HIV is poorly controlled. Although SSA has not been hit as hard as the west, the disruptions have been heavily felt and projected to have long lasting effects. At first, several mathematical models forecasted substantial increase the incidence of COVID-19 across Africa. One estimate projected between 300,000 to 30 million people dying, (Wallace et al., 2020) however, newer models have estimated lower mortality rates. There have been variations in burdens and outcomes related to the COVID-19 pandemic across Africa specifically, eight out of the 54 African nations – Cameroon, SA, Nigeria, Egypt, Ghana, Algeria, Morocco and Sudan- account for two-thirds of all known cases in the continent. In addition, only three out of the 54 African countries-SA, Egypt and Algeria account for over half of all the COVID-19 cases and deaths in Africa (Africa CDC; Twahirwa Rwema et al., 2020). Africa CDC estimates as of May 1st, 2020 that Cameroon has the highest number of confirmed cases in the Central African subregion.

It is likely that SARS-CoV-2 will remain in circulation across the continent of Africa for the foreseeable future; therefore, the incorporation of mitigation strategies for sustainable interventions with evolving trajectory is critical. Even so, the effects of the pandemic are beginning to emerge in the HIV care continuum. A survey of PLWHA in SA through a social media platform found that 13% of people did not have access to
medications needed for their chronic conditions during the lockdown (Haasbroek, Stemmet, & Oelofse; Jewell et al., 2020).

Some reports suggest that in May of 2020, only 30-50% of patients collected their medications (Haasbroek et al.). A World Health Organization (WHO) survey in May of 2020, done in 5 countries in SSA, showed three months or less of ART supply stock availability for major first line drugs with the main reason being the failure of suppliers to deliver on time.

Initially, multiple mathematical models projected substantial increase in the incidence of COVID-19 across Africa. One estimate shows between 300,000 to 3 million people dying, however, newer models have estimated lower mortality rates. There have been variations in burdens and outcomes related to the COVID-19 pandemic across Africa specifically, 8 out of the 54 African nations – Cameroon, South Africa, Nigeria, Egypt, Ghana, Algeria, Morocco and Sudan- account for two-thirds of all known cases in the continent. In addition, only 3 of the 54 African countries-South Africa, Egypt and Algeria account for over half of all the COVID-19 cases and deaths in Africa (Africa; Twahirwa Rwema et al., 2020). Africa CDC estimates as of May 1st, 2020 that Cameroon has the highest number of confirmed cases in the Central African subregion. The rapid rise in confirmed cases is of great concern. There is a consensus among medical experts that the number of cases could be underestimated as testing is limited.

We may not have the exact figures due to low testing especially in Cameroon because of the low number of test kits and sensitivity concerns with testing methods (Njonnou, Lekpa, Ouankou, Balti, & Choukem, 2020). Although COVID-19 represents a
public Health emergency for Africa, African public health institutions such as Africa Centers for Disease Control and Prevention have a long history of effective interventions to mitigate infectious diseases such as Ebola, dengue, Zika and malaria. As early as January 2020, even prior to the identification of the first case of SARS-CoV-2 infection on the African continent on February 14th 2020, African countries had already initiated programs to inform the population about the new pandemic (Ayenigbara, 2020). Since it is likely that SARS-CoV-2 will remain in circulation across the continent of Africa for the foreseeable future; therefore, incorporation of mitigation strategies for sustainable interventions with evolving trajectory is critical.

Nonetheless, the effects of the pandemic are beginning to emerge in the HIV care continuum. This is mainly due to competing health risks of COVID-19 across Africa which includes both endemic communicable and noncommunicable diseases and the fragile health system (Gilbert et al., 2020; Oleribe et al., 2019). The level of health disruption due to mandates put in place to prevent the spread of COVID-19 are potentially affecting the provision of HIV, Malaria, vaccination, Tuberculosis and programs in maternal and child health. A survey of PLWHA in South Africa (SA) through a social media platform found that 13% of people did not have access to medications needed for their chronic conditions during the lockdown (Haasbroek, Stemmet, & Oelofse; Jewell et al., 2020). Some reports indicate that in May of 2020, only 30-50% of patients collected their medications (Haasbroek et al.). A World Health Organization (WHO) survey in May of 2020, done in 5 countries in SSA, showed three
months or less of ART supply stock availability for major first line drugs with the main reason being failure of suppliers to deliver on time.

There are numerous studies done on COVID-19 in China as well as other developed countries which have been greatly affected by the pandemic. The majority of published works include a focus on transmission, risk factors, central manifestation and diagnosis (Harapan et al., 2020). In addition, there are lingering questions about why African research to COVID-19 has been subdued relative to other regions despite rising COVID cases and deaths. There are also very limited studies on the unique research themes on COVID-19 in Africa (Gwenzi & Rzymski, 2021). It is worth noting that until now, a comprehensive perspective addressing these knowledge gaps in the context of Africa has been missing.

While some studies offer valuable insight into COVID-19, they do not fully address the effects of the lockdown on the health care systems in LMICs which in the past may not have had as many cases. However, with the increase in the number of cases in SSA, the weak health care system and the double disease burden of infectious and NCD it is crucial to examine the effects of the pandemic in resource limited settings. Many programs may be struggling to provide adequate care to their clients due to the pandemic. In addition, SSA is home to ¾ of the global HIV population and they may be more affected by the pandemic given the limited resources in the subregion. There is limited body of knowledge regarding the effects of lockdown on health care services in SSA in general and Cameroon in particular. Therefore, the goal of this literature review is to examine the effects of the COVID-19 on HIV services at the
BRH in Cameroon. The review is focused on three groups in the literature that are most relevant to this study:

X. RESEARCH AIM

This study sought to build a theory in answer to the following research question:
Examine how the COVID-19 pandemic has affected HIV related services at the Bamenda Regional Hospital’s AIDS treatment center in the city of Bamenda, Cameroon?

