

Predictors of Health-Seeking Behavior: HIV Test Experiences among Youth Aged 15-24 Years in Cameroon and Gabon

Minet Tesfai Hadish^{1,2},
Jing Mao¹, Guilan Gong¹,
Berhe Tesfai Hadish³,
Eyasu Habte Tesfamariam⁴,
Afewerki Weldezghi Tesfay⁵,
Okbmichael Tekle Zewde²,
Andom Yohannes Ghebray²
and Teame Russom Hadgu⁶

Abstract

Background: HIV testing plays a vital role in the prevention and reduction of the HIV epidemic and is a crucial measure for HIV prevention programs and services. However, reports from Cameroon and Gabon indicated low HIV testing and lack information about the predicting factors of HIV testing. Therefore, the aims of this study were to investigate the HIV testing experiences and to explore its predicting factors among 15-24 aged Cameroonian and Gabonese youth.

Methodology: This study used nationally representative datasets from Demographic and Health Surveys (DHS) of Cameroon (2011) and Gabon (2012). A total of 14,880 youth of which 9511(63.91%) from Cameroon and 5369(36.08%) from Gabon were taken. Binary multivariate logistic regression was used to investigate the associates of HIV testing using SPSS version 22.

Results: Above 14% of Cameroonian and 19% of Gabonese youth did not know where to get HIV test. In Cameroon 23.1% and in Gabon 41.6% of youth were tested for HIV in their lifetime. Only 11.7% of Cameroonian and 25.9% of Gabonese youth were tested for HIV in the last 12 months. Most of the youth tested for HIV in the last 12 months were received results of their HIV test. Variables that showed statistically significant association with HIV test and receiving HIV test results were; age, type of residence, educational level, religion, marital status, wealth index, occupation, comprehensive knowledge, and acceptance attitude. Cameroonian and Gabonese male youth were less likely to know a place to get HIV test, to be tested for HIV, tested and received HIV test results than their female counterparts.

Conclusion: Lifetime and in the last 12 months HIV test experiences among Cameroonian and Gabonese youth was very low and even significant proportion of the youth do not know where to get HIV test. Hence, both countries need to implement strategies targeting those younger, male, unmarried, not educated, not working and economically disadvantaged youth to increase their motivation and awareness towards HIV testing.

Keywords: Predictors; HIV testing; Youth; Cameroon; Gabon

- 1 School of Nursing, Tongji Medical College of Huazhong University of Science and Technology, Wuhan, China
- 2 School of Nursing, Asmara College of Health Sciences, Asmara, Eritrea
- 3 Hospital Massawa, Zoba Semenawi Keyh Bahri, Ministry of Health of Eritrea, Massawa, Eritrea
- 4 School of Public Health, Asmara College of Health Sciences, Asmara, Eritrea
- 5 School of Public Health, Tongji Medical College of Huazhong University of Science and Technology, Wuhan, China
- 6 School of Nursing, Faculty of health Sciences, Erciyes University, Turkey

Corresponding author: Mao J

✉ maojing@hust.edu.cn

School of Nursing, Tongji Medical College of Huazhong University of Science and Technology, 13Hang Kong Rd, Hankou, Wuhan, Hubei, China 430030.

Tel: 00862783692635

Fax: 00862783692635

Citation: Hadish MT, Mao J, Gong G, et al. Predictors of Health-Seeking Behavior: HIV Test Experiences among Youth Aged 15-24 Years in Cameroon and Gabon. *J Transm Dis Immun.* 2017, 1:2.

Received: April 24, 2017; **Accepted:** June 01, 2017; **Published:** June 07, 2017

Introduction

HIV testing is believed to be a cornerstone in the prevention and reduction of the HIV epidemic and is a critical measure for HIV prevention programs and services [1,2] as the major sources of HIV transmission are people living with HIV/AIDS who have not yet tested and don't know their serostatus but yet continue to

have unprotected sex [3]. A study based on a mathematical model suggested that a massive coverage of HIV testing coupled with immediate initiation of anti-retroviral treatments (ART) might

help to halt the HIV epidemic [4]. Additionally, it is a rapid and cost-effective intervention and the only means to know the HIV-status of an individual and thereby to seek medical support early and to facilitate referral for social support [5-7]. Knowing the serostatus of the youth also helps them to change their risk sexual behavior [7] and to increase the use of condom as a prevention method even among people in a stable relationship [8]. Through HIV testing, both the HIV-negative and positive individuals can be benefited. The HIV-negative people get updated information on the primary prevention from the pre- and post-test counseling and the HIV-positive people get the opportunity of accessing to the psychosocial support, linkage to care and treatment [2]. On the other hand, delay in diagnosis of HIV infection is the most substantial obstacle to accelerate HIV treatment and prevention and increases morbidity, mortality, and health care costs [9]. The main objectives of the Joint United Nations Program on HIV/AIDS (UNAIDS) are to make voluntary HIV testing services 90% accessible to help 90% of people living with HIV to know their status, especially young people and those living in a high HIV prevalent settings [10,11]. However, even though progress has been made in establishing HIV testing centers, there is a huge gap between the targeted objective and the findings on the ground that "19 million of the 35 million people living with HIV globally do not know their HIV-positive status" [12] which points out the urgency of closing the testing gap [10]. As many other countries [1,13,14], the HIV test uptake in Cameroon and Gabon found to be low [15,16]. In Cameroon, the trend of HIV testing in the general population was decreased from 573,897 in 2007 to 538,252 in 2013 [17]. In fact, there is lack of information about the HIV test experiences of youth in particular. HIV testing remains as a strategic intervention to prevent transmission and stop the epidemic especially in countries with high HIV prevalence. Of all the Western African countries, Cameroon was the first highly HIV prevalent country followed by Gabon in 2014 [3,4]. In spite of the decrease of the new infection by 41% in sub-Saharan Africa between 2000 and 2014, the prevalence of HIV/AIDS has increased from 4.3% in 2011 to 4.8% in Cameroon, and a minimal decrease in Gabon from 4.1% in 2012 to 3.9% in 2014 [18-22]. Globally, youth are particularly affected by HIV and half of the new infections are among 15-24 years old youth [23,24]. Worldwide new HIV infection among youth in 2010 was 42% out of which 80% were living in sub-Saharan Africa [25]. Based on the world Health Organization (WHO) report, every day 6000 youth are infected with HIV [26]. Hence, the number of AIDS-related deaths among youth increased by 50% between 2005 and 2012 [27]. More specifically, in Cameroon, 2.7% of young women and 0.5% of young men were living with HIV in 2011 [17] and in Gabon it was 1.5% of youth in 2012 [16]. In this regard, UNAIDS in its program, the fragile window of opportunity to fast-track the AIDS response '2016 to 2020', has identified Gabon with the countries that need a focused action and Cameroon among the 35 countries in which special focus and scaled up efforts are needed [28]. Advancing HIV test centers and making them more accessible and visible encourages HIV testing uptake among youth. Moreover, understanding of the determining factors to predict HIV testing is the cornerstone to advance the coverage of HIV testing thereby to control the HIV transmission [2,3]. Studies from other countries

revealed that age, type of residence, education, marital status, HIV-related stigma, occupation, low socioeconomic status, and HIV/AIDS knowledge as the main determining factors to predict HIV testing [1,2,13,14,29-32]. However, to our knowledge, no study has been done to investigate the predictors of HIV test among Gabonese and Cameroonian youth. Similarly, in Gabon, lack of studies on the epidemic focused on specific groups was underlined as one of the main challenges on the national report on the response to HIV/AIDS in 2014 [16]. Therefore, the aims of this study were to investigate the HIV testing experiences and to explore its predicting factors among 15-24 aged Cameroonian and Gabonese youth.

