The Determinants of the Demand for HIV testing among Cameroonian women

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Abstract

The objective of this paper is to identify the factors that affect the demand for HIV screening test by Cameroonian women.

1. Introduction

UNAIDS estimates that 36.9 million people were living with HIV in the world in 2017, with more than 25 million people in Africa. According to UNICEF, Eastern and Southern Africa is the most affected region by HIV and account for more than half of all people living with HIV. The Southern Africa sub-region, in particular, is experiencing some of the most serious HIV epidemics in the world. Nine countries, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe have adult HIV prevalence rates above 10%. It is estimated that Swaziland has the highest HIV prevalence rate in the world, at 26.0%, followed by Botswana (23.4%) and Lesotho (23.3%). With 5.6 million people living with HIV (17.3%), South Africa is home to the world's largest epidemic (UNICEF 2013).

Twenty years ago, prevalence rates in East Africa were similar to current rates in West and Central Africa. The HIV prevalence rate in Cameroon was estimated at 5.1 percent, representing the highest rate in the West and Central Africa subregion (UNAIDS, 2009). The results of the 2011 Demographic and Health Multiple Indicator Survey (EDS-MICS 2011) showed that in Cameroon, 4.3% of adults aged 15-49 years were HIV-positive in 2011. The seroprevalence rate among women aged 15-49 (5.6%) was almost the double of that of men of the same age (2.9%). The result was an infection ratio between women and men of 1.9 in favor of women. This indicates that women are significantly more vulnerable than men to HIV infection (National Statistical Institute and ICF International, 2012). It thus appears that despite the major progress made in the fight against HIV, the epidemic still poses serious threats to public health in this region.

Moreover, HIV/AIDS has generated enormous public expenditures for governments, on the one hand for the search for preventive and curative treatments, and on the other hand for the assistance and care of infected people.

In South Africa, government spending on counseling and testing increased from $ 2.4 millions in 2000 to $ 17.3 millions in 2004 and in Mozambique to 55% of all HIV program expenditures on HIV / AIDS. In Cameroon, about 3.64% of current health expenditures were made for HIV / AIDS, for a total of nearly 17.14 billion CFA francs. According to the results of the National Health Accounts, these expenditures were financed mainly by the State at 29.14% and external funds at 16.91% (MINSANTE, 2011).

The HIV/AIDS epidemic has a heavy socio-demographic and economic impact in the African Region. It affects the economy by reducing the supply of labor, because of high mortality and morbidity. In 1997, public health expenditure attributable to AIDS alone exceeded 2% of the

gross domestic product (GDP) of 7 African countries out of the 16 countries sampled (ONU, 2001). This percentage is enormous when we know that in these countries, total health expenditure accounts for 3 to 5% of GDP. Moreover, it is estimated that the impact of HIV / AIDS on the gross domestic product (GDP) of the most affected countries translates into a loss of 1.5% of GDP each year (Rosen et al., 2004). According to UNAIDS projections, by 2050, life expectancy is expected to decline in the Region, compared to other regions of the world, in a range of 12 to 17 years.

Given these huge losses due to HIV / AIDS for African countries, it is important to prevent the spread of this epidemic. This requires that individuals must first know their HIV status by doing IHV screening test. UNAIDS (2017) revealed that 19 millions among the 35 millions of people living with AIDS did not know their status. That is certainly why it has adopted a strategy by defining ten targets to be achieved over the period 2016-2021, in line with the third Sustainable Development Goal[1], aiming to eradicate AIDS. The first target and best known is often called (90-90-90) and can be spelt out as follows:

- 90% of the population (children, adolescents and adults) living with HIV knowing their status;
- 90% of people living with HIV and knowing their status receive a treatment;
- 90% of people under treatment have a suppressed viral load.

In the Global Strategy Paper for the Health Sector on HIV, it is recommended to ensure that all people living with HIV know their status through new screening methods, including self-screening and screening in health facilities, and new screening techniques whose quality is guaranteed. These new screening methods should make it possible to identify people living with HIV in greater numbers and to rapidly provide them with treatment and care, which would optimize the means of prevention and the effectiveness of treatment.

PHIA surveys[2], reveal that in 2018, South Africa which has the largest HIV epidemic in the world with more than 7 million people living with HIV and the largest treatment

[1] The third Goal of SDG is, to ensure healthy lives and promote wellbeing for all at all ages

[2] The PHIA Project, led by ICAP at Columbia University in partnership with the US Centers for Disease Control and Prevention (CDC), measures the reach and impact of HIV programs in PEPFAR-supported countries through national surveys. Each population-based HIV impact assessment (PHIA) survey offers participants household-based HIV counseling and testing conducted by trained survey staff, with return of results. The surveys also asks questions about access to preventive care and treatment services for adults and children. The results will measure national and regional progress toward UNAIDS' 90-90-90 goals and guide HIV policy and funding priorities.

programme in the world with 4.4 million people on antiretroviral therapy has improved treatment coverage and is very close to reaching the 90-90-90 treatment target. The same survey reveals that in Cameroon, viral load suppression among all people living with HIV was less than 50% and that the country is far from reaching the 90-90-90 target, at 47-91-80[3]. The largest difference between South Africa and Cameroun is observed in knowledge of HIV status, indicating that HIV testing services need to be significantly scaled up in Cameroon.

For the third SDG to be attained, people must be encouraged to get tested, because the demand for HIV test is the only way to know one's status, and then to start with treatment[4].

The problem in most of sub-Saharan African countries is that the utilization of Voluntary Counselling and Testing for HIV remains very low (Ngilangwa et al., 2016; Teklehaimanot et al., 2016). Indeed, individuals remain reluctant to get tested, because AIDS is still considered in the society as a disease of shame, and because they would not want to know they are "sentenced to death". Meiberg et al., (2008) found that fear of stigmatization is an important barrier to HIV testing and has negative consequences for AIDS prevention and treatment. That is probably why we observe that, while people with treatable diseases have strong motivations for testing and diagnosis, these incentives may be absent for people concerned about HIV because it is incurable, and they might be afraid to know that they are HIV positive. Moreover, when some individuals are courageous enough to get tested, there is a fear for test results, which can discourage them from returning to collect the results of their tests.

As the HIV -AIDS epidemic continues to rack havoc throughout sub-Saharan Africa with no cure or vaccine on sight, education becomes the only hope for life because it plays critical roles in halting the spread of HIV-AIDS and also mitigating the effects of HIV-AIDS on people. It therefore means that schools have an important role to play as part of a national response to the HIV-AIDS (Thornton, 2008).

Among sociocultural factors that affect health behaviour, education plays a key role (Hendrick et al., 2009; Grossman, 2006). The future course of the AIDS epidemic in Africa depends in large part on the behaviour of the next generation (Duflo et al., 2006). Indeed, it is widely

ICAP also provides technical assistance at the national level to strengthen data collection systems, enhance laboratory infrastructure, and build capacity to design, conduct, and analyze PHIAs in survey countries.

[3] Out of every 100 HIV positive people, 47 report knowing their status.