There is no hypothesis for this question because it is designed to be exploratory hence not possible to statistically test the narrative data that emerges from qualitative data collection. The goal is explication of experiences at the HIV center not predictability of outcomes.
CHAPTER 7:

XI. DESIGN METHODS AND PROCESURES

The goal of the second part of the research is to explain a phenomenon by relying on lived experiences for PLHIV during the COVID pandemic in Cameroon (Stake, 2010). This approach is appropriate as we seek to understand relationships between variables Creswell (2003). Because the main purpose of this research is to examine the experiences and perceptions of PLHIV in relationship to care at the HIV center, a qualitative approach was the most appropriate choice. The qualitative study consists of: (1) Informants (2) Data gathering methods – in-depth interviews (3) process support -data analysis (4) questions and topic (5) strategies narratives. These were used to develop reoccurring themes in the interviews to draw reasonable conclusions.

The purpose of this chapter is to introduce the research methodology for this qualitative phenomenology study regarding the effects of HIV related services during the COVID-19 pandemic. This approach allows for a deeper understanding of the experiences of PLHIV as they access care at the HIV center in Cameroon in order to understand the effects of the COVID pandemic on HIV services. The applicability of phenomenology approach for this study are discussed in-depth in this chapter. The research plan, including the methodology, study participants, procedures, analysis method, and ethical concerns are also primary components of this chapter.
Phenomenology

This qualitative study was performed using phenomenology. Phenomenology is a respected approach to qualitative research that focuses on the commonality of lived experiences within a particular group. Phenomenology is concerned with the study of experience from the perspective of the individual. The main goal of the approach is to illuminate the specific knowledge of an event, situation or experience (phenomenon) to be able to reach at a description of the nature of the phenomenon (Creswell, 2013). A phenomenological approach was ideal in exploring these lived experiences and discussions triggered more questions (Aspers, 2009) as it allowed us to obtained detailed descriptions of the experiences of clients and staff at the center. In addition, this approach was useful because the goal of the study was to learn about commonalities of lived experiences from participants which the researchers could benefit from on the perceptions and beliefs of PLHIV as it relates to services at the HIV center. Typically, interviews are conducted with a group of individuals who have first-hand knowledge of the phenomenon being studied. In the human sphere this translates into gathering ‘deep’ information and perceptions through inductive, qualitative methods such as in-depth interviews, participant observation and discussions from the perspectives of the study participant(s). This approach also provided an opportunity for the researcher to ask follow-up questions and make conclusions on how services are delivered at the center and what improvements need to be made.

Study Participants

The study participants were recruited through purposive sampling for staff and loss to follow up and random sampling for clients. The population will be made up of these 3 groups; 1) Current patients – made up of registered attendees of the BRH AIDS treatment
center or taking ART in the BRH treatment center prior to the COVID pandemic. 2) Past patients - Patients who received care at the center but have missed 3 consecutive appointments. 3. Center personnel - malarias, nurses and community health workers. To be eligible for the study, a participant had to be HIV positive, receive care at the BRH and aged 18 or above. Clients who unable to give consent due to illness such as advanced HIV, or lack of mental capacity were excluded from the study. The sample size was determined by data saturation i.e. at the point where no new themes emerged from participant experiences.

All participants had to be fluent in the English language or the local Cameroonian Pidgin English. Recruitment as done by providing a letter with an explanation of the study to all potential participants in each of the three groups. If they agreed to be part of the study, they will reach out to the Co-PI who will obtain informed consent and then link the participants to the PI Appendix G see informed consent form). The interview will last for about 60-95 minutes and will be audio taped for accurate transcription. The researcher anticipated approximately 14-20 participants for this study. The final number of participants was 14, as determined by point of saturation. In their seminal work, Glaser and Strauss (1967) discussed the concept of saturation, where the researcher starts to realize that for a given subject, no new categories emerged from the code; therefore, nothing more can be added to the emerging theories. Once saturation is reached, the phenomenon is said to be grounded in the data (Charmaz, 2006; Urquhart, 2013). Saturation was reached in this study after the 6th interview for the clients and the 3rd interview for the staff.
Data collection and procedures

The primary methods of data collection were a series of in-depth individual interviews. Data collection occurred concurrently with data analysis. The questions are addressed using primary data collection from study participants recruited from the HIV Center. This location was selected because it has one of the highest rates of HIV in the country (4.0%) (DHS, 2018) and has been one of the most highly affected areas by the COVID-19 pandemic. Each participant was given an informed consent form prior to the study. This form had all the information the participants needed to know with respect to their participation rights in the study. They were reminded that the interviews would be recorded and that recording would start at the beginning of the interview sessions. Prior to the interview, I let each participant tell me more about themselves and why they decided to participate in the study. This was done to create rapport and to put the participants at ease so they would be more open to share their true perceptions. The interviews were done by phone because of the pandemic which prevented face to face interviews and were based on in-depth questions from participants to get their perceptions of the effect of the COVID-19 pandemic at the center. The complete list of questions and the interview script can be found in the appendix H and I. Some of the interview questions were as follows:

1. Are you currently receiving care at this HIV center?
2. Has your city been affected by the COVID 19 pandemic and if yes how so?
3. Tell me more how the COVID-19 pandemic and nationwide lockdown affected how you receive and provide care and if so how?
4. Think back prior to the pandemic, could you explain to me the difference in treatment and care at the centers?
5. What services are lacking at the HIV centers in Bamenda Cameroon during the COVID-19 pandemic?

The data was collected, organized and analyzed and codes were assigned to each of the participants to facilitate data analysis. Codes were created during the research process, based on the data collected. Some participants spoke in pidgin English and I we were able to translate into English since it is a commonly used language and all staff and PI are fluent in that language. Coding of transcripts was completed in the order in which the interviews were conducted. We did the coding in batches of four at a time, allowing time to reflect and edit the interview questions as theories began to emerge from the data. We used coding to aid in understanding the perspectives of the participants and in analyzing their combined experiences. Quotations were inserted where appropriate and the meaning was retained. The qualitative nature of the study exposed the true perceptions of the study participants as it relates to HIV related services at the center, and helped guide our conclusions for how HIV services could be sustained amidst the pandemic in a resource poor setting like Cameroon.