Method and Design

Data source

This study used DHS data conducted in Cameroon (2011) and Gabon (2012) which are the most recently available DHS data on the two countries as of June 2016 [33]. The DHS is a nationally representative household survey, which collects data on a wide range of health indicators including HIV/AIDS. It is conducted based on multistage cluster sampling method and by probability proportional to size which enables us to generate a nationally representative sample. First, geographic units commonly known as primary sample units (PSU) are sampled within the country, and then a random sample of households are selected with a known probability. Interviews are conducted with all women aged 15-49 and men 15-59 who spent the previous night in the household. During the collection of data, interviewers use a standardized questionnaire to gather information from participants in each country, providing an internationally accepted, comparable and consistent data among countries [34]. The data collection method in DHS is defined and published elsewhere [34-37]. In this study, nationally representative sample of 14,880 youth 15-24 years old selected by probability proportional to size was filtered from the DHS data files of the two countries. Selection of the countries was determined by being the most HIV prevalent West African countries. Variables of HIV test were selected and re-categorized based on the MEASURE DHS online tools for HIV/AIDS survey indicators database [37].

Measures

Independent variables

The explanatory variables of the survey respondents like the level of education, place of residence, and wealth index were taken as they appeared in the DHS data files. The study used only the first two age groups, 15-19 and 20-24 from the seven 5-year groups created in the data files. Marital status was re-categorized into three: never in union, currently in union (married and living with a partner), and formerly in union (widowed, divorced and separated or no longer living together). Religion of the respondents was grouped into categories which varied between the two countries. Hence, it was recoded into four groups: 'Christian'- (Catholic, Protestant, Methodist, Evangelical and other Christians), 'Muslim', 'other religion' - (Animist and other

religions) and 'no religion'. The various categories of occupation in the two countries were re-grouped to working (involving in different works) and not working.

Definition of dependent variables

Voluntary HIV Counseling and Testing (VCT) is defined as the way to make an informed choice to know an individuals' HIV-status and to take suitable action through confidential counseling [1]. In this context, in the present study respondents were assessed whether they know a place to get HIV test, ever been tested in their lifetime, tested in the last 12 months, and tested and received results in the last 12 months. All the variables were binary variable containing a "YES" or "NO" answers, coded 0 if the answer is "NO" and 1 otherwise.

Statistical Analysis

The study used SPSS version 22 to analyze the DHS data. Binary logistic regression was used for multivariate analysis to examine the significance of the HIV test variables against the selected factors to predict HIV test among youth. Odds ratio and 95 percent

confidence interval were used to observe the associations and comparisons by taking p-values less than 0.05 as significant. In every part of the analysis, missed values were not considered.

Ethical consideration

The DHS survey is approved by the Institutional Review Board of ICF Macro in Calverton, Maryland, USA. In all countries, DHS study participants give informed consent before participation and all information is collected confidentially by removing all the identifiers of the participants. Permission for use of the raw data in the present study has been obtained from ICF Macro Inc. in Calverton, Maryland, USA.

Results

Characteristics of the respondents

Socio-demographic characteristics of the survey respondents are presented in **Table 1**. A total of 14,880 youth aged 15-24 years; 4765 (32.0%) males and 10,115 (68.0%) females were included. The mean age of the respondents' was 19.15±2.82 years. The

Table 1 Socio demographic characteristics of participants.

Variables	CAMEROON		GABON	
	Female (N=6708) N (%)	Male (N=2803) N (%)	Female (N=3407) N (%)	Male (N=1962) N (%)
Age				
15-19	3590 (53.5)	1612 (57.5)	1834 (53.8)	1192 (60.8)
20-24	3118 (46.5)	1191 (42.5)	1573 (46.2)	770 (39.2)
Type of residence				
Urban	3585 (53.4)	1561 (55.7)	2476 (72.7)	1403 (71.5)
Rural	3123 (46.6)	1242 (44.3)	931 (27.3)	559 (28.5)
Educational status				
No education	771 (11.5)	134 (4.8)	76 (2.2)	44 (2.2)
Primary	1984 (29.6)	754 (26.9)	872 (25.6)	492 (25.1)
secondary	3698 (55.1)	1770 (63.1)	2374 (69.7)	1389 (70.8)
Higher	255 (3.8)	145 (5.1)	85 (2.5)	37 (1.9)
Religion				
Christian	5072 (76.9)	2066 (74.5)	2975 (87.4)	1459 (74.4)
Muslim	1340 (20.3)	570 (20.6)	150 (4.4)	97 (4.9)
Other religion	73 (1.1)	28 (1.0)	33 (1.0)	24 (1.2)
No religion	110 (1.7)	108 (3.9)	247 (7.3)	381 (19.4)
Marital status				
Never in union	3637 (54.2)	2511 (89.6)	2188 (64.2)	1752 (89.3)
Currently in union	2834 (42.2)	261 (9.3)	1083 (31.8)	174 (8.9)
Formerly in union	237 (3.5)	31 (1.1)	136 (4.0)	36 (1.8)
Wealth index				
Poorest	865 (12.9)	368 (13.1)	1156 (33.9)	681 (34.7)
poorer	1254 (18.7)	471 (16.8)	817 (24.0)	494 (25.2)
Middle	1395 (20.8)	584 (20.8)	555 (16.3)	281 (14.3)
Richer	1638 (24.4)	679 (24.2)	478 (14.0)	253 (12.1)
Richest	1556 (23.2)	701 (25.0)	401 (11.8)	253 (12.1)
Occupation				
Not working	3428 (51.1)	808 (28.8)	2598 (76.3)	1088 (55.5)
Working	3280 (48.9)	1995 (71.2)	809 (23.7)	874 (44.5)
†Religion & Occupation are recategorized				

majority were from urban, secondary in education, Christianity in religion and never in union in marital status. In Cameroon, an increasing pattern of percentages was observed with increase of wealth index from the poorest to the richest, whereas, the opposite was seen in Gabon.

History of HIV test experiences among youth

The HIV test experiences of youth are presented in **Figure 1**. Above 14% of Cameroonian youth (14.3% of males and 14.1% of females), and 19% of Gabonese youth (female=16% and males 25.4%) did not know where to get HIV test. In Cameroon, 23.1% of youth (22.2% of females and 25.3% of males) and in Gabon 41.6% of youth (53.2% of females and 21.5% of males) were tested for HIV in their lifetime. However, only 11.7% of Cameroonian (11% of females and 13.6% of males) and 25.9% of Gabonese (33% of females and 13.55% males) youth were tested for HIV in the previous 12 months. Most of the youth tested for HIV in the last 12 months, 86.5% of Cameroonian and 95.5% of Gabonese youth, received results of their HIV test. The main reasons for HIV test among Cameroonian youth were asked for the test (46.9%), offered and accepted (40.70%) and required (12.4%). However, this type of data was not available in the DHS data files of Gabon.

