

Predictors of HIV/AIDS Knowledge and Attitude among Young Women of Nigeria and Democratic Republic of Congo: Cross-Sectional Study

Simon Afewerki Gebremedhin¹, Wang Youjie^{1*} and Eyasu Habte Tesfamariam²

¹School of Public Health, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

²School of Public Health, Asmara College of Health Sciences, Asmara, Eritrea

Abstract

Background: Adequate HIV/AIDS knowledge and positive attitude towards People Living with HIV/AIDS (PLWHA) are very important and vanguards in averting and ending the epidemics. This study was aimed at assessing predictors of HIV/AIDS knowledge and acceptance attitude towards PLWHA among young women aged 15-24 of Nigeria and Democratic Republic of Congo (DRC).

Methods: This was a cross-sectional study which used 2013 Nigeria and 2013-2014 DRC demographic health survey data, with a sample size of 14,619 in Nigeria and 7661 for DRC. SPSS Version 22 was employed to analyze chi-square tests and multivariate logistic regression. P-values of 0.05 were set up to show the statistical significance.

Results: Awareness of the young women of Nigeria (91.1%) and DRC (90.6%) was universal. HIV/AIDS knowledge (33.6% Vs 9.8% respectively) and acceptance attitude towards PLWHA (28.4% vs. 3.2%, respectively) was low. Multivariate logistic regression model showed that age, residence, education, religion, marital status and wealth index were significant associates with HIV/AIDS knowledge. Similarly, age, education, religion, marital status, wealth index and HIV/AIDS knowledge showed significant associations with acceptance attitude towards PLWHA. After controlling the confounding variables, higher HIV/AIDS knowledge (OR 1.09, 95% C.I 1.01-1.17) and acceptance attitude towards PLWHA women (OR 2.54, 95% C.I 2.17-2.98) was observed among young women in Nigeria than in DRC.

Conclusion: Increased HIV/AIDS awareness was observed. However the level knowledge on HIV/AIDS and positive attitude towards PLWHA was very low. Hence educational intervention programs to increase the knowledge of the young women on the epidemic are highly needed.

Keywords: Knowledge; Acceptance attitude; HIV/AIDS; Young women; Nigeria; Democratic Republic of Congo (DRC)

Introduction

HIV/AIDS has become one of the world's most serious public health and development challenges, particularly in low- and middle-income countries [1]. Young women (aged 15-24) are particularly most vulnerable to HIV with infection rates twice as high as in young men, and accounting for 22% of all new HIV infections and 31% of new infections in Sub-Saharan Africa [2]. In this region, women acquire HIV infection at least 5-7 years earlier than men, often associated with sexual debut [3,4]. According to UNAIDS, the HIV prevalence for young women in Nigeria and DRC in 2013 were estimated 1.3% and 0.5% as compared to 0.7% and 0.3% of young men, respectively [4]. Young women are more susceptible to HIV, as a result of lack of correct health information, inadequate access to reproductive health services, engagement in risky behaviors, financial insecurity, regional and national conflicts, age-disparity, intergenerational sexual relationships, early, forced, and child marriage, gender violence and discrimination [5-8].

Despite the fact that young women are highly exposed to HIV infection, they were also less likely to have adequate HIV/AIDS about knowledge compared to young men [9]. Adequate knowledge on HIV/AIDS is crucial for averting the HIV infection and ending the negative acceptance attitude and discrimination towards the infected and affected person [10]. Improving HIV/AIDS knowledge has been suggested as an effective HIV preventive behavioral intervention and has been associated with increased safe sex practices, HIV testing and treatment uptake [11]. Several studies of young people from Nigeria [12-16] and elsewhere [17-21] have sought to understand the gaps in their knowledge of HIV/AIDS, with a view towards creating an appropriately targeted educational interventions in improving their HIV/AIDS

knowledge and decreasing their risky behaviors. Knowledge about HIV among young people in the western and central Africa continued to be alarmingly low. According to the most recent household surveys, only 24% of young women aged 15-24 years compared to 31% of young men of the same age had comprehensive and correct knowledge of how to prevent HIV [16]. On the other hand, negative attitudes towards HIV/AIDS and PLWHA have been shown to be hindrances for HIV prevention, voluntary counseling and testing, HIV status disclosure and treatment compliance [22,23]. Other studies showed the association between negative attitudes of people towards PLWHA and individual's wrong information about prevention and transmission of the disease [24,25].