Procedures Followed

Approval from the Institutional Review Board (IRB) was sought from the State University at Albany. Approval was also needed by an ethical review body in Cameroon, the Cameroon Baptist Convention ethical review board was used and ethical clearance was granted to conduct research in Cameroon. The PI contacted the Co-PI and other research staff at the
BRH to request assistance and permission to discuss study protocol with the hospital director and subsequently potential study participants. Potential participants were screened using a selection process to be sure they met the selection criteria. An informed consent form was required for each participant prior to participating in the study. Participants were interviewed over the telephone only due to COVID restrictions. The interviews were recorded electronically using a Groove Onn Cassette Voice Recorder (Appendix H interview script). No interview was conducted without confirming the written informed consent of the participant. Each participant interview took place in a single interview session. Since the theory or phenomenon emerges from the data, we added some interview questions and modified some of the interview questions during the research study, a technique generally used in qualitative research (Birks & Mills, 2011; Charmaz, 2006; Urquhart, 2013). As some initial themes surfaced during the first four interviews, or subsequent interviews, the researcher added clarifying questions or points to subsequent interviews in an effort to explore more on the topic or gap that emerged. The participants were not equipped to provide any insight into how the group of individuals collectively may have similar or different perspectives.
CHAPTER 8: RESULTS

Our sample consisted of 18 participants: 4 staff, 10 current clients and 4 former clients all recruited from the BRH from March 26th to April 16, 2021 (see table 6). One staff member declined to participate in the study due to time difference and being burnt out from working long hours. Interviews last about 10-60 mins (mean = 33.21 Minutes, SD =17.9). Three common themes emerged from the analysis of the staff interview: ART shortage, lack of personal protective equipment (PPE) and the armed conflict in the region. In addition, three themes also emerged from interviewing the client’s interviews: ART shortage, lack of masks, social distance and community myths on COVID-19.

The age of the staff is between 28-36 years old (mean = 33.0 years, SD =3.32) while the age of the clients is between 32-52 years old (mean = 43.7 years, SD=6.08). The years of service for the staff is between 2-7 years (mean = 4.5 years, SD =1.80) while the years of receiving care at the center is between 2-17 years (mean = 9.67 years, SD=5.29). There were fewer male participants in the study; one in male staff participated out of 4 (25%0 and two male clients participated out of ten (20%). The participants live within the city limits of Bamenda although sometimes the facility sees patients from Batibo or Bali which are the outskirts of Bamenda. Based on the professions of the clients who participated, I can deduce that they are mostly of a lower SES and less education.
Table 6: In-depth interview participants at the HIV Center, BRH (N=14)

<table>
<thead>
<tr>
<th>Participants</th>
<th>Age</th>
<th>Gender</th>
<th>Experience /years attending clinic</th>
<th>Profession</th>
<th>Marital Status</th>
<th>Common themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff 1</td>
<td>28</td>
<td>Male</td>
<td>2 years</td>
<td>Research Assistant</td>
<td>Single</td>
<td>No ART, SD, no PPE, fewer clients, covid myths</td>
</tr>
<tr>
<td>Staff 2</td>
<td>36</td>
<td>Female</td>
<td>7 years</td>
<td>Psychosocial counselor</td>
<td>Married</td>
<td>No ART, SD, no PPE, stigma, fewer clients, conflict, less time</td>
</tr>
<tr>
<td>Staff 3</td>
<td>32</td>
<td>Female</td>
<td>5 years</td>
<td>Nurse</td>
<td>Married</td>
<td>No ART, SD, no PPE, conflict, increase workload, conflict,</td>
</tr>
<tr>
<td>Staff 4</td>
<td>36</td>
<td>Female</td>
<td>4 years</td>
<td>Nurse/Psychosocial counselor</td>
<td>Single</td>
<td>No ART, SD, no PPE, less time, increase workload, no PPE, conflict, home bound</td>
</tr>
<tr>
<td>Client 1</td>
<td>40</td>
<td>Female</td>
<td>15 years</td>
<td>Business/ off license</td>
<td>Married</td>
<td>No ART, SD, no masks, stigma, health talks, rude staff</td>
</tr>
<tr>
<td>Client 2</td>
<td>52</td>
<td>Female</td>
<td>10 years</td>
<td>Farmer</td>
<td>Married</td>
<td>No ART, SD, no masks</td>
</tr>
<tr>
<td>Client 3</td>
<td>39</td>
<td>Female</td>
<td>8 years</td>
<td>Nurse not at the clinic</td>
<td>Single</td>
<td>No ART, no mask, increase in transportation, Dr. not available, conflict, rude staff</td>
</tr>
<tr>
<td>Client 4</td>
<td>43</td>
<td>Female</td>
<td>17 years</td>
<td>Business</td>
<td>Married</td>
<td>No ART SD, no masks, lecture talks, covid myths, fear of covid by staff, handwashing, confidentiality</td>
</tr>
<tr>
<td>Client 5</td>
<td>42</td>
<td>Female</td>
<td>?</td>
<td>Business</td>
<td>?</td>
<td>SD, no masks, vaccine, No ART, covid Myths, shame,</td>
</tr>
<tr>
<td>Client 6</td>
<td>51</td>
<td>Male</td>
<td>2 years</td>
<td>Palm wine tapper</td>
<td>Widower</td>
<td>No ART, covid myths, face masks</td>
</tr>
<tr>
<td>Client 7</td>
<td>50</td>
<td>Female</td>
<td>4 years</td>
<td>Farmer</td>
<td>Business</td>
<td>SD, no masks, Amba, covid myths, missed appointments</td>
</tr>
<tr>
<td>Client 8</td>
<td>48</td>
<td>Female</td>
<td>9 years</td>
<td>Business</td>
<td>Business</td>
<td>SD, no mask, amba</td>
</tr>
<tr>
<td>Client 9</td>
<td>32</td>
<td>Male</td>
<td>5 years</td>
<td>carpentry</td>
<td>Married</td>
<td>SD, no masks, handwashing, Lecture talks</td>
</tr>
<tr>
<td>Client 10</td>
<td>40</td>
<td>Female</td>
<td>17 years</td>
<td>Farmer</td>
<td>Married</td>
<td>SD, no masks, more meds at appt, Lecture talks, delay, amba, vaccine</td>
</tr>
</tbody>
</table>