Comparison by country and gender

Comparisons of HIV testing by country are shown in **Table 2**. Gabonese male (AOR=0.47, $p<0.001$) and female (AOR=0.64,

$p<0.001$) youth were less likely to know a place where to get HIV test compared to Cameroonian youth. However, Gabonese youth were more likely to be tested for HIV in their lifetime (females AOR=1.44, $p<0.001$), in the last 12 months (males AOR=1.31, $p=0.014$ and females AOR=1.65, $p<0.001$) and to be tested and received results (males AOR=1.37, $p=0.005$ and females AOR= 1.65, $p<0.001$) than Cameroonian youth. Lifelong HIV test experience among males was not statistically significant. Comparison of HIV testing by gender is presented in **Table 3**. Males were less likely to know a place where to get HIV test (Cameroonian AOR=0.76, $p=0.008$ and Gabonese AOR=0.61, $p<0.001$), ever been tested for HIV (Cameroonian AOR=0.36, $p<0.001$ and Gabonese AOR=0.23, $p<0.001$), to be tested in the last 12 months (Cameroonian AOR=0.56, $p<0.001$ and Gabonese AOR=0.33, $p<0.001$), and tested and received results in the last 12 months (Cameroonian AOR=0.54, $p<0.001$ and Gabonese AOR=0.33, $p<0.001$) than female youth in both countries.

Multivariate analysis of the predicting factors of HIV test among youth

Knowledge of youth to a place where to get HIV test

Table 4 presents the multivariate analysis of knowledge of youth to a place where to get HIV test. The 20-24 aged youth and urban

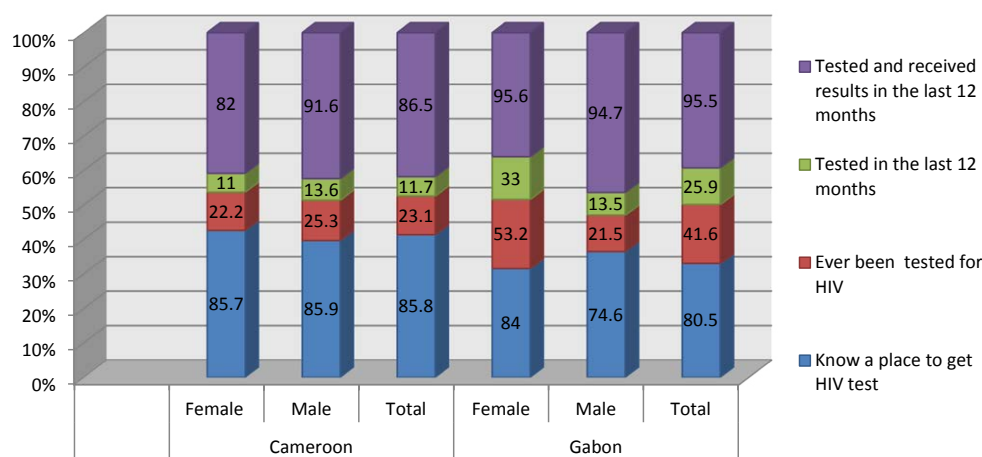


Figure 1 HIV test experiences of the respondents.

Table 2: Multivariate analysis showing Comparison of HIV testing by country.

Variable	GENDER	Country	AOR	95%CI	P
Know a place to get HIV test	Male	Gabon (Ref=Cameroon)	0.47	0.38-0.57	<0.001
	Female	Gabon (Ref=Cameroon)	0.64	0.52-0.78	<0.001
Ever been tested for HIV	Male	Gabon (Ref=Cameroon)	1.07	0.88-1.28	0.508
	Female	Gabon (Ref=Cameroon)	1.44	1.25-1.66	<0.001
Tested in the last 12 months	Male	Gabon (Ref=Cameroon)	1.31	1.06-1.63	0.014
	Female	Gabon (Ref=Cameroon)	1.65	1.43-1.90	<0.001
Tested and received results in the last 12 months	Male	Gabon (Ref=Cameroon)	1.37	1.09-1.71	0.005
	Female	Gabon (Ref=Cameroon)	1.65	1.42-1.90	<0.001

residents of both countries and both gender groups were more likely to know a place to get HIV test than their 15-19 age group counterparts and rural residents, respectively. An increased adjusted odds ratio (AOR) of knowing a place to get HIV test was observed with increased educational status from primary to higher than youth with no education in both countries. Regarding religion, only Gabonese Christian females (AOR=1.53, p=0.020) and males (AOR=1.46, p=0.007) were more likely to know a place to get HIV test. Currently married female youth in Cameroon (AOR=1.64, p=0.001) and currently married (AOR=1.91, p<0.001) and formerly married female youth (AOR=5.01, p=0.002) in Gabon were more likely to know a place to get HIV test compared to never married youth. The AOR of knowing a place to get HIV test among Cameroonian youth showed a congruent increment with the wealth category status from the poorer to the richest, however, only the poorer female youth showed significant association compared to the poorest in Gabon. Cameroonian working males (AOR=1.93, p<0.001) and Gabonese working females (AOR=1.66, p<0.001) were more likely to know a place to get HIV test than those who do not work. Cameroonian both gender groups and Gabonese female youth with comprehensive HIV/AIDS knowledge and acceptance attitude were more likely to know a place to get HIV test compare to youth without comprehensive HIV/AIDS knowledge and acceptance attitude, respectively.

Lifelong HIV test experiences among youth

The multivariate analysis of the lifelong HIV test experiences among youth is presented in **Table 5**. The 20-24 years old youth were more likely to be tested in their lifetime than their 15-19 years old counterparts. The AOR of lifetime HIV testing among youth was found to be increased with the increase of educational status. There was no significant difference among the urban-rural residents and the different religions of the respondents towards lifetime HIV testing. Currently married and formerly married youth were more likely to be tested in their lifetime (except the Gabonese formerly married males) than never in union youth. Lifelong HIV testing has shown a significant positive association with wealth index among Cameroonian youth and the poorer group of Gabonese youth compared to the poorest. Working youth were more likely to be tested for HIV in their lifetime (except Cameroonian males) compared to not working youth. Among Cameroonian youth, comprehensive HIV/AIDS knowledge was significantly associated with lifelong HIV testing. Only Cameroonian males with acceptance attitude were more likely to be tested in their lifetime compared to youth with no acceptance attitude.

HIV testing in the last 12 months

The multivariate analysis of HIV testing in the last 12 months among youth is presented in **Table 6**. In both countries and both genders, the 20-24 age groups were more likely to be tested for HIV in the last 12 months than the 15-19 aged youth. Education was significantly associated with HIV testing in the last 12 months in Cameroon except for males with primary education (AOR=4.82, p=0.124). However, in Gabon, only males with secondary education (AOR=6.15, p=0.018) showed a significant difference compared to the youth with no education. Cameroonian Moslem males were less likely to be tested for HIV (AOR=0.47, p=0.033) compared to youth with no religion. Currently married and formerly married youth were more likely to be tested for HIV compared to never in union youth. Wealth index of the respondents was significantly associated with HIV testing. Cameroonian female and Gabonese male working youth were more likely to be tested for HIV compare to not working. Cameroonian males and Gabonese females with comprehensive knowledge were more likely to be tested for HIV than youth without comprehensive knowledge. Place of residence and acceptance attitude were not significantly associated with HIV testing in the last 12 months.