[4] According to UNAIDS, in sub-Saharan Africa, nearly 90 percent of people who were tested positive for HIV had accessed antiretroviral therapy. In Cameroon, among those who report knowing their status, more than 90% report being on treatment.

established that education is important for the viability of a country because of the critical role it can play in preventing AIDS. For the World Bank (2002), prioritizing education is crucial for the following reasons: education is a major engine of economic and social development and, education is a proven means to prevent HIV/AIDS. Basic education has a general preventive impact, as it can inform children and youth and equip them to make decisions concerning their own lives, bring about long-term behavioural change, and give them the opportunity for economic independence, all fundamental to prevention, and therefore to hope. In addition, instruction focused on HIV/AIDS prevention is crucial to closing persistent fundamental gaps in knowledge. After 20 years into the epidemic, millions of young people, even in badly affected countries, are ignorant or have misconceptions about the disease (UNAIDS 2000a).

Among PLHIV, there are more women than men. Statistics among age-group, show that young women represent 7 in 10 of all youth ages (15-24 years) who are HIV positive (CNLS/GTC, 2010). An analysis by age and sex, done by The Cameroon Population-based HIV Impact Assessment (CAMPHIA, 2018) shows that HIV prevalence peaks at 9.3% among females ages 40-44, as compared to a peak of 6.0% among males ages 50-54. Prevalence among 15-24 years old is 1.2% that is 2.0% among females and 0.4% among males. The disparity in HIV prevalence between males and females is most pronounced among younger adults, with women in age groups 15-19, 20-24 and 25-29 all having prevalence at least triple that of males in the same age groups.

We will therefore pay particular attention in this paper to identifying the factors that affect the demand for HIV screening test by Cameroonian women.

The remainder of the paper proceeds as follows. Section 2 provides background information on the Cameroonian context. Section 3 presents theoretical framework. Section 4 presents literature review on the determinants of HIV testing decision, Section 5 discusses the data and the estimation strategy. Section 6 presents the empirical results and the final section concludes and proposes recommendations.

2. Background information on the Cameroonian context

- **Socio-demographic characteristics**

Cameroon is located in Central Africa and is surrounded by six countries: Chad, Central African Republic, Congo, Gabon, Equatorial Guinea and Nigeria. The country is subdivided into ten

administrative regions[5]. Cameroon has more than 200 ethnic groups with a linguistic diversity. Officially, two languages are presents: French and English. The French-speaking population represents 80% of the total population and is strongly represented in eight of the ten regions of the country (Far-North, North, Adamaoua, West, Littoral, Center, South and East), and the English-speaking minority represents only the remaining 20%, and is strongly represented in two regions (North-West and South-West). Endowed with significant petroleum and forestry resources and a rich agricultural base, Cameroon has the potential to be one of the wealthiest countries in SSA.

The population of Cameroon was estimated at 23,248,044 inhabitants in 2017. According to the results of the last census, Cameroon still has slightly more women (50.6%) than men (49.4%). Half of the population is under 17.7 years old and the population under 15 is 43.6%. People over 60 represent only 5.5% of the total population. About 50% of the total population lives in urban areas with about 50% in the cities of Douala (economic capital) and Yaounde (political capital). The population growth rate is 2.37% per year, and in 2016, life expectancy at birth was 55.02 years, and the GDP growth rate was 4.53%. According to the United Nations Development Report of 2014, Cameroon was ranked 153rd globally out of 188 countries, with a Human Development Index (HDI) of 0.512. This ranking based on socio-economic data such as education, health or per capita income gives an estimate of the general standard of living of a country. For Cameroon, it has improved between 1980 and 2014, from 0.405 to 0.512.

- **The Cameroonian Health System**

From the beginning of the 1980s, Cameroon adopted as national health policy: Primary Health Care (1982-1986), the Reorientation of Primary Health Care (1989-1996) and the Sectorial Health Strategy (2001-2015). To achieve national and international health goals (SDGs, DSCE) and progress towards universal health coverage, Cameroon has adopted a sectorial health strategy (SSS) 2016-2027, based on government documents such as the strategy paper for growth and employment (DSCE) and the 2035 vision for the emergence of the country by 2035. Its vision is "a country where universal access to quality health services is ensured for all social strata by 2035 with the full participation of communities", and will result in the implementation of priority basic and specialized priority intervention packages and thus, in the strengthening of the health system.

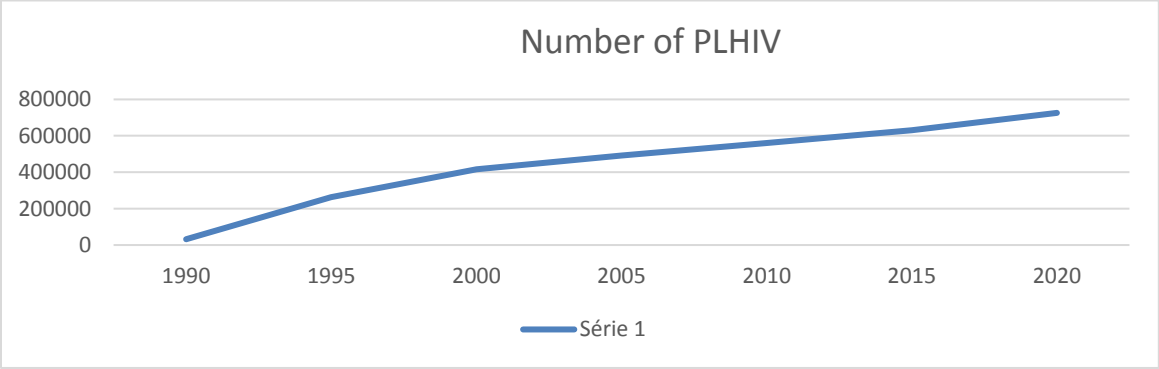
[5] The ten administrative regions of Cameroon are: Far-North, North, Adamaoua, West, North-West, South-West, Littoral, Center, South and East.

The health workers in Cameroon work within a system structured in three levels: central, intermediate and peripheral. Each level having specific functions and having dialogue structures. The central level develops national policies, standards and strategies; it designs and proposes regulatory texts to the government, and coordinates, controls and allocates resources to operational levels. The intermediate level is represented by the 10 regional public health delegations. Each follows the boundaries and denomination of its administrative province. Their role is to translate the centrally developed policy into programs. The health district is the peripheral or operational level. The District Health Unit is headed by a multidisciplinary team supervised by a public health physician who coordinates and supervises all district health activities, including traditional practitioners and the modern private sector (PETS 2, 2010).

- **HIV epidemic in Cameroon**

The first AIDS case in Cameroon was diagnosed in 1985. Since then, the number of cases officially reported have significantly increased and the country is facing a generalized epidemic. The number of people living with HIV (PLHIV) has increased from 1990 to 2010 as it appears on Figure 2.1, with a projection of PLHIV till 2020:

Figure 2.1 evolution of Number of PLHIV in Cameroon

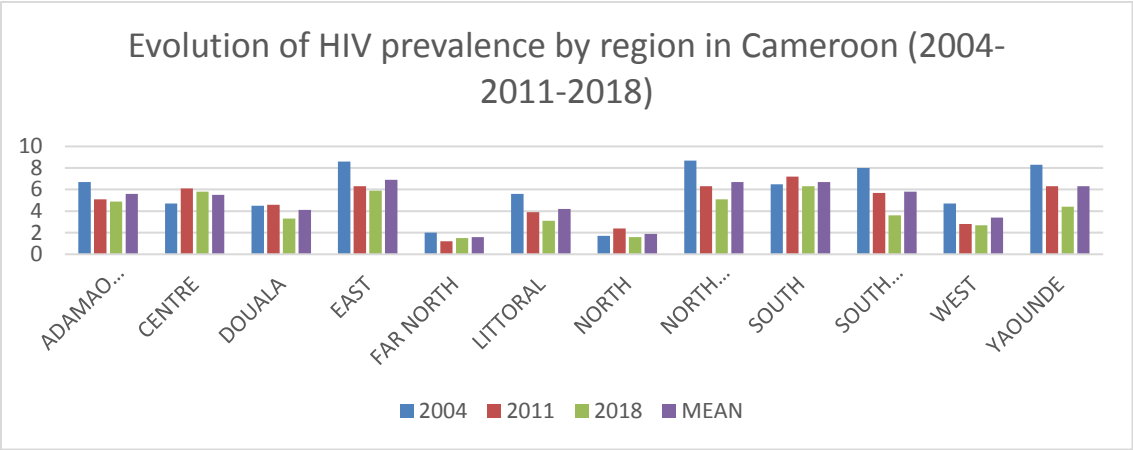


Source: AIDS impact model for Cameroon, 2010

HIV prevalence rate has decreased from 2004 to 2011 (5.5% in 2004, 4.3% in 2011) but has increased from 2011 to 2018 (4.8% in 2018).