Lost Client 1

Lost Client 2
Staff Perspective

1. ART shortage amid COVID_19

From the staff perspective, shortage of ART was a major problem during the COVID-19 pandemic. Prior to the pandemic, they did not experience any medication shortage. Currently clients can get only about 2 weeks supply as opposed to 6 months’ supply before the pandemic. In some cases, clients where even sent home without medications. As recently as Friday the 9th of April 2021, a pregnant woman showed up to get her regular supply of ART but the HIV center was out of medication. A nurse I interviewed stated “A pregnant woman came in on Friday and had no drug and I had to search until I found one and it was very disturbing…. It has never happened like that.” This finding is consistent with other studies done during the COVID pandemic where there is a shortage of ART medications. For example, a study in SA found that 13% of people did not have access to chronic conditions during the lockdown (Haasbroek, Stemmet, & Oelofse; Jewell et al., 2020) and another study, only 30-50% of patients collected their medications (Haasbroek et al.,2020). In addition, a WHO survey done in 5 countries in SSA, showed three months or less of ART supply stock availability for major first line drugs with the main reason being the failure of suppliers to deliver on time. This is precisely what is happening at the BRH in Cameroon were patients are only able to get one-month supply of medications if they are lucky but mostly only two-
week supply and, in some cases, patients are turned away for lack of availability of ART. The shortage is critical for clients who are in 2\textsuperscript{nd} line treatment and the center has substituted their medications. A nurse I interviewed had this to say regrading medication shortage. “Going from day to day without the medications is like an open door for the virus to multiply. That is why we are dishing out the substitute.”

2. Scarcity of masks and Personal protective equipment

Center staff explained that the hospital does provide them with some PPE but it is on a very limited basis now with COVID-19. For example, masks are supplied to staff maybe every couple of months if they are lucky and they may get just two masks at a time. Some staff even say they have to rewash masks and after 2-3 washes, they can no longer use the masks. The supply of hand sanitizers is intermittent as well and they have to provide for themselves but some staff who cannot afford to buy resort to borrowing from their colleagues. The scarcity of PPE was verbalized by a staff member who stated that “They can give face masks for like 2 months, you will get 2 facemasks but you need to be providing for yourself… resources are really limited especially facemasks.”

3. Armed conflict or the Ambazonia crisis

There has been a reduction in the number of clients seen at the center due to the COVID-19 pandemic but some staff members site the armed conflict as a bigger problem than the COVID19 pandemic. The staff provided me with first-hand knowledge on this issue from their perspective; first, individuals refuse to leave their houses for fear of being attacked by the armed separatists, second, they do not pick up calls when the psycho-social workers call
to remind them of their upcoming appointments and finally, the roads are blocked preventing clients from keeping their appointments. There are gun shots sometimes within the city of Bamenda or an imposed curfew which prevents clients from leaving their houses because they will be attacked if they do not respect the curfews. Also, to prevent loss to follow up, the psychosocial workers have to make calls to the clients to remind them of their appointment but the clients may not recognize staff phone numbers they do not pick up the phone for fear that the armed separatists could be calling to intimidate or abduct them and ask their families for ransom. Third, the vehicles that transport medications are routinely stopped and even burned down to prevent them from getting into the hospital and sometimes the roads are blocked preventing clients from getting to the center. A client I interviewed stated “the bridge between my house and the clinic was destroyed, I had to take a different road to get to the clinic.” (see appendix J for common themes in a chart)

Client Perspective

1. ART shortage amid COVID_19

The clients also expressed their lack of ART drugs during the COVID-19 pandemic. Prior to the pandemic they had a supply of up to 6months work of medication but now with the COVID-19 pandemic they will be lucky if they get 1month. Most people get a two-week supply, some one week while others are sent home without any medications. A client had this to say regarding the shortage of ARV drugs “I collected my medications 4 days ago they gave 1 container before it was 4 containers.”
2. Lack of face coverings from hospital personnel

The clients who visit the hospital or the center are not allowed to enter the hospital without face covering however, the hospital does not provide them with masks. The clients are not allowed to visit the hospital of the center without proper face covering. If for some reason they do not have face covering and they have an appointment at the center they will not be allowed through the hospital entrance and they will miss their appointments. The hospital does not provide them with masks or any other type of face coverings.

3. Increased social distance

Currently due to the pandemic there is increased social distancing at the center as participants arrive for their appointments. The COVID restrictions imposed on the hospital only permits staff to bring in groups of 15 or 30 clients at a time. Prior to the pandemic, there were larger groups of clients in the waiting area however, the hospital no longer allows that so the clients wait outside and are brought into the center in smaller groups. This is done to avoid close contact and increase social distance to prevent the spread of COVID-19. A client stated the following, “Now we come in to the center in groups of 15 or 20 before COVID it was like 50 or more at a time.”

4. Community myths on COVID-19

Many participants mentioned some rumors going on in the community regarding COVID-19. The main rumor is that COVID is contracted through the COVID injections. In community the individuals are urged to stay away from the BRH as the hospital has COVID injections that they use to inject people and infect them with the SARS virus that
causes COVID-19. This has led to a drop in the number of clients who come into the center for medications. Some clients have not come into the center for fear of getting these injections. A client had this to say about the COVID pandemic “The COVID story in the community is that when you go to the hospital and you sneeze, they will take you and give you COVID injection.” Another client stated “We are scared because we do not know who and what the next person is harboring… myself, I am even afraid to take the COVID test.” (see appendix K for common themes in a chart)
CHAPTER 9: DISCUSSION

The purpose of this qualitative study was to identify how the COVID-19 pandemic has affected HIV services at the HIV daycare center in the BRH. This chapter includes a discussion of major findings as it relates to the literature on HIV, the COVID-19 pandemic and ending the epidemic. Some of the factors identified relate primarily to the center and hospital while some are related to the larger Bamenda community as a whole. All of these factors help contribute to an environment at the center and how services are provided during the COVID-19 pandemic.

Also included is discussions and possibilities for future research to help answer the question:

Examine how the COVID-19 pandemic has affected HIV related services at the Bamenda Regional Hospital’s AIDS treatment center in the city of Bamenda, Cameroon? There are three themes that emerged from the staff interviews: (1) ART shortage (2) scarcity of PPE and (3) the armed conflict. There are 4 themes that came out of the client interviews; (1) ART shortage (2) lack of face covering from hospital personnel (3) social distancing and (4) Community myths on COVID-19. Each of these elements will be discussed from the staff and client’s perspectives.