Young women are at the center of the global HIV/AIDS epidemic, not only in terms of new infections but also an opportunities for halting the transmission of HIV [26]. United nations made a political declaration in 2016 with a specific target which showed that by 2020 the new HIV infections among young women aged 15 to 24 years should reduce to fewer than 100,000. Nigeria and DRC were identified as Fast-

***Corresponding author:** Wang Youjie, School of Public Health, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China; Tel: +8613260653481; E-mail: wangyoujie@mails.tjmu.edu.cn

Received February 13, 2017; **Accepted** March 10, 2017; **Published** March 17, 2017

Citation: Gebremedhin SA, Youjie W, Tesfamariam EH (2017) Predictors of HIV/AIDS Knowledge and Attitude among Young Women of Nigeria and Democratic Republic of Congo: Cross-Sectional Study. J AIDS Clin Res 8: 677. doi: 10.4172/2155-6113.1000677

Copyright: © 2017 Gebremedhin SA, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Track countries in western and central region of SSA [27]. Moreover they are two of those six countries that face the triple threat of a high HIV burden, low treatment coverage and little or no decrease in HIV infections [28]. Adequate Comprehensive HIV/AIDS knowledge and Positive acceptance attitude towards people living with HIV/AIDS are vital aspects and vanguard in preventing and reversing the HIV infection [29,30]. No evidence has been shown on associates and comparison of knowledge on HIV/AIDS and acceptance attitude towards PLWHA among young women between Nigeria and DRC, using nationally representative sample data. Therefore the main aim of this study was to assess the main correlates of HIV/AIDS knowledge and acceptance attitude towards PLWHA and to compare the variables between young women aged 15-24 of Nigeria and DRC. It mainly focused on young women aged 15-24 years because they are most vulnerable and highly exposed to HIV/AIDS in both countries and they also have inadequate knowledge about HIV/AIDS and negative attitude towards people living with HIV/AIDS. Hence this study will provide evidence based information which will help program managers for both countries in designing HIV/AIDS programs, proper implementation and evaluation for their contribution regarding HIV/AIDS prevention, hence moving towards achieving the global targets of ending the epidemic.

Method

Data source

The data was sourced from current publicly available Demographic and Health Surveys (DHS) of two countries: 2013 Nigeria and 2013-14 Democratic Republic of Congo (DRC) [31]. In this study only women aged 15-24 years were considered. Variables of HIV-related knowledge and attitudes were selected and categorized based on HIV/AIDS Survey Indicators from DHS [32].

Measures

Dependent variables: The two dependent binary variables were used in this study were two binary variables, HIV/AIDS knowledge and acceptance attitude towards PLWHA. These variables were selected and categorized based on the MEASURE DHS online tools for HIV/AIDS Survey Indicators Database. The indicators used in this database were drawn from guides from UNAIDS, the United Nation General Assembly Special Session on HIV/AIDS, the Millennium Development Goals, the President's Emergency Plan for AIDS Relief, and the Global Fund to Fight HIV/AIDS, Malaria and Tuberculosis [32].