HIV testing and receiving results in the last 12 months

The multivariate analysis of HIV testing and receiving results in the last 12 months is presented in **Table 7**. The 20-24 age group of both countries and both genders were more likely to be tested and received results of HIV tests compared to the 15-19 age group. In Cameroon primary (AOR=3.36, p<0.001), secondary (AOR=5.84, p<0.001), and higher (AOR=9.97, p<0.001) educated females and secondary (AOR=10.29, p=0.023) and higher (AOR=22.57, p=0.003) educated males, as well as in Gabon secondary (5.23, p=0.032) educated males were more likely to be tested and received results of HIV test than youth with no education. Currently and formerly married youth were more likely to be tested and received results than never in union youth except for formerly married Cameroonian males and currently and formerly married Gabonese males. The AOR of HIV testing and receiving results was increased with the rise of wealth index among Cameroonian females from the poorer to the richest and among Cameroonian and Gabonese males from the middle to the richest compared to the poorest. Cameroonian working females and Gabonese working males, as well as Cameroonian males and Gabonese females with comprehensive knowledge, were more likely to be tested and received results of HIV test

Table 3 Multivariate analysis showing Comparison of HIV testing by Gender.

Variables	Gender	Cameroon			Gabon		
		AOR	95% CI	P	AOR	95% CI	P
Know a place to get HIV test	Male (Ref=Female)	0.76	0.62-0.93	0.008	0.61	0.52-0.73	<0.001
Ever been tested for HIV	Male (Ref=Female)	0.36	0.31-0.41	<0.001	0.23	0.20-0.27	<0.001
Tested in the last 12 months	Male (Ref=Female)	0.56	0.48-0.66	<0.001	0.33	0.27-0.39	<0.001
Tested and received results in the last 12 months	Male (Ref=Female)	0.54	0.46-0.64	<0.001	0.33	0.27-0.39	<0.001

Table 4: Multivariate analysis showing associates of knowledge of a place to get HIV test among youth.

Variable	Cameroon						Gabon					
	Female			Male			Female			Male		
	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI	P
Age (Ref=15-19)												
20-24	2.23	1.68-2.96	<0.001	2.24	1.67-3.02	<0.001	2.86	2.21-3.71	<0.001	2.21	1.69-2.89	<0.001
Place of Residence (Ref=Rural)												
Urban	1.38	0.95-2.00	0.089	1.75	1.20-2.54	0.004	1.48	1.16-1.90	0.002	1.68	1.27-2.22	<0.001
Highest Education level (Ref=No Education)												
Primary	2.15	1.52-3.04	<0.001	1.75	1.10-2.79	0.019	1.26	0.63-2.50	0.516	4.23	1.96-9.15	<0.001
Secondary	7.52	4.79-11.81	<0.001	6.95	4.17-11.57	<0.001	3.9	1.96-7.77	<0.001	7.41	3.48-15.79	<0.001
Higher	-	-	-	7.38	2.05-26.62	0.002	5.88	1.51-22.91	0.011	-	-	-
†Religion (Ref=No religion)												
Christian	1.37	0.70-2.71	0.361	1.39	0.81-2.41	0.235	1.53	1.07-2.19	0.020	1.46	1.11-1.92	0.007
Moslem	0.77	0.38-1.55	0.458	1.41	0.79-2.53	0.248	0.92	0.49-1.73	0.786	1.15	0.63-2.10	0.655
Other	5.80	0.64-52.65	0.118	0.96	0.23-3.97	0.949	1.38	0.44-4.35	0.586	1.2	0.44-3.26	0.728
†Marital Status (Ref=Never in Union)												
Currently married	1.64	1.21-2.21	0.001	0.89	0.57-1.39	0.613	1.91	1.45-2.51	<0.001	1.58	0.97-2.57	0.065
Formerly married	1.43	0.74-2.77	0.293	0.72	0.24-2.15	0.561	5.01	1.79-14.03	0.002	2.14	0.70-6.57	0.182
Wealth Index (Ref=Poorest)												
Poorer	2.24	1.60-3.13	<0.001	1.64	1.15-2.33	0.006	1.61	1.19-2.17	0.002	0.78	0.57-1.07	0.125
Middle	3.08	2.04-4.66	<0.001	2.53	1.68-3.82	<0.001	1.25	0.88-1.77	0.209	0.87	0.60-1.27	0.46
Richer	3.83	2.28-6.46	<0.001	2.12	1.30-3.47	0.003	1.08	0.76-1.55	0.665	0.91	0.61-1.35	0.622
Richest	3.72	2.05-6.76	<0.001	3.76	2.09-6.74	<0.001	1.26	0.84-1.91	0.264	1.33	0.85-2.07	0.213
†Occupation (Ref=Not Working)												
Working	0.93	0.72-1.21	0.605	1.93	1.43-2.60	<0.001	1.66	1.25-2.19	<0.001	1.17	0.92-1.49	0.202
††Comprehensive knowledge (Ref=No)												
Yes	2.65	1.77-3.96	<0.001	2.57	1.83-3.63	<0.001	1.39	1.05-1.84	0.022	1.07	0.82-1.39	0.616
†††Acceptance attitude (Ref=No)												
Yes	2.26	1.28-4.01	0.005	1.75	1.15-2.66	0.009	1.9	1.40-2.59	<0.001	1.57	1.20-2.06	0.001

†Religion, marital status and occupation are re-categorized

††Comprehensive knowledge was defined as (1) knowing that both condom use and limiting sex partners to one uninfected faithful partner are HIV prevention methods, (2) being aware that a healthy looking person can have the AIDS virus, and (3) rejecting two most common local misconceptions (the two most common local misconceptions in Cameroon and Gabon were; that the AIDS virus can be transmitted through mosquito bites, and by supernatural means).

†††To assess acceptance attitudes of the respondents towards PLHA, respondents were asked if they would (1) be willing to care for a relative sick with the AIDS virus, (2) be willing to buy fresh vegetables from a market vendor who had the AIDS virus, (3) say that a female teacher who has the AIDS virus but is not sick should be allowed to continue teaching, and (4) not want to keep a family member's HIV positive status secret.

compared to not working and without comprehensive knowledge youth, respectively. Place of residence and acceptance attitude of respondents was not significantly associated with HIV test and receiving results.