While there has been a drastic decline in clients who visit the center for medications and regular checkup, those who still visit the center has very short supply of medications or are turned away from the center for lack of medications. Although none of the clients we interviewed for this study reported not getting their medications, they do report that they have seen other clients being turned away from the center for lack of medications. The shortage of ART has short term and long terms effects for the clients. Short term effects
include increase viral load and CD4 counts and could develop into full blown AIDS if the shortage of drugs persists. It could also lead to an increase in mother-to-child transmission of HIV at the clinic and the region if they do not get the medications that they need to prevent their babies from contracting HIV. The long-term effect could be that communities in Bamenda or Cameroon as a whole could see an increase in new HIV infections since PLHIV are unable to maintain viral load suppression due to shortage of ART. In addition, there could be an increase in AIDS related mortality in the country and the region which could impact the UNAIDS target of ending the HIV epidemic by 2030.

The shortage of PPE has impacted how care is delivered at the HIV center in the BHR for both staff and clients. Staff discussed the intermittent distribution of PPE during COVID and the difficulty it creates for them as they try to care for the clients. The lack of PPE could pose a health risk especially during COVID. The staff are put at risk because they do not have the necessary gear to disinfect and effectively carry out their duties at the center. They are left to their own devices and have to use their own funds to provide these things or borrow supplies form a colleague. For the clients they must have face covering before they can receive care. This means that if they do not have money to buy masks, they cannot receive car. This is another barrier for the clients who may already have a hard time getting to the center for routine checkups.

Although there is a decline of patients coming in for HIV related services, this decline is not just due to COVID as there was already a decline due the Ambazonia crisis. All through the Ambazonia crisis, which has been going on for five years the hospital did not experience shortage of medications. However, the COVID-pandemic has made the situation worse and the hospital has run out of medication which the clients and staff say
has never happened. The separatists force the community to observe Mondays as “Country Monday” meaning that no one is allowed to leave their homes for any reason until after the 6pm curfew. This means that no clients can visit the center on Mondays and the staff cannot go to the center to provide care to the clients. The separatists do this as their way of getting the governments attention to the marginalization of the English-speaking Cameroonians. Further studies will be needed to fully comprehend the effects of curfews on Mondays in the English-speaking regions of Cameroon like Bamenda and also to investigate whether the COVID pandemic or the ambazonia crisis has had a greater effect on HIV services at the clinic. Once all COVID restrictions are lifted, face to face contact will be better to do a comprehensive data collection and observation of delivery of services.

Besides ART shortage, lack of PPE and the ambazonia crisis faced by the staff and some clients there is also the issue of maintaining social distancing while providing care at the clinic at all times. The staff take all the steps to prevent the spread of COVID by attending to patients in groups of 10, 15 or 30 clients at a time on very busy days instead of 50 or more at a time. Waiting outside under a canopy before they are called in for treatment has exacerbated the issue of HIV stigma as some patients end up not receiving treatment for fear of being stigmatized by their community for being HIV positive. To address this concern, they could spread out appointments so that they do not have to receive many clients at a time. This will allow more social distancing while still maintaining confidentiality. This will also provide more time for the health talks which the clients particularly like and the staff indicates that it is something they will really like to continue as it helps the clients especially how they can protect themselves from infections like COVID given that they are immunocompromised.
Stigma is not the only thing that is preventing clients from coming to the center during the pandemic. Another deterrent is the rumors about the COVID injection in the community. This is mainly due to lack of the proper knowledge of how the COVID virus is spread. Some clients expressed the same concern prior to coming to the center but when they came into the center they were given the proper information by the staff they are comfortable to resume care. The community could benefit from health education programs on the spread of COVID-19 to dispel the rumors in the community and hopefully have more clients to the clinic. This was mentioned as a possible reason for defaulters.

XII. LIMITATIONS AND STRENGTHS

A limitation of this study is that participants were interviewed by telephone, because of strict lockdown measures and the PI could not get to the hospital. Also, the IRB does not allow any face to face interviews during the COVID pandemic. It was more difficult to build rapport with participants over the phone but once I told them that I was born and raised in Cameroon, they felt more comfortable during the interviews and wanted to tell me more about their experiences at the center. We did not pilot the semi-structured interview guide but the interviewers were trained in interview skills prior to the start of the study.

Another limitation is that this is a qualitative research cannot be generalized, therefore we cannot say that the experiences of the participants at the BRH HIV center during the COVID pandemic will be the experiences of all HIV treatment centers in the whole of Cameroon. It is possible that other research may show a different result because we may
not know for certain that ART shortage is a problem during the COVID pandemic in the other English-speaking region or in all regions of Cameroon.

A major strength of the study is that we were able to collect in-depth information on the experiences of participants with respect to HIV services provided at the center during the COVID-19 pandemic. Their experiences are firsthand information as to what is going on at the center and provide valuable insight as to what is happening at the center given the current restrictions during the COVID pandemic. Another strength is that the main researcher was born and raised in Cameroon and was able to speak the language in which many of the clients felt comfortable and made communication easier. Also, they felt like the researcher was one of them and would not judge them regardless of what they shared during the interview.

SIGNIFICANCE OF STUDY

This study is crucial in improving the COVID-19 response in Cameroon and the rest of the continent. In view of the projected numbers of cases and the current number of confirmed cases in Cameroon, a complete lockdown or total confinement of the entire country is inevitable. Given vulnerable groups such as PLHIV, it is imperative that the government of Cameroon develops alternative measures to facilitate continuity and minimal interruptions in HIV care and prevention during the COVID pandemic. These measures will help save millions of lives and make it possible to protect PLHIV from COVID-19 by maintaining viral load suppression as well as the overall wellbeing of the community.
Cameroon has limited capabilities to increase the number of beds in the intensive care units, produce respirators and masks and may be difficult to get from other countries in Africa or beyond who are also struggling to deal with the COVID crisis. In addition, the fragile health care system in Cameroon is already dealing with the effects of the double burden of diseases such as HIV, TB, other infectious diseases and non-communicable diseases which puts a strain on the country’s health care system. The emergence of COVID-19 could cause the health care system to completely collapse as provision of healthcare services may exacerbate the fragility of the healthcare system.

Therefore, this study would help the government of Cameroon to find ways to communicate to its citizens the proper knowledge about COVID-19 while developing alternative ways to secure more ARV drugs for its citizens in collaboration with the different regions of the country. This will allow continuity of care to PLHIV and prevent as little interruption as possible.
CHAPTER 10: CONCLUSION

After completing both research studies in Cameroon, we can come to the conclusions that HIV testing among men is dependent on the region and the socio-demographic status in which the men belong to. Also, we can conclude that COVID-19 has had an impact on HIV services at the BRH specifically the availability of ART drugs.