The Demographic and Health Survey in 2004 and 2011 revealed that prevalence was higher in urban areas than in rural areas. Prevalence rates also vary from one region to another. Between 2004, 2011 and 2018 the IHV prevalence rate has varied in different region of the country as shown in Figure 2.2.

Figure 2.2 Evolution of HIV prevalence by region in Cameroun (2004-2011-2018)



Source: Authors, using DHS 2004, 2011 and CAMPHIA, 2018

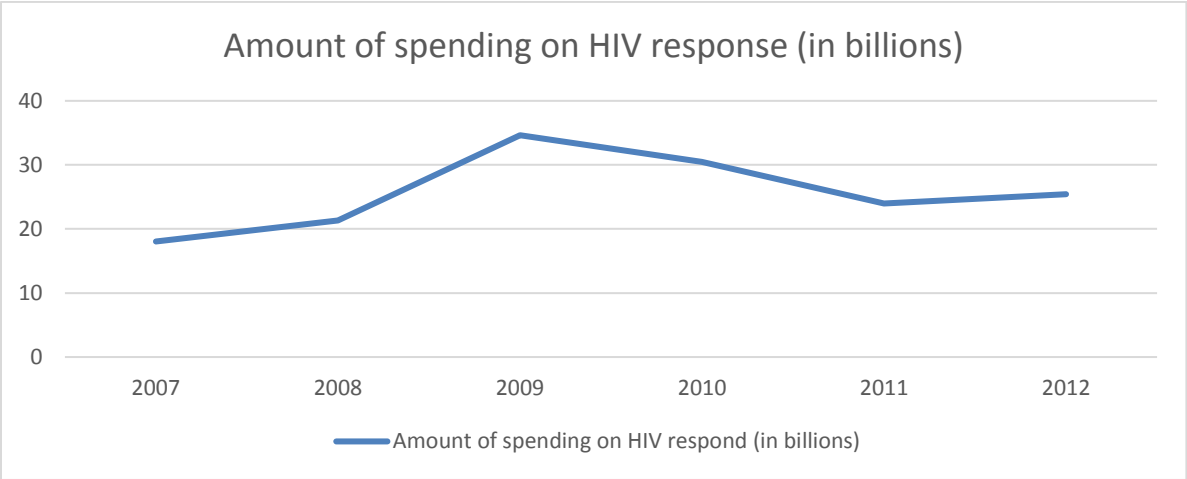
We easily observe in the Figure 2.2 that highest rates are recorded in the north-western (6,7%) and southern (6,7%) and eastern (6,9%) regions. The figure also shows that, globally the HIV prevalence rate has decreased from 2011 to 2018, even if greater efforts must still be made by Cameroonian government to expand and strengthen its national programme against HIV, in order to achieve the 90-90-90 goals by 2020.

- **Impact of HIV/AIDS on socio-economic development**

HIV/AIDS represents a real public health problem in Cameroon, a major cause of mortality, and has a negative impact on the economic and social development of the country. Cameroon's socioeconomic development has been affected by HIV and AIDS in many ways.

In the Health sector, the impact is significant. According to GTC/CNLS (2013), spending on the HIV response has grown from 2007 to 2012 as displayed in the Figure 2.3:

Figure 2.3: Amount of spending on HIV response (in billions)



Source: GTC/CNLS, 2013

Funds come from publics funds (77.4%), profit making enterprises (1.5%), and households (21.1%).

HIV and AIDS programme expenses absorb a major part of the Cameroonian national health budget and costs for AIDS patients will increase as more patients have access to care and treatment. At the hospitals level, there is a reduction of capacity to accept new patients because many beds are occupied by AIDS patients, and loss of skilled health workers due to HIV-related illness.

The impact on the Education Sector is also perceptible through the loss of teachers and greater absenteeism among teachers due to HIV-related illness, and the decrease in public financing of education due to the increased funding needed for the fight against HIV.

At the Enterprises level, HIV/AIDS has significantly reduced the productivity of workers. Many enterprises have faced loss of professional and technical personnel and qualified workers due to HIV-related illness, as well as an increase in production costs associated with the need to provide care and treatment for sick workers.

HIV has significantly impoverished households in many African Countries (Wyss et al., 2004; Kumarasamy et al., 2007; CNLS, 2010; Rajapakse and Rodrigo, 2010; Steinert et al., 2016) by increasing levels of poverty at the family level through the reduction of resources available for children's education due to household income loss. In Cameroon, women and girls are particularly vulnerable to HIV, as they are at higher risk for HIV infection for biological and socioeconomic reasons and the power differential between women and men. Certain socio-cultural practices increase the risk of transmission such as use of vaginal drying agents that may create lesions, increasing the probability of HIV transmission. Women and girls are more likely to care for HIV-positive family members and thus have an additional workload (CNLS/GTC, 2010).

- **State of knowledge about HIV**

People's attitudes and behaviour towards HIV strongly depend on the level of knowledge (prevention and transmission) of the disease by individuals. According to the National Institute of Statistics (NIS) of Cameroon (INS, 2011), almost all women (96%) and men (98%) reported hearing about HIV / AIDS. The knowledge of the disease increases with the level of education of the individual, regardless of gender.

Preventive measures[6] are essential for the effective control of the spread of HIV. According to the fifth Multiple Indicators Cluster Survey for Cameroon (MICS, 2014), 30.5% of women and 41.9% of men have a knowledge considered "deep" of AIDS that is, they know that:

• Regular use of condoms during sex and limiting sex to one faithful, uninfected partner reduces the risk of contracting the AIDS virus; and,

• a person in good health may nevertheless have contracted the AIDS virus.

They also reject the two most common misconceptions about the transmission or prevention of AIDS (The two most commonly cited misconceptions: AIDS can be transmitted by mosquito bites and by supernatural means).

According to the National Institute of Statistics (NIS) of Cameroon (INS, 2011), Men are more likely than women to have a correct knowledge of HIV / AIDS transmission. Among women with no education, only 13.7% have a good knowledge of HIV prevention, as compared to those with primary (22.7%), secondary (39.4%) or higher education (60.1%). Among men, only 16.4% of them without a level of education have a thorough knowledge of HIV / AIDS compared to those with primary (26.6%), secondary (50.5%) or higher education (65.5%).