Discussion

History of HIV test experiences among youth

HIV test is an acute measure for HIV prevention programs and services [1], nevertheless, the HIV test experience among youth of both countries in this study was very low even considerable part of the youth didn't know where to get HIV testing. Other studies from Cameroon, Gabon, and other countries had reported

similar low results [1,7,13-16]. Though similar data was not available in the DHS data files of Gabon, the main reasons for HIV test uptake among Cameroonian youth were found to be asked for the test, offered and accepted, and required which indicates their low awareness, as they did not do it voluntarily. However, a welcoming achievement was found in receiving results of HIV testing which is higher than in many African countries [3]. The causes for the decreased awareness and HIV test uptake among youth can be many, for example, their own lack of knowledge and information about HIV/AIDS [38], limitations of the countries to provide the services due to some shortages like human, financial, material and technical resources and others like inadequate involvement of community volunteers or spiritual

Table 5: Multivariate analysis showing associates of lifelong HIV test among youth.

Variable	Cameroon						Gabon					
	Female			Male			Female			Male		
	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI	P
Age (Ref=15-19)												
20-24	3.10	2.59-3.73	<0.001	3.03	2.45-3.75	<0.001	3.56	3.00-4.22	<0.001	2.99	2.30-3.88	<0.001
Place of Residence (Ref=Rural)												
Urban	1.12	0.88-1.42	0.357	1.21	0.91-1.61	0.191	1.03	0.84-1.25	0.796	1.01	0.74-1.40	0.931
Highest Education level (Ref=No Education)												
Primary	2.95	2.03-4.30	<0.001	2.36	0.91-6.15	0.079	1.05	0.56-1.97	0.878	1.49	0.57-3.89	0.421
Secondary	5.54	3.68-8.34	<0.001	6.81	2.64-17.56	<0.001	1.77	0.95-3.28	0.071	2.67	1.06-6.74	0.037
Higher	8.78	4.70-16.41	<0.001	21.75	7.72-61.27	<0.001	3.64	1.55-8.56	0.003	8.92	2.65-30.02	<0.001
†Religion (Ref=No religion)												
Christian	1.19	0.65-2.17	0.571	1.14	0.65-2.01	0.651	1.26	0.92-1.74	0.156	0.86	0.64-1.17	0.347
Moslem	0.92	0.49-1.73	0.794	1.01	0.55-1.85	0.975	1.06	0.63-1.78	0.841	0.94	0.53-1.68	0.839
Other	1.17	0.45-3.04	0.745	0.73	0.22-2.39	0.603	2.00	0.80-5.02	0.140	0.32	0.07-1.48	0.145
†Marital Status (Ref=Never in Union)												
Currently married	3.45	2.81-4.24	<0.001	2.06	1.48-2.85	<0.001	2.61	2.15-3.16	<0.001	1.80	1.23-2.64	0.003
Formerly married	3.68	2.30-5.88	<0.001	2.49	1.04-5.95	0.040	3.42	2.12-5.52	<0.001	0.70	0.29-1.71	0.435
Wealth Index (Ref=Poorest)												
Poorer	2.88	2.00-4.14	<0.001	1.72	1.06-2.78	0.028	1.40	1.12-1.75	0.003	1.21	0.84-1.73	0.302
Middle	3.25	2.20-4.81	<0.001	2.09	1.29-3.38	0.003	1.16	0.90-1.51	0.246	1.38	0.91-2.09	0.135
Richer	4.28	2.80-6.55	<0.001	2.43	1.47-4.02	0.001	1.19	0.91-1.57	0.211	2.14	1.41-3.26	0.000
Richest	3.89	2.50-6.05	<0.001	2.63	1.56-4.42	<0.001	0.76	0.56-1.02	0.068	3.07	2.02-4.67	0.000
†Occupation (Ref=Not Working)												
Working	1.48	1.23-1.77	<0.001	1.25	0.99-1.58	0.061	1.37	1.13-1.67	0.002	1.70	1.31-2.20	<0.001
††Comprehensive knowledge (Ref=No)												
Yes	1.33	1.10-1.61	0.003	1.66	1.36-2.04	<0.001	1.20	0.99-1.45	0.059	1.18	0.90-1.53	0.227
†††Acceptance attitude (Ref=No)												
Yes	1.08	0.84-1.40	0.541	1.44	1.14-1.82	0.002	1.00	0.82-1.21	0.962	1.07	0.82-1.40	0.605

†Religion, marital status and occupation are re-categorized

††Comprehensive knowledge was defined as (1) knowing that both condom use and limiting sex partners to one uninfected faithful partner are HIV prevention methods, (2) being aware that a healthy looking person can have the AIDS virus, and (3) rejecting two most common local misconceptions (the two most common local misconceptions in Cameroon and Gabon were; that the AIDS virus can be transmitted through mosquito bites, and by supernatural means).

†††To assess acceptance attitudes of the respondents towards PLHA, respondents were asked if they would (1) be willing to care for a relative sick with the AIDS virus, (2) be willing to buy fresh vegetables from a market vendor who had the AIDS virus, (3) say that a female teacher who has the AIDS virus but is not sick should be allowed to continue teaching, and (4) not want to keep a family member's HIV positive status secret.

heads [16,17]. Other studies also indicated that knowing a place where to get HIV testing as one of the determining factors among HIV-positive and negative people whether to be tested for HIV [13,32,39]. Therefore, the governments, political and religious leaders, United Nations Agencies, national and international organizations, different stakeholders, private sectors, civil societies as volunteers and significant figures from community need to be effectively involved and integrate their efforts and play their model role to scale up HIV test among youth to curb HIV transmission. Besides, both expanding the coverage and accessibility of HIV test services and integrating the regular screening for HIV with the health care system may encourage youth thereby to facilitate HIV testing [4,39].

Comparison by country and gender

Gabonese youth were more likely to get tested for HIV in their lifetime, in the last 12 months and to be tested and received HIV test results than Cameroonian youth. The difference of HIV testing in the two countries may depend on their economy, in Gabon around 92% of the investment to fight against HIV was covered by the government and other Gabonese private sectors and only 8% was funded from international organizations [16]. Hence the involvement of the civil societies may increase the HIV testing among the people. However, in Cameroon dominantly was covered by the donation of international funds [17]. Moreover, the lack of human, financial and technical resources [17] may limit the provision of broad HIV testing in Cameroon. Males were less likely to know a place to get HIV test, to ever

Table 6 Multivariate analysis showing associates of HIV test in the last 12 months among youth.