We examined how stigma and knowledge affect HIV testing outcomes among men in Cameroon using a nationally representative data from DHS to answer the following question: To examine how stigma and HIV transmission knowledge are associated with testing for HIV among men in Cameroon aged 15-64. We hypothesize that Cameroonian men with greater perceived stigma about PLHIV are less likely to have been tested for HIV (ever or recently). Also, we hypothesize that Cameroonian men with greater HIV transmission knowledge are more likely to have been tested for HIV (ever or recently). In addition, we did a qualitative study to build a theory to answer to the following research question: Examine how the COVID-19 pandemic has affected HIV related services at the Bamenda Regional Hospital’s AIDS treatment center in the city of Bamenda, Cameroon.

To examine the relationship between stigma and knowledge, we divided stigma into two constructs; personal prejudice stigma and perceived societal stigma. Then we selected questions pertaining to each of the two types of stigma and questions pertaining to HIV transmission knowledge. We then made sure that there was some degree of consistency among these questions. We ran five binary logistic regression analysis for each of the two outcomes. For the bivariate analyses, binary logistic regression models were run for personal prejudice stigma and for perceived societal stigma. For the HIV knowledge
multivariate analyses, binary logistic regression models where run for personal prejudice stigma and perceived societal stigma including knowledge and all the covariates.

HIV testing outcomes in the models show similar trends however, there was a difference in personal prejudice stigma and perceived societal norms. Personal prejudice stigma is negatively related to testing while societal stigma shows a positive relationship. In the fully adjusted models age, marital status, region, education, employment status, and HIV knowledge were significantly associated with recent HIV testing and ever tested for HIV. The only exception for both models was residence (urban or rural). Binary logistic regression indicated that perceived prejudice was associated with less likelihood of HIV testing outcomes among the men in the study. This could be a strong indication of low HIV testing uptake among men and could possibly indicate that personal prejudice is a strong indicator of low testing among Cameroonian men. Respondents with more personal prejudice stigma about HIV were less likely to have had a recent HIV test or to ever get tested for HIV.

In contrast, when we examine perceived societal stigma and the two HIV testing outcomes we found a positive association. Binary logistic regression indicated that perceived societal stigma was associated with an increased likelihood of HIV testing outcomes among the men in this study. The more an individual Perceived societal stigma towards PLHIV, the more likely it is that they have tested for HIV (recently or ever). This was unexpected as we were expecting less testing outcomes not increased testing among the men in relation to perceived societal stigma. We could conclude that maybe one’s personal attitudes matters more than societal attitudes. It may indicate that personal prejudice stigma seems to be the key barrier because it showed the opposite effect and more research may be
needed to fully understand this effect with respect to HIV testing in Cameroonian men. There is a possible cultural angle to this finding as men in Cameroon may not routinely test for HIV except they are pushed to test by their primary care providers or by some other person they consider influential.

When we examined HIV transmission knowledge, we found a positive association with the two HIV testing outcomes. The more knowledgeable a person was about HIV, the more likely they were to have had a recent HIV test or to ever get tested for HIV. This finding is accurate as knowledgeable is linked to education, wealth and a higher SES which are all factors that have strong association to testing and are known to influence positive health seeking behaviors and engaging in care and treatment.

When accounting for all the demographic, stigma and knowledge measures simultaneously, a binary logistic regression analysis revealed that personal prejudice stigma, societal stigma and knowledge remained significant predictors of HIV testing among Cameroonian men. All covariates showed significant associations in all the models with the exception of place of residence in Cameroon (urban or rural). The strongest associations were seen in employment status, education and knowledge while the weakest associations were seen in current age in both regression models. Therefore, we can conclude that men who are employed, educated and knowledgeable about HIV transmission are more likely to have had an HIV test (recently or ever) while age is not a strong predictor of whether these men would test or not with respect to the two outcomes we tested.

To the best of my knowledge this is the first study of its kind that has examine HIV testing in men in all the 10 regions of Cameroon. This was done using 2018 CDHS which is the most recent DHS survey so the government of Cameroon and the policy makers will
be getting the most up to date information on how stigma and knowledge impact HIV testing in Cameroonian men.

Besides, low HIV testing uptake in men, other HIV related services have also been impacted by the COVID-19 pandemic. Through in depth interviews we were able to get perspective on the effects of COVID-19 on HIV services at the BRH. We interviewed staff and clients to get first-hand knowledge of their experiences receiving care at the HIV daycare center. We found that the main effect of the COVID pandemic is the shortage of ART drugs. The staff has had to ration ARV drugs due to extreme shortage and in the case of clients in second line treatment there are no medications at all. Some clients may get drugs for only a week at a time and in some cases the clients are sent home without any medications.

The main finding from the staff was shortage of ART drugs, the conflict and limited availability of PPE. The clients also echoed the lack of ART drugs and the availability of masks or other face coverings for the clients when the visit the center. The clients also reported more social distancing in the way services are provided at the clinic and also COVID related myths within the community that may prevent some patients from seeking care or keeping their regular appointments at the center.

This study highlights the importance of other HIV related services that impact not only on how individuals enter care but also how they stay in the HIV care continuum. This is crucial because it is vital that PLHIV should continue to access and receive care to maintain viral load suppression. Not maintaining viral load suppression is detrimental to everyone but more so to PLHIV. Taking ART as prescribed without skipping doses is essential for achieving and maintaining an undetectable viral load. The stability and
reliability of health care provided by programs such as PEPFAR or the Ryan White HIV/AIDS Program indicates that high rates of viral suppression are possible in the context of quality care delivery. Therefore, if high quality care is maintained at the BRH clients will receive their medications as needed. The access to care for testing and maintaining viral load cannot be ignored as undetectable = untransmissible. This signifies that PLHIV who receive ART and have achieved viral load suppression by maintaining an undetectable viral load cannot sexually transmit the HIV virus to others (Eisinger, Dieffenbach, & Fauci, 2019). This concept has broad implications of treatment of HIV infection not just from a scientific point of view but also from a public health standpoint with respect to stigma reduction as we see in the first part of this research and the lack of medications at the BRH.