Comprehensive HIV/AIDS knowledge means an individual is capable of identifying the two major methods of HIV prevention (condom use and having one faithful uninfected sexual partner), Knows that anyone can be diagnosed with HIV despite the health status and reject at least the two most common misconceptions of HIV transmission (can get infected through mosquito bite, sharing food with person who has AIDS and witchcraft and supernatural means). Knowledge was coded 1 if respondents reported five correct responses and 0 was coded if not. On the other hand, acceptance attitudes towards people living with HIV/AIDS means a respondents who had heard of AIDS were asked if willingly they can take care of HIV positive family member, being able to buy vegetables from a person who had HIV, Allow HIV positive female teacher who is not sick to teach and would not hide the status of the family Member's sero-status. Acceptance attitude was coded 1 if the respondents answered all four questions correctly and was coded 0 if not.

Independent variables: The demographic and socioeconomic characteristics of the survey respondents included were age, level of

education, place of residence, marital status, religion, wealth index and occupation. This study focused only on young women aged 15-19 and 20-24 out of seven groups created in DHS data. Type of place of residence was categorized into two groups, 'Urban' and 'Rural' areas in the DHS and were taken without any change. The level of education was also taken as the originally classified four groups: 'No Education', 'Primary Education', 'Secondary Education' and 'Higher Education'. Marital status was grouped into three categories: 'Never in union', 'Currently in Union/living with a man' and 'Formerly in Union/living with a man'. The respondents were asked about their religion, and the responses were grouped into many categories which varied among the two countries. However, this study recoded them into four groups: 'Christian' - (Catholic, Protestant, Arme de Salut, Kimbanguiste and Other Christians), 'Muslim', 'Other religion' - (Bundu dia Kongo, Animist, Traditionalist and other religions) and 'No religion'. DHS grouped wealth quintiles, including 'Poorest', 'Poorer', 'Middle', 'Richer', and 'Richest', were taken to compare the influence of wealth on the dependent variables. The various categories of occupation in the two countries were re-grouped to 'Agricultural' - (self-employed and employee) and 'Non Agricultural' - (professional/technical/managerial, clerical, sales, household and domestic, services, skilled/unskilled manpower, army and others) and 'Not working'.

Statistical analysis

Data analysis was performed using SPSS version 22. Descriptive and chi-square test results were displayed using a table. Multivariate analysis was run using binary logistic regression to analyze the associations between the selected variables of HIV/AIDS knowledge and acceptance attitude towards PLWHA and between these selected variables and countries. Odds ratios and 95% CI were estimated to examine the associations. For all types of analyses, the study used 0.05 of significance level.

Results

Background characteristics

Table 1 describes the socio-demographic characteristics of young women aged 15-24 years between Nigeria (2013) and DRC (2013/2014). The two countries had majority of respondents from rural areas than urban areas. Considerable number of young women in Nigeria (27.5%) had never attended school. The dominant religious denomination of the young women in DRC was Christians (96.7%) whereas in Nigeria both Christians (51.2%) and Islam (47.8%) share the proportion. Moreover, highest proportion of young women from DRC (52.2%) and Nigeria (56.0%) were single who had never been in union. Majority of the young women were not working. As shown in Figure 1, before the survey most of the Congolese (90.6%) and Nigerian (91.1%) young women had already heard about HIV/AIDS. The knowledge of HIV/AIDS (28.4% vs. 33.6%, respectively) and acceptance attitude towards PLWHA (3.2% vs. 9.8%, respectively) was low.

Table 2 presents results of the relationship between the socio-demographic characteristics and the dependent variables. Except marital status of the women with their acceptance attitude towards PLWHA, all the other socio-demographic characteristics of the respondents taken in this study were significantly associated with HIV/AIDS knowledge and acceptance attitudes towards PLWHA. HIV/AIDS increases as age and educational level of the respondents increases. Majority of the young women with higher educational level in DRC (66.8%) and Nigeria. (59.1%) had HIV/AIDS knowledge. Young women residing in urban areas had increased knowledge of