Variable	Cameroon						Gabon					
	Female			Male			Female			Male		
	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI	P
Age (Ref=15-19)												
20-24	1.75	1.43-2.14	<0.001	2.67	2.05-3.48	<0.001	1.88	1.58-2.23	<0.001	2.53	1.87-3.43	<0.001
Place of Residence (Ref=Rural)												
Urban	1.05	0.81-1.36	0.713	0.98	0.70-1.38	0.905	1.20	0.98-1.45	0.074	1.19	0.81-1.75	0.380
Highest Education level (Ref=No Education)												
Primary	3.64	2.05-6.49	<0.001	4.86	0.65-36.45	0.124	0.95	0.51-1.78	0.876	3.51	0.75-16.47	0.112
Secondary	5.86	3.23-10.63	<0.001	11.93	1.61-88.33	0.015	1.40	0.76-2.59	0.281	6.15	1.36-27.79	0.018
Higher	9.76	4.74-20.09	<0.001	23.58	3.07-181.43	0.002	1.71	0.78-3.72	0.179	4.29	0.79-23.50	0.093
†Religion (Ref=No religion)												
Christian	1.41	0.68-2.91	0.353	0.68	0.37-1.27	0.228	1.24	0.90-1.71	0.188	0.80	0.57-1.15	0.227
Moslem	1.07	0.50-2.29	0.865	0.47	0.24-0.94	0.033	0.88	0.53-1.47	0.635	0.87	0.45-1.69	0.686
Other	1.61	0.56-4.60	0.378	0.33	0.07-1.68	0.180	1.68	0.73-3.84	0.222	0.28	0.04-2.18	0.222
†Marital Status (Ref=Never in Union)												
Currently married	2.49	2.01-3.07	<0.001	2.04	1.40-2.97	<0.001	1.62	1.35-1.94	<0.001	1.33	0.85-2.06	0.213
Formerly married	1.82	1.14-2.91	0.012	1.72	0.63-4.68	0.290	1.56	1.07-2.27	0.021	0.15	0.02-1.13	0.065
Wealth Index (Ref=Poorest)												
Poorer	2.62	1.61-4.28	<0.001	2.22	1.05-4.66	0.036	1.18	0.95-1.46	0.142	1.35	0.88-2.09	0.173
Middle	2.59	1.55-4.33	<0.001	3.60	1.75-7.41	0.001	1.11	0.87-1.43	0.393	1.63	0.99-2.66	0.054
Richer	3.45	2.01-5.91	<0.001	4.77	2.27-9.99	<0.001	1.16	0.89-1.51	0.276	2.43	1.48-3.98	<0.001
Richest	3.28	1.88-5.71	<0.001	5.07	2.38-10.79	<0.001	0.79	0.58-1.06	0.115	3.28	2.02-5.32	<0.001
†Occupation (Ref=Not Working)												
Working	1.27	1.05-1.55	0.015	1.20	0.91-1.59	0.204	1.10	0.92-1.32	0.304	1.83	1.35-2.48	<0.001
††Comprehensive knowledge (Ref=No)												
Yes	1.18	0.97-1.44	0.108	1.59	1.25-2.04	<0.001	1.21	1.01-1.45	0.036	1.13	0.84-1.53	0.426
†††Acceptance attitude (Ref=No)												
Yes	1.16	0.90-1.51	0.258	1.24	0.94-1.64	0.125	1.01	0.84-1.23	0.887	1.03	0.76-1.39	0.865

†Religion, marital status and occupation are re-categorized

††Comprehensive knowledge was defined as (1) knowing that both condom use and limiting sex partners to one uninfected faithful partner are HIV prevention methods, (2) being aware that a healthy looking person can have the AIDS virus, and (3) rejecting two most common local misconceptions (the two most common local misconceptions in Cameroon and Gabon were; that the AIDS virus can be transmitted through mosquito bites, and by supernatural means).

†††To assess acceptance attitudes of the respondents towards PLHA, respondents were asked if they would (1) be willing to care for a relative sick with the AIDS virus, (2) be willing to buy fresh vegetables from a market vendor who had the AIDS virus, (3) say that a female teacher who has the AIDS virus but is not sick should be allowed to continue teaching, and (4) not want to keep a family member's HIV positive status secret.

been tested for HIV and in the last 12 months, and to be tested and received results than female youth in both countries. The result of this study coincides with findings of other many studies [2,3,13-15,31,40,41]. Studies found that the reason for HIV testing uptake among females was accepting testing when it is offered, while among males it was voluntary testing [31] and significantly determined by the individual's economic status, behavior and knowledge of HIV/AIDS [42]. Therefore, the differences between male and female HIV test experiences may be directly explained by the increased rate of utilization of HIV test among females as part of the antenatal care [2,14,29,40].

Predicting factors of HIV testing among youth

The 20-24 age group youth were more likely to know a place to get HIV test, tested in their lifetime and in the last 12 months,

and to be tested and received results compared to their 15-19 aged youth counterparts. Other studies from Tanzania and South Africa and Caribbean countries also reported similar findings [29,30,41]. It might be suggested that, with advancing in age, they may become more educated to increase their awareness and economically stable to be tested for HIV. Being urban resident was significantly associated to know a place to get HIV test but it was not significantly associated with testing in their lifetime, in the last 12 months, and testing and receiving results of HIV test in both countries compare to the rural residents. However, studies have been indicated that HIV test rates are higher in urban residents [3,13,14,30,41]. In this study, above 93% of the respondents had primary or above educational level and hence the urban-rural differences may be narrowed by their increased awareness due to education. An increased

Table 7 Multivariate analysis showing associates of HIV test and receive results in the last 12 months among youth.

Variable	Cameroon						Gabon					
	Female			Male			Female			Male		
	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI	P	AOR	95% CI	P
Age (Ref=15-19)												
20-24	1.66	1.35-2.04	<0.001	2.52	1.91-3.33	<0.001	1.89	1.59-2.25	<0.001	2.63	1.93-3.58	<0.001
Place of Residence (Ref=Rural)												
Urban	1.07	0.82-1.39	0.630	0.94	0.66-1.34	0.746	1.22	1.00-1.48	0.054	1.29	0.86-1.93	0.213
Highest Education level (Ref=No Education)												
Primary	3.63	2.01-6.58	<0.001	3.75	0.50-28.33	0.200	1.13	0.60-2.16	0.704	3.08	0.65-14.54	0.156
Secondary	5.84	3.17-10.79	<0.001	10.29	1.39-76.32	0.023	1.61	0.86-3.03	0.141	5.23	1.15-23.74	0.032
Higher	9.97	4.76-20.91	<0.001	22.57	2.93-174.10	0.003	1.82	0.82-4.03	0.142	3.83	0.70-20.99	0.122
†Religion (Ref=No religion)												
Christian	1.49	0.70-3.17	0.297	0.65	0.34-1.23	0.181	1.22	0.88-1.68	0.237	0.85	0.59-1.22	0.384
Moslem	1.12	0.51-2.47	0.780	0.46	0.23-0.94	0.032	0.97	0.58-1.62	0.911	0.81	0.40-1.62	0.546
Other	1.83	0.63-5.35	0.268	0.36	0.07-1.78	0.208	1.78	0.78-4.09	0.172	0.31	0.04-2.47	0.271
†Marital Status (Ref=Never in Union)												
Currently married	2.59	2.09-3.20	<0.001	2.00	1.35-2.97	0.001	1.57	1.31-1.89	<0.001	1.32	0.84-2.08	0.228
Formerly married	1.87	1.16-3.02	<0.001	2.01	0.73-5.52	0.177	1.50	1.03-2.18	0.036	0.16	0.02-1.22	0.077
Wealth Index (Ref=Poorest)												
Poorer	2.58	1.55-4.28	<0.001	1.95	0.89-4.30	0.097	1.16	0.93-1.45	0.180	1.37	0.88-2.15	0.169
Middle	2.65	1.56-4.50	<0.001	3.64	1.71-7.76	0.001	1.09	0.85-1.40	0.491	1.69	1.02-2.81	0.041
Richer	3.59	2.06-6.25	<0.001	4.77	2.20-10.34	<0.001	1.12	0.85-1.46	0.422	2.59	1.57-4.29	<0.001
Richest	3.39	1.91-6.01	<0.001	4.85	2.20-10.70	<0.001	0.79	0.58-1.07	0.124	3.25	1.97-5.35	<0.001
†Occupation (Ref=Not Working)												
Working	1.26	1.03-1.53	0.025	1.18	0.88-1.57	0.274	1.10	0.91-1.32	0.315	1.75	1.29-2.39	<0.001
††Comprehensive knowledge (Ref=No)												
Yes	1.12	0.91-1.37	0.288	1.72	1.33-2.22	<0.001	1.29	1.07-1.54	0.007	1.1	0.81-1.50	0.537
†††Acceptance attitude (Ref=No)												
Yes	1.14	0.87-1.49	0.344	1.29	0.97-1.72	0.081	1.03	0.85-1.24	0.798	1.12	0.82-1.52	0.481