When discussing the most basic knowledge about HIV prevention, it is worrying to note the alarming ignorance of young people (15-24 years old). Only 62.2% of young people (28.7% of young women and 33.5% of young men) have a "deep" knowledge of HIV. This would partly explain risk behaviours such as having multiple sexual partners and non-use of condoms in this age group, which are more common among women (62.7%) than men (57%).

[6] The main means of preventing HIV infection is the limitation of sexual intercourse to one faithful and uninfected partner, as well as the use of condom during sex.

Regarding the prevention of mother-to-child HIV transmission, a sizeable proportion of women (66%) and men (61%) know that the AIDS virus can be transmitted from mother to child through breastfeeding.

The proportion of respondents who know that HIV can be transmitted through breastfeeding and who are aware of drugs that can reduce the risk of maternal transmission of the virus increases with education, with 15% of women with no education and 73% of those with upper secondary education or above.

In addition, 57% of women and 51% of men know that the risk of mother-to-child transmission can be reduced if the mother takes medication during pregnancy. Overall, 48% of women and 37% of men aged 15-49 years know that there is a risk of transmission through breastfeeding, and the existence of a drug that can reduce the risk of maternal transmission during pregnancy.

- **Government response to HIV**

In 2007, the Economic and Monetary Community of Central Africa (CEMAC)[7] countries introduced HIV and AIDS education into the official curriculum of school systems (at the primary, secondary and normal levels), to enable young people to acquire knowledge about sexuality and reproduction in order to develop and maintain responsible sexual behaviours. The State of Cameroon reacted in this line by deciding through the creation of a National AIDS Control Committee (CNLS), and the elaboration of a National Plan to fight against AIDS and STIs.

The National Strategic Plan for the fight against HIV, AIDS and STIs (2014-2017) propose 8 strategic axes[8], with the first one being the strengthening of prevention and transmission of HIV and STIs, through communication and education for behavioural change.

[7] the Economic and Monetary Community of Central Africa is made up of six states: Cameroon, the Central African Republic, Chad , the Republic of Congo, Gabon, and Equatorial Guinea

[8] The eight axis of the National Strategic Plan are: strengthening prevention of HIV transmission and STIs, strengthening access to care and treatment, strengthening support and protection for (People Living with HIV (PLHIV), (Orphans and Vulnerable Children (OVC) and affected people, appropriation of the fight against HIV by all actors, strengthening the health system, strengthening the community system, strategic information and coordination, partnership and management by the CNLS.

3. Theoretical framework

Among the models of health care utilization, Andersen's Behavioural Model provides a useful analytical framework for examining determinants of HIV testing. This theoretical framework is grounded in the notion that utilisation of health care services is dependent upon contextual situations, which in turn influences individual circumstances. Andersen (1968) developed a model of health care utilization which looks at three categories of determinants:

- Predisposing characteristics

This category represents the proclivity to utilize health care services. According to Andersen, an individual is more or less likely to use health services based on demographics, position within the social structure, and beliefs of health services benefits. An individual who believes health services are useful for treatment will likely utilize those services (Wolinsky, 1988b).

- Enabling characteristics

This category includes resources found within the households and the community. Family resources comprise economic status and the location of residence. Community resources incorporate access to health care facilities and the availability of persons for assistance (Wolinsky, 1988b).

- Need based characteristics

The third category includes the perception of need for health services, whether individual, social, or clinically evaluated perceptions of need (Wolinsky, 1988b).

What is important in this approach is the emphasis on the joint effects of community and individual level factors that influence health care service utilization.

Predisposing factors that may affect the level of HIV testing among women usually includes personal attributes of an individual such as demographic characteristics.

These predisposing factors are assumed to operate through enabling and perceived need factors and these comprise of contextual and sometimes personal circumstance, representing the ability to use health care services.

Enabling factors are in turn assumed to facilitate or inhibit individuals from accessing HIV testing services. The need factors pertain to the perceived and evaluated assessment of one's health status which may compel the need for seeking health care services.

The accumulated effects of predisposing, enabling and need factors govern one's trajectory to HIV testing behaviour. Given the background of growing inequality in access to health care services in Cameroon (Kamgnia, 2006), issues of community influence on HIV testing come to the fore. A growing need exists for implication of both individual and community level effects on HIV testing. Such information will help the HIV prevention programs (CNLS) identify communities with high concentration of individuals who are likely to have been ever tested for HIV.

In line with this conceptual framework, this study aims to understand individual and community-level factors associated with HIV testing. Specifically, the study aims to identify the predisposing, enabling and perceived need factors associated with HIV testing with particular focus on women in Cameroon.

4. Literature review on the determinants of HIV testing decision

Many studies have examined the factors that may determine the demand for HIV testing (Friesner et al., 2007; Conserve et al., 2012; Dhoro, 2014, Fuster-Ruiz et al., 2014, Brunie et al., 2016 and Teklehaimanot et al., 2016, Gazimbi and Magadi, 2017). The determinants are commonly divided into socio-demographic and behavioural factors.

socio-demographic factors include age, gender, marital status, education, occupation, area of residence, religion, standard of living, partner's education level, distance to the nearest health facility, and behavioural factors include condom use, number of sexual partners, high risk sexual partners, perception of HIV risk, HIV stigma scale, and knowledge about HIV.

Conserve et al., (2012) found that among men, age, education, condom use, and knowledge of partner's HIV status were significant predictors of previous HIV testing, and education, number of sexual partners, and condom use were also associated with knowledge of partner's HIV status.

Teklehaimanot et al., (2016) concluded that there was low utilization of Voluntary Counseling and Testing (VCT) in the rural communities, influenced by socio-economic, behavioural and

health service factors. Their study revealed that overall, men (28 %) were relatively more likely to get tested for HIV than women (23.7 %) through VCT.

Dhoro (2014) limited her study only to women and found that relational-level and individual-level variables determine HIV testing in women in Zimbabwe.

Some authors have considered monetary determinants in their studies. Fuster-Ruiz et al., (2014) have introduced the cost of testing in their analysis, as well as Nyblade et al., (2002) who investigated the impact of the costs associated with VCT in rural Uganda.

These studies do not analyze the effect of sexual behaviors of individuals by ethnicity. In Cameroon, for example, different sexual behavior is attributed to each ethnic group, some groups being more libertine than the others.

5. Materials and Methods

5.1 The Data

The Dataset used in this study is Demographic and Household Survey and Multiple indicators Cluster Survey (DHS-MICS) data of Cameroon, collected by the National Institute of Statistics in collaboration with the Ministry of Public Health, on a representative sample of household, of women aged between 15 and 49 years old and men aged between 15 and 59 years old. At the individual level, 15.426 women and 7.191 men was surveyed. The information collected during the 2011 DHS-MICS allows the updating of basic indicators on the demographic and health situation. These data also facilitate the monitoring and evaluation of HIV / AIDS, malaria and specific programs for maternal and child health and family well-being.

5.2 Description of variables

Outcome variable

The variable of interest is whether the woman has ever been tested for HIV. This outcome is a binary and the possible responses are ‘yes’ if the woman have been tested or ‘no’ otherwise.

Explanatory variables

We present the independent variables we have retained for the analysis, guided by the conceptual framework and the literature review presented above. These variables are presented according to the different factors captured in the Andersen’s behavioural model.

- **Predisposing factors**

These are socio-economics and demographic factors such as: age, area of residence, level of education, marital status, religion, ethnicity, and whether the individual works or not. Those variables have widely been used in the literature.