Variables	DRC	Nigeria
	7661 (34.4%)	14619 (65.6%)
Age		
15-19	3981 (52.0)	7905 (54.1)
20-24	3680 (48.0)	6714 (45.9)
Type of residence		
Urban	3004 (39.2)	5831 (39.9)
Rural	4657 (60.8)	8788 (60.1)
Educational status		
No education	805 (10.5)	4025 (27.5)
Primary	2682 (35.0)	1858 (12.7)
Secondary	3954 (51.6)	7909 (54.1)
Higher	220 (2.9)	827 (5.7)
Religion†		
No religion	45 (0.6)	-
Christian	7405 (96.7)	7483 (51.2)
Muslim	114 (1.5)	6983 (47.8)
Other religion	97 (1.3)	153 (1.0)
Marital status		
Never in union	3998 (52.2)	8186 (56.0)
Currently in union/living with a man	3275 (42.7)	6210 (42.5)
Formerly in union/living with a man	388 (5.1)	223 (1.5)
Wealth index		
Poorest	1663 (21.7)	2190 (15.0)
Poorer	1451 (18.9)	2901 (19.8)
Middle	1451 (18.9)	3248 (22.2)
Richer	1442 (18.8)	3358 (23.0)
Richest	1654 (21.6)	2922 (20.0)
Occupation		
Not Working	3222 (42.1)	8979 (61.4)
Agricultural	2610 (34.1)	912 (6.2)
Non Agricultural	1829 (23.9)	4728 (32.3)

†Religion and ††occupation were re-categorized

Table 1: Distribution of socio-demographic characteristics, HIV/AIDS awareness, HIV/AIDS knowledge and acceptance attitude towards PLWHA of young women of age 15-24 years in the two countries.

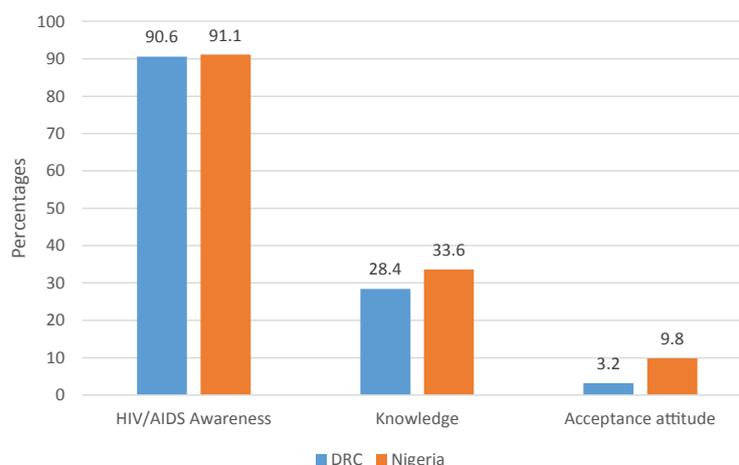


Figure 1: HIV/AIDS awareness, knowledge and acceptance attitude towards PLWHA among young women of DRC and Nigeria.

HIV/AIDS compared to their counterparts. HIV/AIDS knowledge was predominantly higher among women in the highest wealth quintile. 42.5% vs. 46.2% of the women in the richest wealth index compared to 19.1% vs. 19.8% of women in the poorest group in

DRC and Nigeria, respectively had HIV/AIDS knowledge. Similarly the acceptance attitude increased with increased age, educational level, wealth quintiles increases and HIV/AIDS knowledge of the respondent.