†Religion, marital status and occupation are re-categorized

††Comprehensive knowledge was defined as (1) knowing that both condom use and limiting sex partners to one uninfected faithful partner are HIV prevention methods, (2) being aware that a healthy looking person can have the AIDS virus, and (3) rejecting two most common local misconceptions (the two most common local misconceptions in Cameroon and Gabon were; that the AIDS virus can be transmitted through mosquito bites, and by supernatural means).

†††To assess acceptance attitudes of the respondents towards PLHA, respondents were asked if they would (1) be willing to care for a relative sick with the AIDS virus, (2) be willing to buy fresh vegetables from a market vendor who had the AIDS virus, (3) say that a female teacher who has the AIDS virus but is not sick should be allowed to continue teaching, and (4) not want to keep a family member's HIV positive status secret.

AOR of knowing a place to get HIV test, testing in their lifetime, testing in the last 12 months, and testing and receiving results of HIV test was showed a significant association with increased educational status compared to youth with no education. Similar results have been reported from Kenya, South Africa, Uganda, Zimbabwe, Tanzania and other sub-Saharan African countries [1,13,14,29,31,32]. Gabonese Christian youth were more likely to know a place where to get HIV testing compared to youth with no religion. Other studies also found a strongly significant association of religion with HIV testing [3,39]. There have been some reports that indicate involvements of religious groups in the implementation of HIV prevention programs by donating money or participating in the program as sanitary providers of

the HIV test providing centers [17], which may help them to have awareness about HIV testing. Nevertheless, Cameroonian Moslem males were less likely to be tested and to be tested and received results than youth with no religion. Generally, currently married and formerly married youth were more likely to know a place to get HIV test, to be tested in their lifetime and in the last 12 months, and to be tested and received results than the never in union youth. Similar findings were reported from other sub-Saharan African countries and Caribbean countries [7,39-43]. This is an alarming finding which clearly reveals that youth are not only restricted to the access of the HIV prevention services by their own lack of knowledge [38], but most of the reproductive health services in developing countries are also intended to

serve the needs of married people only [23]. Other researchers had also supported that, in particular, the needs of adolescents and young people are often ignored in many countries during the development of national HIV prevention programs, sexual and reproductive health policies and budget allocations [16,23]. As a result, young people living with HIV/AIDS often have inadequate access to health and social support services and face considerable stigma and discrimination [44]. Wealth index of both genders in both countries showed an increment in AOR with knowing a place to get HIV test, testing in their lifetime, testing as well as testing and receiving results of HIV test compared to the poorest. The finding is congruent with the results of other studies from Uganda, Tanzania, Ivory Coast and other countries of sub-Saharan Africa [2,14,29,32,40]. Other studies found that voluntary HIV testing was significantly determined by the individuals economic status [31,42]. Working youth were more likely to know a place to get HIV test, to be tested in their lifetime, tested in the last 12 months, and to be tested and received results of HIV test than not working youth. Other studies from Kenya and South Africa also found similar results [1,13]. The reason may be related to their economic differences that the working youth are more economically stable than the not working to get tested for HIV and they may get information related HIV in their work places. Youth with comprehensive HIV/AIDS knowledge were more likely to know a place to get HIV test, to be tested in their lifetime and in the last 12 months, and to be tested and received results of HIV test compared to youth without comprehensive HIV/AIDS knowledge. Having a correct knowledge of HIV/AIDS has been found to be significantly associated with HIV testing [2,13,14,32]. Media exposure, participation in HIV/AIDS campaigns and discussion of parents to their teenagers about HIV were mentioned as determiners of HIV/AIDS knowledge and thereby boost HIV testing among youth [1,30,31]. The youth of both countries and both gender groups who have acceptance attitude towards people living with HIV were more likely to know a place to get HIV test. But only Cameroonian males having acceptance attitude were more likely to be tested in their lifetime. It is believed that, stigma in its different types; social rejection stigma, disclosure concerns stigma, or observed enacted stigma as a barrier to HIV testing [31,45].

Conclusion

HIV testing is continued to be the key strategy for HIV prevention. However, lifetime and in the last 12 months HIV test experiences among Cameroonian and Gabonese youth are very low and even significant proportion of the youth do not know where to get HIV test. Hence, both countries need to implement strategies targeting those younger, unmarried, not educated, not working, and economically disadvantaged youth to increase their knowledge and attitude thereby to boost their motivation and awareness towards HIV testing. Making HIV testing centers more accessible and visible and integrating HIV screening with the health care system may expand the access among youth to facilitate the diagnosis, treatment, care and support. Besides, community and religious leader's involvement and making public health messages targeting these youth at higher risk can be imperative to encourage HIV test uptake among youth.

Limitations of the study

This study consists of some limitations related to the cross-sectional nature of the study; it looks at associations, not causes and effects. The DHS is a household-based survey, and hence excludes significant non-household population groups, like those living on the street or in institutions, for example, prisons, colleges or boarding schools, military barracks, or refugee camps, which could have different HIV test experiences than the household population. Similarly, as the questionnaire is designed to collect self-reported responses, there could be recall biases and socially desirable responses. Besides, the missing data in the data files of the countries may affect the results.

Competing interests

The authors declare that they have no competing interests.

Acknowledgements

We would like to thank the Demography Health Surveys (DHS) Program, ICF International Rockville USA, for allowing us to use the raw data of this study.