However, some of the limitations our finding is that we used a small sample size and used qualitative analysis which does not allow us to investigate causality. Also, the results of the research cannot be verified and not statistically representative of all the 8,000 or more clients who receive care at this HIV center. Further research could be quantitative so that we will be able to investigate causality and draw reliable conclusions on our findings that can be replicated in other LMICs in SSA and beyond.

The SSA region really needs to pay attention as many of the countries have already weakened healthcare systems that could negatively impact some of the gains made in field of HIV/AIDS and impede the goal of ending the HIV epidemic by 2030 (Jewell et al., 2020; Kavanagh et al., 2020; Lai & Yu, 2020). If stigma and knowledge-based interventions are developed, there will be reduced prevalence of HIV in the community and less mother to child transmission of HIV because PLHIV will have better outcomes; to achieve and or maintain viral load suppression (Stewart et al., 2014). This study will be useful in
developing male appropriate interventions to reduce stigma, increase knowledge and increase HIV testing uptake among Cameroonian men. This could be beneficial for many other countries in SSA as other studies show that the countries in SSA show similar health indicator trends and could be useful in developing healthcare delivery models especially during COVID-19 so PLHIV should continue to receive care and treatment with as little interruption as possible.

The government of Cameroon should consider comprehensive HIV knowledge, sociodemographic variations and increase availability of HIV services at the grass roots level to promote HIV testing among men. This study is significant to add to the body of research on HIV testing among men and how to move the 2030 agenda forward. At this point we may not know for certain how long the different strains of COVID will stick around but we are certain that it affects delivery of HIV related services at the BRH.
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bank, w. the world bank in Cameroon.
Britannica. Cameroon.
CDC. Global health Cameroon.
CDC. travellers health

CDC, A. Corona virus disease.


John hopkins. Corona virus resource center.


UNAIDS. fast track.

Understanding the fast UNAIDS Reference.

APPENDIX A: HIV PREVALENCE AMONG ADULTS, BY REGION

Among adults ages 15-64 years, HIV prevalence among adults varies by region, ranging from 6.3 percent in the South Region to 1.5 percent in the Far North Region.

<table>
<thead>
<tr>
<th>Region</th>
<th>HIV Prevalence (%)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adamawa</td>
<td>4.9</td>
<td>3.1-6.7</td>
</tr>
<tr>
<td>Centre</td>
<td>5.8</td>
<td>4.8-6.8</td>
</tr>
<tr>
<td>Douala</td>
<td>3.3</td>
<td>2.5-4.0</td>
</tr>
<tr>
<td>East</td>
<td>5.9</td>
<td>4.5-7.3</td>
</tr>
<tr>
<td>Far North</td>
<td>1.5</td>
<td>1.0-2.1</td>
</tr>
<tr>
<td>Littoral</td>
<td>3.1</td>
<td>1.2-4.9</td>
</tr>
<tr>
<td>North</td>
<td>1.6</td>
<td>1.0-2.1</td>
</tr>
<tr>
<td>North West</td>
<td>5.1</td>
<td>3.4-6.7</td>
</tr>
<tr>
<td>South</td>
<td>6.3</td>
<td>5.4-7.3</td>
</tr>
<tr>
<td>South West</td>
<td>3.6</td>
<td>2.4-4.9</td>
</tr>
<tr>
<td>West</td>
<td>2.7</td>
<td>1.8-3.6</td>
</tr>
<tr>
<td>Yaounde</td>
<td>4.4</td>
<td>3.2-5.6</td>
</tr>
</tbody>
</table>
APPENDIX B: VIRAL LOAD SUPPRESSION IN CAMEROON BY REGION.

Viral Load Suppression among HIV-Positive Adults, by Region, CAMPHIA 2017
APPENDIX C: TOTAL CASES OF COVID-19 IN THE CENTRAL AFRICAN REGION.

Source: https://africacdc.org/covid-19/
APPENDIX D: MAP OF AFRICA SHOWING THE LOCATION OF CAMEROON.

https://www.cdc.gov/globalhealth/countries/cameroon/default.htm
APPENDIX E: CAMEROON POPULATION PYRAMID
APPENDIX F: MAP OF CAMEROON SHOWING ALL 10 REGIONS AND SOME SURROUNDING COUNTRIES.
APPENDIX G: INFORMED CONSENT FOR HIV RELATED CARE DURING THE COVID-19 PANDEMIC IN CAMEROON

University at Albany INFORMED CONSENT INFORMATION FOR RESEARCH PARTICIPATION

Study Title: HIV RELATED CARE DURING THE COVID-19 PANDEMIC IN CAMEROON

Principal Investigator: Heidi Iyok, MPH

Co-Principal Investigator: Dr. Benjamin Shaw

I am a student at the University at Albany, in the School of Public Health. I am planning to conduct a research study, which I invite you to take part in. I am doing this study with colleagues at the health clinic in Bamenda and the Ministry of health in Cameroon. This form has important information about the reason for doing this study, what we will ask you to do if you decide to be in this study, and the way we would like to use information about you if you choose to be in the study.

Why are you doing this study?
You are being asked to participate in a research study about HIV related services during the covid-19 pandemic. The purpose of this study is to understand how the covid-19 pandemic has affected the services you receive at the HIV clinic.

What will my child be asked to do if my child is in this study?
Parents will be asked questions about their child and no interactions will occur with their child for the research. The parents may be asked about their experiences while helping the child receive care at the clinic. Participation should take about 60-90 minutes.

What will I do if I choose to be in this study?
If you agree to participate in this study,

I. You will be required to have a cell phone.
II. You will be given information about the study
III. You will be required to sign a consent form
IV. You will be contacted by the PI to schedule a phone interview
V. You will be asked to take part in a phone interview that includes 10-15 questions that will take approximately 60-90 minutes to complete.
**Study time:** Study participation will take approximately a one-time phone interview for 60-90 minutes and a follow-up interview if needed not to exceed an hour.

**Study location:** All study procedures will take place via telephone using WhatsApp.

I would like to audio-record this interview to make sure that I remember accurately all the information you provide. I will keep these tapes in a locked cabinet and they will only be used by research team members. If you prefer not to be audio-recorded, I will take notes instead. I may quote your remarks in presentations or articles resulting from this work. A pseudonym will be used to protect your identity, unless you specifically request that you be identified by your true name.