Variable	HIV/AIDS Knowledge				Acceptance attitude towards PLWHA			
	DRC		Nigeria		DRC		Nigeria	
	Yes (%)	χ^2	Yes (%)	χ^2	Yes (%)	χ^2	Yes (%)	χ^2
Age		40.337*		71.691*		5.046*		34.931*
15-19	25.2		30.5		2.8		8.5	
20-24	31.8		37.2		3.7		11.4	
Place of Residence		236.239*		23.468*		14.911*		29.472*
Rural	22		28.7		2.6		8.7	
Urban	38.2		40.9		4.2		11.5	
Education level		487.977*		551.006*		24.258*		81.185*
No education	12.5		22.4		1.5		7.7	
Primary	18.9		28.4		2.7		7.5	
Secondary	35.9		37.8		3.7		10.7	
Higher	66.8		59.1		7.3		16.6	
Religion†		12.295*		50.550*		9.500*		9.507*
No religion	13.3		-		2.2		-	
Christian	28.7		36.2		3.3		9.2	
Muslim	26.3		31		0.9		10.5	
Other religion	16.5		22.9		0		5.9	
Marital Status		7.635*		52.460*		1.508		3.396
Never in Union	29.7		36		3.3		9.7	
Currently in union/living with a man	26.8		30.3		3.0		9.8	
Formerly in union/living with a man	28.4		37.7		4.1		13.5	
Wealth Index		273.256*		493.252*		33.063*		50.173*
Poorest	19.1		19.8		1.9		6.2	
Poorer	21.4		26.3		2.0		8.8	
Middle	27.6		33.4		2.5		10.8	
Richer	30.9		38		3.9		10.8	
Richest	42.5		46.2		5.1		11.3	
Occupation††		96.873*		39.106*		23.783*		1.205
Not Working	31.3		33.5		3.6		9.9	
Agricultural	21.4		24.8		1.9		8.8	
Non Agricultural	33.2		35.4		4.4		9.9	
HIV/AIDS Knowledge	-	-	-	-		49.155*		80.296*
No	-	-	-	-	2.3		8.2	
Yes	-	-	-	-	5.5		12.9	

*P-value<0.05,

†Religion and ††Occupation were re-categorized

Table 2: The association of socio-demographic characteristics of the respondents by HIV/AIDS knowledge and acceptance attitude towards PLWHA of the two countries.

Predictors of HIV/AIDS knowledge

As shown in Table 3, Women in the age group of 20-24 had increased knowledge both in DRC (AOR 1.39, 95% CI 1.23-1.56) and in Nigeria (AOR 1.26, 95% CI 1.16-1.37) as compared to young women aged 15-24. Increased knowledge of HIV /AIDS was also observed among young women based in urban areas than those based in rural areas in DRC (AOR 1.27, 95% CI 1.09-1.49). As the young women's educational level increase the HIV/AIDS also increased when compared with those women with no education. Young women with primary education were 1.57 times and 1.34 time respectively more likely to have of HIV/AIDS knowledge compared to those with no education in DRC (AOR 1.57, 95% CI 1.24-1.98) and Nigeria (AOR 1.34, 95% CI 1.17-1.54). Similarly those women in higher educational level were 8.59 and 3.64 times more likely to have HIV/AIDS knowledge than those women with no education in DRC (AOR 8.59, 95% CI 5.87-12.56) and Nigeria (AOR 3.64, 95% CI 2.97-4.46). Nigerian Christian young women had significantly increased HIV/AIDS knowledge than young women with other religion (AOR 1.23, 95% CI 1.13-1.35). Positive association

was observed between HIV/AID knowledge and wealth index of the women. Richest women were 1.47 and 2.03 times more likely to have knowledge than the poorest women in DRC (AOR 1.47, 95% CI 1.18-1.82) and Nigeria (AOR 2.03, 95% CI 1.71-2.40). Moreover, this study reveals that marital status and occupation of the women were significantly associated with HIV/AIDS knowledge.

Predictors of acceptance attitude towards PLWHA

The data as shown in Table 3 reveal that Nigerian young women aged 20-24 years were 1.31 times more probable to have higher acceptance attitude than those women aged 15-19 years (AOR 1.31, 95% CI 1.15-1.49). Compared to the women with no education, women with secondary (AOR 1.78, 95% CI 1.46-2.18) and higher education (AOR 1.78, 95% CI 1.46-2.18) had 1.78 and 2.55 times more probable to have positive attitude towards PLWHA in Nigeria. Christian Nigerian women were 1.59 times more accepting attitude than women with other religion (AOR 1.59, 95% CI 1.39-1.82). Wealth index was positively associated with attitude towards PLWHA. Young women in the richer wealth category were 1.83 and 1.35 times more likely to have