References

- 1 Achia TN, Obayo E (2013) Trends and correlates of HIV testing amongst women: lessons learnt from Kenya. *African Journal of Primary Health care & Family Medicine* 5: 10.
- 2 Jean K, Anglaret X, Moh R, Lert F, Dray-Spira R (2012) Barriers to HIV testing in Côte d'Ivoire: the role of individual characteristics and testing modalities. *PLoS One* 7: e41353.
- 3 Brima N, Burns F, Fakoya I, Kargbo B, Conteh S, et al. (2015) Factors Associated with HIV Prevalence and HIV Testing in Sierra Leone: Findings from the 2008 Demographic Health Survey. *PloS One* 10: e0137055.
- 4 Granich RM, Gilks CF, Dye, Cock KMD, Williams BG (2008) Universal voluntary HIV testing with immediate antiretroviral therapy as a strategy for elimination of HIV transmission: a mathematical model. *The Lancet* 373: 48-57.
- 5 Denison JA, O'Reilly KR, Schmid GP, Kennedy CE, Sweat MD (2008) HIV voluntary counseling and testing and behavioral risk reduction in developing countries: a meta-analysis, 1990-2005. *AIDS and Behavior* 12: 363-373.
- 6 Fonner VA, Denison J, Kennedy CE, O'Reilly K, Sweat M (2012) Voluntary counseling and testing (VCT) for changing HIV-related risk behavior in developing countries. *The Cochrane Library*.
- 7 Darteh EK, Amo-Adjei J, Awusabo-Asare K (2014) Correlates of HIV testing among young people in Ghana. *Journal of HIV/AIDS & Social Services* 13: 219-233.
- 8 Hearst N, Ruark A, Hudes ES, Goldsmith J, Green EC (2013) Demographic and health surveys indicate limited impact of condoms and HIV testing in four African countries. *African Journal of AIDS Research* 12: 9-15.
- 9 Schwarcz S (2011) Identifying barriers to HIV testing: personal and contextual factors associated with late HIV testing. *AIDS Care* 23: 892-900.
- 10 Unaid (2016) On the Fast-Track to end AIDS.
- 11 Irungu T (2008) HIV voluntary counseling and testing in Nakuru, Kenya: findings from a community survey. *HIV medicine* 9: 111-117.
- 12 UNAIDS, PRESS RELEASE (2014) UNAIDS report shows that 19 million of the 35 million people living with HIV today do not know that they have the virus. GENEVA.
- 13 Peltzer K, Matseke G, Mzolo T, Majaja M (2009) Determinants of knowledge of HIV status in South Africa: results from a population-based HIV survey. *BMC Public Health* 9: 1.
- 14 Gunn JK, Asaolu JO, Center KE, Gibson SJ, Wightman P (2016) Antenatal care and uptake of HIV testing among pregnant women in sub-Saharan Africa: a cross-sectional study. *Journal of the International AIDS Society* 19.
- 15 Ngwakongnwi E, Quan H (2009) Sex differentials in the use of centres for voluntary counseling and testing for HIV in Cameroon. *African Journal of AIDS Research* 8: 43-49.
- 16 Gabonaise R (2014) Rapport National Sur La Reponse Au Vih/Sida 2014, Ministère de la Santé et de la Prévoyance Sociale.
- 17 Cameroun RD (2014) Rapport national de suivi de la déclaration politique sur le vih/sida cameroun., in global aids response progress (garp) onusida.
- 18 UNAIDS (2015) World AIDS Day: Fact sheet 2015;
- 19 UNAIDS (2014) HIV and AIDS Estimates: Cameroon.2014: Geneva, Switzerland.
- 20 UNAIDS (2014) HIV and AIDS Estimates: Gabon. 2014: Geneva, Switzerland.
- 21 La Direction Générale de la S, ICF International (2013) Prévalence du VIH/sida au Gabon : résultats de l'EDSG-II 2012.
- 22 L'Institut National de la S, ICF International (2012) HIV Prevalence in Cameroon: Finding from the 2011 DHS-MICS.
- 23 WHO (2009) Women and health: today's evidence tomorrow's agenda. 2009: World Health Organization.
- 24 UNAIDS (2012) Every minute, a young woman is newly infected with HIV.
- 25 UNAIDS (2012) Fact Sheet on Adolescents, Young People and HIV/AIDS.
- 26 WHO (2016) World Health Organization, Media Centre, Major UN Study Finds Alarming Lack of Knowledge About HIV/AIDS Among Young People.
- 27 AVERT (2016) Averting HIV and AIDS; Global information and advice on HIV & AIDS; YOUNG PEOPLE, ADOLESCENTS AND HIV/AIDS.
- 28 UNAIDS (2016) On the Fast-Track to end AIDS.
- 29 Semali I, Damian DJ, Saronga HP, Malamsha D (2014) Factors associated with HIV testing and receiving results during antenatal care in Tanzania. *Etude de la Population Africaine* 28: 1035.
- 30 MacPhail C, Pettifor A, Moyo W, Rees H (2009) Factors associated with HIV testing among sexually active South African youth aged 15-24 years. *AIDS Care* 21: 456-467.
- 31 Sambisa WS, Curtis, Mishra V (2010) AIDS stigma as an obstacle to uptake of HIV testing: evidence from a Zimbabwean national population-based survey. *AIDS Care* 22: 170-186.
- 32 Gage AJ, Ali D (2005) Factors associated with self-reported HIV testing among men in Uganda. *AIDS Care* 17: 153-165.
- 33 Measuredhs. The DHS Program, Demographic and Health Surveys. Available datasets.
- 34 Measuredhs (2013) Standard recode manual for dhs 6, Demographic and Health Surveys Methodology, Demographic and Health Survey's DHS Toolkit of methodology for the MEASURE DHS Phase III project, implemented from 2008-2013
- 35 Uthman OA (2010) Does it really matter where you live? A multilevel analysis of social disorganization and risky sexual behaviours in sub-Saharan Africa. *DHS Working Papers* 78: 1-29.
- 36 Teshome R, Youjie W, Habte E, Kasm NM (2016) Comparison and Association of Comprehensive HIV/AIDS Knowledge and Attitude towards people Living with HIV/AIDS among Women Aged 15-49 in Three East African Countries: Burundi, Ethiopia and Kenya. *Journal of AIDS & Clinical Research* 7:559.
- 37 Measuredhs . Measure DHS Online Tools. HIV/AIDS Survey Indicators Database. Program Areas and Indicators.
- 38 Minet T, Eyasu HT, Simon AG, Afewerki WT, Henok KA, et al. (2016) Associates of Comprehensive HIV/AIDS Knowledge and Acceptance Attitude among Male Youth Aged 15-24: Comparison Study among Ivory Coast, Cameroon and Gabon. *J AIDS Clin Res* 7: 2.
- 39 Tenkorang EY, Owusu GA (2010) Correlates of HIV testing among women in Ghana: some evidence from the Demographic and Health Surveys. *AIDS care* 22: 296-307.

- 40 Takarinda KC, Madyira LK, Mhangara M, Makaza V, Maphosa-Mutsaka M, et al. (2016) Factors Associated with Ever Being HIV-Tested in Zimbabwe: An Extended Analysis of the Zimbabwe Demographic and Health Survey (2010-2011) *PloS One* 11: e0147828.
- 41 Andrews BE (2011) Prevalence and correlates of HIV testing among Caribbean youth. *International Journal of STD & AIDS* 22: 722-726.
- 42 Stephenson R, Elfstrom KM, Winter A (2013) Community influences on married men's uptake of HIV testing in eight African countries. *AIDS and Behavior* 17: 2352-2366.
- 43 Mwangi M, Kellogg TA, Dadabhai SS, Bunnell R, Baltazar G, et al. (2014) Factors associated with uptake of HIV test results in a nationally representative population-based AIDS indicator survey. *The Open AIDS Journal* 8: 7-16
- 44 Unicef (2016) Eastern and southern Africa, HIV and AIDS, Preventing HIV infection among adolescents and young people. Available September 2016. Available from: http://www.unicef.org/esaro/5482_HIV_prevention.html.
- 45 Koku EF (2011) Desire for, and uptake of HIV tests by Ghanaian women: the relevance of community level stigma. *Journal of community health* 36: 289-299.