Age groups: women successfully surveyed in DHS was aged between 15 and 49 years old. For this study we have recoded this variable into 6 categories: 15-24 (young women), 25-29, 30-34, 35-40, 40-45 and 45-49. This variable will allow us to observe HIV testing behaviour among young women.

Area of residence: in this study we consider two types of area of residence, urban area and rural area.

Marital status: this variable is used to capture HIV testing behaviour among singles (never married), married, divorced and widows. We recoded this variable into these four categories.

Religion: this variable has five categories: Christians, Muslims, Animists, those from other religions and those who do not belong to any religion.

Ethnicity: To our knowledge, there is no previous study in the literature that has made use of ethnicity as a potential determinant of the demand for HIV test. This variable has been introduced in this study is because different sexual behaviours are attributed to some ethnic groups in Cameroon. The relative sexual freedom of unmarried men and women may be the aspect of the Beti's social organization most widely emphasized by ethnographic literature. On the other hand, many published works on prenuptial sexuality among the Biu-mandara are unanimous: women must be virgins at the time of marriage. Premarital pregnancies are unacceptable and the consequences of non-compliance with these rules are severe (Johnson-Hanks, 2003). The bamileke group is characterized by a strong domination of women and rigid sexual mores (Rwenge, 2004)
This variable has six categories, that we have grouped with respect to the similarity in their culture and sexual behavior. Group 1: Arab (choa/peulh/haoussa/kanuri biu-mandara/ adamaoua-oubangui), group 2: Grassfields (Bantonde/southwest), group 3: Bamileke (bamoun), group 4: Côtier (ngoe/oroko) group 5: Beti (bassa/mbam Kako/meka/pygme) and group 6: Stranger/other.

Occupation: Economic dependency has been one of the major barriers to women's control over their health behaviour in developing countries (Gazimbi and Magadi, 2017). However, studies have shown that a woman's occupation is an important factor that influences her access to health care services, since women who are working and earning money will have greater autonomy and control over financial resources, and thus they are more able to pay for health care services.

This variable has been recoded into 3 categories, formal sector, informal sector and not working.

- **Enabling Factors**

Wealth: This variable is used as an indicator of economic well-being of the woman. We have five categories, poorest, poorer, middle, richer and richest.

AIDS transmission knowledge: This variable is derived from eight HIV related question about AIDS transmission. The variable has been classified into four categories: none, if participants do not answer correctly all the questions, low, if participants answered three or less questions correctly, medium if participants answered four or five questions correctly and high if participants answered six or more questions correctly.

AIDS prevention knowledge: This variable is derived from two HIV related question about AIDS prevention. The variable has been classified into three categories: none if participants do not answer correctly all the two questions, medium if participants give correct answer to one of the two questions correctly, and high if participants answered the two questions correctly.

HIV related stigma: In line with Sambisa, 2008 and Gazimbi and Magadi, 2017, this study uses this variable to assess individual's attitude towards people living with HIV. The attitude of people in the society towards PLHIV may have an influence on the decision of the individual to get tested or not. For example, People may have been discouraged from being tested for HIV if they observed PLHIV being discriminated against in their communities or families. We have therefore constructed this variable on the basis of four questions asked to the participants: 'are you willing to care for a relative with AIDS?', 'would you want a teacher with HIV to continue teaching?', 'would you buy vegetables from a vendor with HIV?' and 'would you want others to know if a family member became infected with HIV?'. This variable has been recoded into three categories: no stigma, medium and high stigma.

Level of education: this variable was recoded into four categories: no education, primary education, secondary education and higher education.

- **Need factors**

Multiple sex partners: this variable indicates whether the woman had multiple sex partner or not. It is a binary variable which takes the value 0 if the woman did not have sex or had sex

with only one partner, and 1 if the woman had sex with more than one partners in the last twelve months preceding the survey.

Condom use: this variable was recoded into three categories. It takes the value 0 for woman who did not use condom during the last sex encounter and 1 for those who did, and 2 for women not sexually active.

Ever born: This variable indicates if the woman has already given birth and takes the value 1 if yes and 0 otherwise. The national health policy in Cameroon wants the woman to be tested HIV when she is pregnant.

5.3 Methods and estimation strategy

The objective of this paper is to investigate the different factors that encourages women to demand for HIV testing in Cameroon. In this case a woman has either been tested for HIV or not tested, meaning that the dependent variable is a binary variable, taking values of one (if an individual has been tested) and zero (if not tested). The two standard binary outcome models are the logit model and the probit model, which focus on the determinants of the probability p of the occurrence of one outcome rather than an alternative outcome that occurs with a probability of 1- p. Both models lead to the same results since the direction of effect is always the same. However, economists tend to favour the normality assumption for the error term, which is why the probit model is more popular than logit in econometrics. In addition, several specification problems are most easily analysed using probit because of properties of the normal distribution (Wooldridge, 2004). In line with this, we will use probit model as a tool for the analysis.

The basic model supposes the outcome variable, y, which takes one of the two values:

$$y = \begin{cases} 1 \; with \; probability \; p \;\; that \; is \; woman \; ever \; been \; tested \; for \; HIV \\ 0 \; with \; probabity \; 1 - p \; that \; is \; woman \; never \; been \; tested \; for \; HIV \end{cases}$$

(1)

Given our interest in modeling p as a function of regressors X, there is no loss of generality in setting the outcome values to 1 and 0. The probability mass function for the observed outcome, , is $p^y \, (1-p)^{1-y}$, with $E(y) = p$ and $Var(y) = p(1-p)$.

A regression model is formed by parameterizing p to depend on an index function $X'\beta$ where X is a $K \times 1$ regressor vector and β is a vector of unknown parameters. In the probit model, the conditional probability has the form:

$$p_i \equiv \Pr(y_i = 1|X) = F(X'_i\beta) \quad (2)$$

The density and distribution functions associated with a normal variable are respectively:

$$\emptyset(z) = \frac{1}{\sqrt{2\pi}} e^{-z^2/2} \text{ and } F(X'\beta) = \Phi(X'\beta) = \int_{-\infty}^{X'\beta} \emptyset(z)dz \quad (3) \text{ and } (4)$$

The probit parameters are estimated using the method of Maximum Likelihood Estimation (MLE). The Maximum likelihood (ML) estimation is widely used in health economics, particularly for nonlinear models involving qualitative or limited dependent variables. The Maximum Likelihood function has desirable properties, such as consistency and asymptotic normality, but these rely on the model being fully and correctly specified.

After estimations, the most commonly used test, and most easily calculated test is the Likelihood Ratio Test. We will use it to test our exclusion restrictions, in order to decide whether we should or should not exclude a variable or set of variables. The likelihood ratio statistic is just twice the difference in the log likelihood functions :

$LR = 2 (L_{ur} – L_r)$

where L_{ur} and L_r are the log likelihoods for the unrestricted and restricted models

6. Results

6.1 distribution of hiv testing by predisposing, enabling and need factors

Among the 15.426 women who were surveyed, 15.341 answered to the principal question which is our dependant variable « have you ever been tested for HIV ? ». To this question, only 26.44% of women said they have ever been tested, against 73.56% who declared that they have never been tested. This shows that cameroonian women are still reluctant to be screened, and is in line with the intuition which led us to lead such a study, in order to analyse factors that could explain such a behaviour. Table1, table 2 and table 3 below show the distribution of HIV testing by predisposing, enabling and need factors according to Andersen's behavioural model.