Variable	HIV/AIDS Knowledge		Acceptance attitude towards PLWHA	
	AOR 95% CI			
	DRC	Nigeria	DRC	Nigeria
Age				
15-19	1	1	1	1
20-24	1.39 (1.23-1.56)*	1.26 (1.16-1.37)*	1.27 (0.95-1.71)	1.31 (1.15-1.49)*
Place of Residence				
Rural	1	1	1	1
Urban	1.27 (1.09-1.49)*	1.08 (0.99-1.18)	0.73 (0.49-1.10)	1.1 (0.96-1.26)
Highest Education level				
No education	1	1	1	1
Primary	1.57 (1.24-1.98)*	1.34 (1.17-1.54)*	1.54 (0.83-2.88)	1.07 (0.85-1.34)
Secondary	3.30 (2.61-4.16)*	1.93 (1.69-2.21)*	1.52 (0.81-2.86)	1.78 (1.46-2.18)*
Higher	8.59 (5.87-12.56)*	3.64 (2.97-4.46)*	1.89 (0.80-4.46)	2.55 (1.90-3.42)*
Religion†				
No religion	1	-	1	-
Christian	1.55 (0.64-3.75)	1.23 (1.13-1.35)*	1.07 (0.14-7.97)	1.59 (1.39-1.82)*
Muslim	1.36 (0.51-3.64)	0.83 (0.56-1.24)	0.31 (0.02-5.08)	0.86 (0.43-1.70)
Other religion	1.05 (0.37-2.98)	1	-	1
Marital Status				
Never in Union	1	1	1	1
Currently in union/ living with a man	1.16 (1.02-1.32)*	1.1 (1.00-1.22)	1.13 (0.82-1.56)	1.15 (0.99-1.34)
Formerly in union/ living with a man	1.11 (0.87-1.42)	1.48 (1.11-1.97)*	1.41 (0.80-2.46)	1.55 (1.03-2.34)*
Wealth Index				
Poorest	1	1	1	1
Poorer	1.07 (0.90-1.28)	1.31 (1.14-1.51)*	1.29 (0.80-2.08)	1.39 (1.11-1.73)*
Middle	1.39 (1.16-1.65)*	1.55 (1.34-1.80)*	1.19 (0.73-1.93)	1.53 (1.21-1.94)*
Richer	1.29 (1.07-1.55)*	1.65 (1.41-1.92)*	1.83 (1.12-2.98)*	1.35 (1.05-1.74)*
Richest	1.47 (1.18-1.82)*	2.03 (1.71-2.40)*	2.23 (1.27-3.92)*	1.26 (0.96-1.66)
Occupation††				
Not working	1	1	1	1
Agricultural	0.95 (0.82-1.10)	0.79 (0.67-0.93)*	0.61 (0.42-0.91)*	1.05 (0.81-1.35)
Non Agricultural	1.08 (0.95-1.23)	1.1 (1.01-1.19)*	1.12 (0.83-1.52)	0.92 (0.81-1.04)
HIV/AIDS Knowledge				
No	-	-	1	1
Yes	-	-	2.03 (1.55-2.66)*	1.45 (1.29-1.62)*
*P-value<0.05, †Religion and ††Occupation were re-categorized				

Table 3: Factors associated with HIV/AIDS knowledge and acceptance attitude towards PLWHA among young women of age 15-24 in the two countries.

accepting attitude towards PLWHA than those women in the poorest group in DRC (AOR 1.83, 95% CI 1.12-2.98) and Nigeria (AOR 1.35, 95% CI 1.05-1.74). Significant positive impact of HIV/AIDS knowledge was clearly observed, as young women with HIV/AIDS knowledge had higher acceptance attitude towards PLWHA in DRC (AOR 2.03, 95% CI 1.55-2.66) and Nigeria (AOR 1.45, 95% CI 1.29-1.62). Furthermore, the study revealed the association between the acceptance attitude and women's marital status and occupation (Table 3).