**What are the possible risks or discomforts?**
To the best of our knowledge, the things you will be doing have no more risk of harm than you would experience in everyday life.

Your participation in this study does not involve any physical or emotional risk to you beyond that of everyday life.

Your participation in this study may involve the following risks:
I. Emotional and psychological risks, including risks of emotional discomfort from being asked about or discussing sensitive issues.
   I. You may feel emotional or upset when answering some of the questions. Tell the interviewer at any time if you wish to take a break or stop the interview.
   II. You may be uncomfortable with some of the questions and topics we will ask about. If you are uncomfortable, you are free to not answer or to skip to the next question.

As with all research, there is a chance that confidentiality of the information we collect from you could be breached – we will take steps to minimize this risk, as discussed in more detail below in this form.

**What are the possible benefits for me or others?**
The possible benefits to you from this study include more effective interventions created to help patients at the clinic and the community as a whole. When patients stay in care the community as a whole benefit.

How will you protect the information you collect about me, and how will that information be shared?
Results of this study may be used in publications and presentations. Your study data will be handled as confidentially as possible. If results of this study are published or presented, individual names and other personally identifiable information will not be used.

To minimize the risks to confidentiality, we will take security measures, e.g., storage of materials in a locked cabinet, coding, encryption on WhatsApp, limited access to study records only by team members, etc. If disclosure of faces or voices is necessary to
understanding the research and therefore identifying information may be used in reports/presentations.

If we think that you intend to harm yourself or others, we will notify the appropriate people with this information.

Financial Information
Participation in this study will involve no cost to you. You will not be paid for participating in this study. This study is voluntary; there will be reimbursement or payment for time and phone air time not to exceed $5. Payments will be received after the consent form is signed.

What are my rights as a research participant?
Participation in this study is voluntary. You do not have to answer any question you do not want to answer. If at any time and for any reason, you would prefer not to participate in this study, please feel free not to. If at any time you would like to stop participating, please tell me. We can take a break, stop and continue at a later date, or stop altogether. You may withdraw from this study at any time, and you will not be penalized in any way for deciding to stop participation. If you decide to withdraw from this study, the researchers will ask you if the information already collected from you can be used.

Who can I contact if I have questions or concerns about this research study?
If you have questions, you are free to ask them now. If you have questions later, you may contact the researchers Heidi Iyok, at hiyok@albany.edu (518) 330-3261 and Benjamin Shaw bashaw@albany.edu

If you have any questions about your rights as a participant in this research, you can contact the following office at the University at Albany:

Institutional Review Board
University at Albany
Office of Regulatory and Research Compliance
1400 Washington Ave, MSC 100E
Albany, NY 12222
Phone: 1-866-857-5459
Email: rco@albany.edu

Consent
I have read this form and the research study has been explained to me. I understand that my participation or not in this study has no implications on my care at the clinic. I have been given the opportunity to ask questions and my questions have been answered. If I have
additional questions, I have been told whom to contact. I agree to participate in the research study described above and will receive a copy of this consent form.

______________________________________________________
Participant’s Name (printed)

______________________________________________________
Participant’s Signature              Date
APPENDIX H: SOME OF THE PHONE INTERVIEW QUESTIONS

1. Are you currently receiving care at this HIV center?
2. If yes how long?
3. If no what made you drop out of care and what will need to be different for you to return to care?
4. What services are available at the center that are or were beneficial to you?
5. Has your city been affected by the COVID 19 pandemic and if yes how so?
6. Tell me more how the COVID-19 pandemic and nationwide lockdown affected how you provide care and if so how?
7. Think back prior to the pandemic, could you explain to me the difference in treatment and care at the center?
8. What services are lacking at the HIV centers in Bamenda Cameroon during the COVID-19 pandemic?
9. Has the COVID-19 pandemic affected how you receive these services and if so how?
10. What are the some of the reasons why patients may stop coming to their appointments at the center?
11. What were some barriers, if any, that you encountered? Staff turnover? Lack of key support? Lack of technical assistance?
12. Where you able to overcome these barrier(s) if so how?
13. What effect, if any, do you feel the COVID pandemic has had on the center your visit?
14. Increased use of services? Increased knowledge of services by center staff?
15. What recommendations do you have for future efforts such as these?
16. Is there anything more you would like to add?

I will be analyzing the information you have given.

Thank you for your time
Hello, my name is Heidi Iyok, and I’m a doctoral student at the State University of New York in Albany, New York state. I am calling because you have indicated interest in being a research participant in this research study. I am conducting a study about how the COVID-19 pandemic has affected services that you receive at the HIV center and would like to talk to you about your experiences receiving care and treatment at the center.

Specifically, with treatment being a component of the overall HIV continuum of care I am assessing care of PLWHA in order to capture lessons that can be used in future interventions. This research will benefit the academic community as it helps us understand how to improve services to people living with HIV during the pandemic. In addition, this research will be beneficial not just to you but also to others in your community and beyond.

The interview will last about 60-95 minutes. I may call at a later time if I have any follow up questions. This research may pose minimal risk which may create some stressful situations as you recall how you have received care in the past and how you receive care now with the COVID-19 pandemic. Please know that I will do everything I can to protect your privacy and identity. Your personal information and your identity will not be disclosed in any publication that may result from the study. Notes that are taken during the interview will be stored in a secure location. However, I may need to know your region of residence and for how long you have been seeking care at this particular facility.

I will be recording our conversation via audiotaping because I do not want to miss any of your comments and insights you may provide. All responses will be kept confidential. This means that your interview responses will only be shared with research team members and we will ensure that any information we include in our report does not identify you as the respondent. You a few questions. Remember, you don’t have to talk about anything you don’t want to and you may end the interview at any time. Do you understand the process and are there any questions before we proceed? Are you willing to participate in this interview? Would it be okay to begin with my questions?
APPENDIX J: COMMON THEMES FROM STAFF INTERVIEWS

In-depth Interview with Staff Members at the HIV Center

- No ART
- SD
- No PPE
- Conflict
- Covid myths
- Fewer clients
- Home bound
- Increase workload
- Loss time
- Stigma
APPENDIX K: COMMON THEMES FROM CLIENT INTERVIEWS

In-depth Interview with Clients at the HIV Center