Table 1 : Distribution of HIV testing and proportion of women ever been tested by predisposing factors

	Never been tested		Ever been tested		Proportion of women ever been tested
	Weighted (%)	**N**	**Weighted (%)**	**N**	**(%)**
Age groups					
15-24	46,1	5202,385	36,56	1482,8736	22,1812452
25-29	15,9	1794,315	20,81	844,0536	31,9914966
30-34	11,3	1275,205	15,29	620,1624	32,7199043
35-39	10,3	1162,355	12,65	513,084	30,6238544
40-44	8,3	936,655	8,08	327,7248	25,9198067
45-49	8,1	914,085	6,61	268,1016	22,6784503
Total	**100**	**11285**	**100**	**4056**	
Area of residence					
Urban	46,82	5283,637	62,43	2532,1608	32,3979825
Rural	53,18	6001,363	39,57	1604,9592	21,1003315
Total	**100**	**11285**	**100**	**4056**	
Marital status					
Never married	30,06	3392,271	21,77	882,9912	20,6534982
Married	62	6996,7	67,46	2736,1776	28,11273
Widow	2,85	321,6225	3,62	146,8272	31,3432157
Divorced / separated	5,09	574,4065	7,15	290,004	33,549338
Total	**100**	**11285**	**100**	**4056**	
Religion					
Christians	93,71	10575,1735	95,81	3886,0536	26,8722258
Muslims	4,83	545,0655	2,56	103,8336	16,0015016
None/Animists	1,12	126,392	1,46	59,2176	31,9043843
Others	0,34	38,369	0,17	6,8952	15,2332307
Total	**100**	**11285**	**100**	**4056**	
Occupation					
Not working	34	3835,2	27,35	1109,0425	22,4309892
Informal sector	54,7	6170,16	56,45	2289,0475	27,0598339
Formal sector	11,3	1274,64	16,2	656,91	34,0094743
Total	**100**	**11280**	**100**	**4055**	
Ethnicity					
Arab-choa	35,44	3999,404	16,71	677,7576	14,4907886
southwest/grassfields	14,59	1646,4815	19,6	794,976	32,5615334
Bamileke/bamoun	18,91	2133,9935	27,79	1127,1624	34,5632786
Côtier/ngoe/oroko	4,16	469,456	4,91	199,1496	29,7858109
Beti/bassa/mbam	23,75	2680,1875	28,4	1151,904	30,0594075
Stranger/other	3,15	355,4775	2,59	105,0504	22,8108655
Total	**100**	**11285**	**100**	**4056**	

Source: Authors, using Cameroonian DHS 2011

In table 1 we can see that by age groups, the highest proportions of women ever benn tested for HIV were observed in three age groups, that is 25-29 age group and 30-34 age group and 35-39 age group (31.99%, 32.71% and 30.62% respectively). The lowest proportion was observed in the youngest (15-29) and oldest age group of the sample (45-49) with only 22.18% and 22.67% of women of these age groups who ever get tested for HIV.

The proportion of women ever been tested for HIV is higher in urban area (32.39%) than in rural area (21.1%). With respect to marital status, the higher proportion of HIV testing is observed among divorced women (33.55%). Women never married have the lowest proportion of HIV testing.

A higher proportion of women who ever been tested for HIV according to the religion were animists or women who do not belong to any religious obedience, followed by christians women. By occupation category, the highest coverage of HIV testing was observed among women who work in the formal sector (34%). The proportions of women who were tested by ethnic group are higher for Bamileke / Bamoun group.

whatever the predisposing factor, we can observe that all the proportion of women ever been tested for HIV is less than 35%

Table 2: Distribution of HIV testing and proportion of women ever been tested by enabling factors

Enabling Factors					**Proportion of women ever been tested**
	Never been tested		**Ever been tested**		
Level of education	**Weighted (%)**	**N**	**Weighted (%)**	**N**	**(%)**
No education	21,79	2459,0015	7,82	317,1792	11,42502
Primary education	35,72	4031,002	34,79	1411,0824	25,9290797
Secondary education	38,59	4354,8815	50,49	2047,8744	31,9842648
Higher education	3,9	440,115	6,9	279,864	38,8711337
Total	**100**	**11285**	**100**	**4056**	
Wealth					
Poorest	18,31	2066,2835	5,25	212,94	9,34265551
Poorer	20,72	2338,252	17,18	696,8208	22,9589485
Middle	20,39	2301,0115	21,23	861,0888	27,2315461
Richer	20,68	2333,738	26,9	1091,064	31,8577249
Richest	19,9	2245,715	29,44	1194,0864	34,7138181
Total	**100**	**11285**	**100**	**4056**	
Prevention knowledge					
None	78	8802,3	5,87	238,0872	2,63359516
Medium	8,45	953,5825	20,81	844,0536	46,9535297

High	13,55	1529,1175	73,32	2973,8592	66,0420739
Total	**100**	**11285**	**100**	**4056**	
Transmission knowledge					
None	74,84	8445,694	0,67	27,1752	0,32073197
Low	7,42	837,347	8,8	356,928	29,8865839
Medium	7,82	882,487	24,7	1001,832	53,1667939
High	9,92	1119,472	65,83	2670,0648	70,4588698
Total	**100**	**11285**	**100**	**4056**	
HIV stigma					
No stigma	75,11	8476,1635	14,35	582,036	6,42551536
Medium	15,07	1700,6495	69,38	2814,0528	62,3308607
High	9,82	1108,187	16,27	659,9112	37,3232211
Total	**100**	**11285**	**100**	**4056**	

Source: Authors, using Cameroonian DHS 2011

Among the enabling factors, the highest proportion of women ever been tested for HIV is observed among women who have high knowledge about the means of transmission of HIV (70.45%) and about the means of preventing HIV (66.04%). With respect to level of education, as we expected, the highest proportion is observed among women with higher level of education. The lowest proportion is observed among women with no education level. The proportion of women who were ever tested for HIV was higher among the richest, and lowest among the poorest. HIV testing was higher among women who reported having medium observed HIV stigma.

Table 3: Distribution of HIV testing and proportion of women ever been tested by need factors

Need Factors					**Proportion of women ever been tested**
	Never been tested		**Ever been tested**		
	Weighted (%)	**N**	**Weighted (%)**	**N**	**(%)**
Multiple sex partners					
No	94,36	10648,526	92,85	3765,996	26,1264022
Yes	5,64	636,474	7,15	290,004	82,0027858
Total	**100**	**11285**	**100**	**4056**	
Condom use					
No	60,72	6852,298	65,09	2640,0504	27,81254
Yes	12,21	1377,702	18,64	755,9496	35,4292763
Not sexually active	27,07	3054,8495	16,27	659,9112	17,7645683
Total	**100**	**11285**	**100**	**4056**	
Everborn					
No	32,32	3647,312	18,64	756,0384	17,169617
Yes	67,68	7637,688	81,36	3299,9616	30,1706648
Total	**100**	**11285**	**100**	**4056**	

Source: Authors, using Cameroonian DHS 2011

Women who have been engaged in multiple sexual partnerships may consider themselves to be at risk of HIV infection. Therefore, they may perceive themselves as having a need to test for HIV. It is the case in our sample, where 82% of women who reported have been engaged in multiple sexual partnerships have ever been tested for HIV. The highest proportion of HIV testing was observed among women who did use condoms in the last sexual intercourse reported (35.43%), as well as women who have reported having ever given birth (30.17%).

6.2 probit results and discussion

Table 4: Probit results and marginal effects

	Estimates (β)	Marginal effects dy/dx
Predisposing factors		
Agegroups (15-24)		
25-29	0.129** (2.36)	0.017**(2.36)
30-34	0.097 (1.55)	0.013(1.55)
35-39	-0.0523 (-0.82)	-0.007(-0.82)
40-44	-0.323*** (-4.55)	-0.043***(-4.60)
45-49	-0.476*** (-6.44)	-0.064***(-6.58)
Location (urban area)		
Rural area	-0.038 (-0.75)	-0.005(-0.75)
Mstatus (Never in union)		
Married/living with partner	0.331*** (5.69)	0.045***(5.65)
widow	0.544*** (4.95)	0.073***(5.06)
Divorced/separated	0.431*** (5.05)	0.058***(5.09)
Religion (Christians)		
Muslims	-0.276*** (-3.01)	-0.037***(-3.00)
Animist/none	0.195 (1.33)	0.026(1.34)
others	-0.332 (-0.79)	-0.044(-0.79)
Occupation (not working)		
informal sector	0.126*** (2.94)	0.0169***(2.93)
formal sector	0.232***(4.01)	0.031***(4.02)
Ethnicity (Arab)		
Southwest/Grassfields	0.512*** (8.36)	0.069***(8.29)
Bamileke/Bamoun	0.380*** (6.36)	0.052***(6.27)
Côtier/Ngoe/Oroko	0.064 (0.73)	0.009(0.73)
Beti/Bassa/Mbam	0.146** (2.55)	0.02**(2.53)
Stranger/Other	0.195* (1.93)	0.027*(1.94)
Enabling factors		
Wealth index (poorest)		
poorer	0.357*** (5.42)	0.05***(5.40)
middle	0.508*** (6.98)	0.071***(6.92)

richer	0.677*** (8.12)	0.094***(8.03)
richest	0.727*** (8.15)	0.101***(8.08)
Transmissionknowledge (None)		
Low	2.579*** (24.65)	0.371***(21.49)
Medium	2.864*** (28.20)	0.456***(27.99)
High	3.149*** (31.91)	0.541***(35.11)
Preventknowledge (None)		
Medium	0.232*** (3.50)	0.033***(3.43)
High	0.429*** (6.75)	0.061***(6.40)
Hivstigma (No stigma)		
Medium	0.192*** (3.54)	0.026***(3.49)
High	0.102 (1.58)	0.014(1.58)
Instruction (No education)		
Primary education	0.311*** (5.23)	0.043***(5.17)
Secondary education	0.563*** (7.95)	0.077***(7.85)
Higher education	1.081*** (9.67)	0.144***(10.08)
	Need factors	
Multiple sex partners (No)	0.028 (0.39)	0.004(0.39)
Condomuse (No)		
Yes	0.212*** (3.82)	0.028***(3.85)
Not sexually active	-0.183*** (-3.53)	-0.025***(-3.50)
Everborn (No)	1.059*** (19.28)	0.146***(20.66)
_cons	-5.336*** (-41.13)	
Number of obs	15.335	
LR chi2(37)	10523.88	
Prob > chi2	0.0000	
Log likelihood	-3596.129	
Pseudo R2	0.5940	

Source: By authors using Cameroonian DHS 2011

*** represents significance at 1%; ** represents significance at 5%; * represents significance at 10%. z-values are presented in parentheses.

The pseudo R-square value, a nonlinear transformation of the constrained and unconstrained maximum likelihood values, is a measure of goodness of fit. However, its interpretation is not straight forward as is the case in classical regression analysis. Pseudo R-square value of 0.5940 may be considered satisfactory for a large cross-section data set of 15.426 women. The probability value of 0.000 for the log pseudo likelihood value indicates that the explanatory variables used in the probit model are appropriate. We report on Table 4 the probit estimated coefficients alongside with the marginal effects to facilitate interpretation.

The probit results show that two age groups (30-34, 35-39), the area of residence, the animists and those from other religion, ethnicity Côtier, high observed stigma and multisexual partnership were not significant.

An examination of Table 4 indicates that there is a positive relationship between the first and second groups. As compared to younger women (reference category), women aged between 25 and 29 years old are more likely to be tested for HIV. In fact, a high proportion of married women are among women aged 25 to 29. it is also the age range where women have their first birth and thus it may that they were tested during antenatal care. The marginal effect shows that when a woman's age increases by one year in this age group, her probability of being tested increases by 1.69%. in contrast, for the last two age groups (40-44 and 45-49), the marginal effect shows that the increase in women's age by on unit decreases by 4.31% and 6.38% the probability that they get tested. This result goes against the one found by Weiser (2006) who suggests that coverage of HIV testing begins to increase after 40 years.

This can be explained by the fact that, at age 40, women are more stable in their marriages for those who are married, prioritize the education of their children, and care for their family members. This age group also corresponds to the average age of menopause, and medical personnel explain that at menopause, women experience less and less sexual desire, so there is a decline in sexual activity, so they may not feel concerned about HIV testing because they have not been exposed to the risk of contracting it.

We found that with respect to women who have never been in union, being married, widowed or divorced, is positively associated with HIV testing.

With respect to Christians women, being Muslim reduces the probability to be tested. This finding is consistent with the one of Yahara et al., 2010 and Leta et al. 2012, and contrast with Teklehaimanot (2016), who find that respondents belonging to Muslim religion were more likely to be tested. Indeed, most Muslims women belong to Muslim families where the sexuality of women remains a very taboo subject, so they may not feel concerned about HIV testing. Secondly, for religious reasons Muslim women don't further their studies as compared to those belonging to other religion. Consequently, they may not have enough knowledge about the disease. For example, many published works on prenuptial sexuality among the Biu-mandara who are Muslims in majority are unanimous: women must be virgins at the time of marriage. Premarital pregnancies are unacceptable and the consequences of non-compliance with these rules are severe (Johnson-Hanks, 2003).

There is a positive relationship between employment and the probability of being tested. in comparison to women who are unemployed, having a job either in the formal or in the informal sector increases the probability of being tested. This result is in line with studies which have shown that a woman's occupation is an important factor that influences her access to health care services, since women who are working and earning money will have greater autonomy and control over financial resources, and thus they are more able to pay for health care services.

We found a positive association between ethnicity and the probability of being tested. Compared with Arab women, women belonging to other ethnic groups are more likely to be tested. Arab women are in the majority in the northern part of the country, and most of them are Muslims. This part of the country is also the region with the lowest HIV prevalence rate. As we have mentioned above, the relative sexual freedom of women is the aspect of the Beti's social organization which show that they are at risk of HIV infection and are more likely to be

tested. After the Eastern and Southern regions where women belonging to Beti ethnicity are found in majority, the region with the highest HIV prevalence rate is the North-Western region, were women belonging to Grassfields ethnicity are found in majority. This may explain the positive relationship between belonging to these ethnic groups and the probability of being tested. The positive and significant association between belonging to the Bamileke group and the probability of being tested can be explained by the fact that Bamileke women are the most likely to have reached the level of secondary and higher education. As a consequence, They are probably more aware of the disease and therefore more likely to be tested.

There is a positive and significant relationship between wealth and HIV testing, even if the marginal effect is lower for the poorest. This positive association whatever the level of wealth indicates that regardless of the level of wealth or poverty, the Cameroonian woman feels concerned by the disease, certainly because of the media coverage that is made around HIV. the poorest women probably have ever been during free screening campaigns or during antenatal consultations when screening tests were free for pregnant women.

With respect to women who have absolutely no knowledge about the means of prevention and transmission of HIV, those who have a high knowledge about them are more likely to be tested. We must note that the high z-values indicate that there is a huge gap the number of women who have no knowledge about the means of prevention and transmission of HIV. Indeed, more than half of the women in the sample have no knowledge of how to prevent and transmit HIV.

With respect to women with no stigma, those with medium stigma are more likely to be tested. This is because they want to know their status because they have a fear of stigmatization. the fear of stigma becomes for her a source of motivation to be screened. Other studies found an observed strong inverse association between stigma and VCT uptake and suggested that fear of stigma and discrimination is an important barrier to HIV testing (Fylkesnes and Siziya, 2004; Gazimbi and Magadi, 2017).

Education level is positively and significantly related to HIV testing. The more the woman is educated, the more she is likely to be tested for HIV.

There is a positive and significant relationship between condom use and HIV testing. Other studies show inversely that people are more likely to be tested if they have risky sexual behaviours, such as inconsistent condom use (Sherr et al., 2007). A negative and significant association is found between women not sexually active and HIV testing, because they don't feel themselves at risk of HIV infection.

Having already given birth increases the probability of being tested. This is because women who have already given birth have probably been tested during antenatal care.

7. Conclusion and recommendations

The objective of this paper was to analyse the determinant of the demand of HIV testing among Cameroonian women. Andersen's Behavioural Model provided us a useful analytical framework for examining determinants of HIV testing. Indeed, this model of health care

utilization looks at three categories of determinants namely, predisposing, enabling and need factors.

The distribution of HIV testing by predisposing, enabling and need factors was done in a first step, to assess the proportion of women ever been tested. In a second step, we estimate a probit model with all these factors to analyse their relationship with the dependant variable. The main findings show that among the predisposing factors, marital status, occupation and ethnicity are positively related to HIV testing. The older the woman is, the less likely she is to be tested.

We also found that all enabling factors were positively related to HIV testing. For women, having a job either in the formal or in the informal sector increases the probability of being tested. Women who have high knowledge about the means of transmission and prevention of HIV, were more likely to be tested, with a marginal effect of 54%. The distribution of response has shown that more than half of women of the sample did not have any information or knowledge about the means of prevention and transmission of HIV. Women with a medium level of stigma were more likely to be tested. Education level is positively and significantly related to HIV testing that is the more the woman is educated, the more she is likely to be tested for HIV.

Among need factors, women who did use condom during the last sex encounter and women who have already given birth were those who were more likely to be tested for HIV, as opposed to women not sexually active.

From these results, we recommend that policies must focus on enabling factors which were positively related to HIV testing. Policies must encourage women to further their studies through the granting of scholarships. Since the demand for education is a demand derived from employment, they will have more opportunity to find a job in modern sectors of the economy, which will allow them to have greater autonomy and control over financial resources, and thus will enable them to pay for health care services. The health authorities should set up a system to provide information on means of transmission and prevention of the disease, through media, to reach a greater part of the population. for women who can not read or write, posters with very illustrative drawings can be posted in hospitals, as well as on public media. sensitization and information campaigns on the disease should continue to be carried out with the aim of reaching all the population, especially the poorest. These teams that will be in contact with women should have interpreters who can speak to them in their dialect. We also recommend a door-to-door approach to educate women in homes and markets. Women of all ethnic groups should be educated about responsible sexual behaviour. Teams that will be in contact with women should have interpreters who can speak to them in their dialect.

This study has limitations. Indeed, we could have introduced the price variable of the test in the analysis, but we were constrained by the database. Also, regarding the need factors, these are very intimate questions that are sometimes addressed to women by strangers. It is therefore possible that they are suspicious or give biased responses.

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Appendix

Table A1: Descriptive statistics

Dependant Variable : Ever been HIV tested	Obs	Mean	Std. Dev.	Min	Max
no	15,341	.7356105	.441022	0	1
yes	15,341	.2643895	.441022	0	1

- **Descriptive statistics by predisposing factors**

Variables	Obs	Mean	Std. Dev.	Min	Max
Age groups					
15-24	15,426	.4348503	.4957534	0	1
25-29	15,426	.172501	.3778275	0	1
30-34	15,426	.1236873	.3292351	0	1
35-39	15,426	.1094256	.3121826	0	1
40-44	15,426	.0825878	.2752671	0	1
45-49	15,426	.076948	.2665176	0	1
Area of residence					
Urban	15,426	.5038247	.5000016	0	1
Rural	15,426	.4961753	.5000016	0	1
Marital status					
Never in union	15,426	.2775833	.4478212	0	1
Married/living with partner	15,426	.6356152	.4812728	0	1
widow	15,426	.0307273	.1725836	0	1
Divorced/separated	15,426	.0560742	.2300723	0	1
Religion					
Christians	15,426	.9428238	.2321865	0	1
Muslims	15,426	.0422015	.2010551	0	1
Animist/none	15,426	.0119927	.1088562	0	1
others	15,426	.002982	.0545278	0	1
Occupation					
Not working	15,420	.3210117	.4668804	0	1
Informal sector	15,420	.5531777	.4971802	0	1
Formal sector	15,420	.1258106	.3316466	0	1
Ethnicity					
Arab-choa	15,426	.3053287	.4605614	0	1
Southwest/Grassfields	15,426	.1597303	.3663676	0	1
Bamileke/Bamoun	15,426	.2117853	.4085867	0	1
Côtier/Ngoe/Oroko	15,426	.043498	.2039819	0	1
Beti/Bassa/Mbam	15,426	.2496435	.4328207	0	1
Stranger/Other	15,426	.0300143	.170632	0	1

- **Descriptive statistics by enabling factors**

Variables	Obs	Mean	Std. Dev.	Min	Max
Wealth					
poorest	15,426	.1485803	.3556858	0	1
poorer	15,426	.1979126	.3984388	0	1
middle	15,426	.2066641	.4049255	0	1
richer	15,426	.2231946	.4164013	0	1
richest	15,426	.2236484	.4167026	0	1
AIDS Transmission knowledge					
None	15,426	.5495916	.4975507	0	1
Low	15,426	.078439	.2688699	0	1
Medium	15,426	.1234928	.3290127	0	1
High	15,426	.2484766	.4321436	0	1
AIDS Prevention knowledge					
None	15,426	.5864774	.4924808	0	1
Medium	15,426	.1180475	.3226748	0	1
High	15,426	.2954752	.4562709	0	1
Hiv stigma					
No stigma	15,426	.5877091	.492263	0	1
Medium	15,426	.2964476	.4567055	0	1
High	15,426	.1158434	.3200474	0	1
Level of education					
No education	15,426	.1812524	.3852397	0	1
Primary education	15,426	.3552444	.4786028	0	1
Secondary education	15,426	.4165694	.4930062	0	1
Higher education	15,426	.0469337	.2115038	0	1

- **Descriptive statistics by needs factors**

Variables	Obs	Mean	Std. Dev.	Min	Max
Multiple sex partner					
No	15,426	.9394529	.2385055	0	1
Yes	15,426	.0605471	.2385055	0	1
Condom use					
No	15,426	.6195384	.4855161	0	1
Yes	15,426	.1388565	.3458079	0	1
Not sexually active	15,426	.2416051	.42807	0	1
Everborn					
No	15,426	.2854272	.4516323	0	1
Yes	15,426	.7145728	.4516323	0	1

Source : Authors, using Cameroonian DHS 2010