Comparison among the countries

After controlling for confounding factors, HIV/AIDS and acceptance attitude was compared between countries. Likewise, Nigerian young women had 1.09 times more HIV/AIDS knowledge than their counterpart Congolese young women (AOR 1.09, 95% CI 1.01-1.17). The impact was also reflected in acceptance attitude, where Nigerian young women had two and half times more acceptance attitude towards PLWHA than the Congolese young women (AOR 2.54, 95% CI 2.17-2.98).

Discussion

Awareness and HIV/AIDS knowledge

Awareness is a prerequisite in prevention of HIV/AIDS. In this study the understanding of the young women about HIV/AIDS in Nigeria and DRC was found to be stable. Similar results were also reported in sub-Saharan Africa [33-35] and elsewhere [36]. However, despite the high level of awareness of HIV/AIDS, the Nigerian and Congolese young women had low level of knowledge. It is far below the target set in 2001 by the United Nations General Assembly Special Session (UNGASS) to ensure 95% of young people aged 15-24 worldwide have access to correct information, services necessary to boost the life skills needed to reduce their risk to HIV infection [37]. Even it is below the average HIV/AIDS knowledge of western and central region of SSA. Studies done in Sub-Saharan countries and eastern India showed that knowledge of HIV/AIDS ranged from 9% to 42% [9,20,38-40].

However, other studies in Europe revealed an increased degree of HIV/AIDS and related issues awareness [41]. Age of the respondent was associated with knowledge of HIV/AIDS. Women of aged 20-24 years were more likely to have knowledge than women of aged 15-19 years in both countries. The present findings were similar to previous studies conducted elsewhere [42,43]. Urban based young women were more likely to have knowledge of HIV/AIDS compared to rural based young women. This finding is similar with other studies done in Sub-Saharan African countries [34,44] and elsewhere [40,45,46]. This probably could be due to limited availability of higher educational institutions, modern health services and less coverage of mass media and hence less exposure to information related to sexual and reproductive health information in rural than in urban areas [34,44]. Educational level has strong positive association with HIV/AIDS knowledge among young Nigerian and DRC women. Similar results were also found in other study [34,43,47]. This might be associated with gaining more information and experience from media, academics, students' gender club, the anti HIV/AIDS club and other extra curricula activity in the school that could contribute to raise their understanding and knowledge about HIV/AIDS [48]. Nigerian Christian young women had significantly higher HIV/AIDS knowledge than young women with other religion. Related study from Ghana showed that Christian women had increased knowledge on modes of HIV transmission than women who belonged to African traditional religions or were not religiously affiliated [49]. Other similar finding was also reported elsewhere [43,48]. Both Congolese (AOR=1.16, $p<0.023$) and Nigerian (AOR=1.48, $p<0.008$) women who were currently in union/living with a man had increased knowledge about HIV/AIDS than young women who have never been in union. In contrast to the present findings, a study conducted in Kenya revealed that ever married young women had less knowledge of HIV/AIDS than never in union women [10]. Wealth index of the young women was found to be a strong associated of HIV/AIDS knowledge in both Nigeria and DRC. This is consistent with other study in Ghana [34]. In another similar study conducted in Ethiopia, wealth index was a strong predictor of knowledge of HIV/AIDS among adolescents [9]. Socioeconomic deprivation was also associated with reduced media exposure or reduced educational level achievement which turn out to have a negative impact on HIV/AIDS knowledge [20,44]. Knowledge about HIV/AIDS was observed among young Nigerian women belonged to non-agriculture work than those not working.

Acceptance attitude of young women towards PLWHA

Negative attitude and discrimination against PLWHA remains the major obstacles in the fight against HIV/AIDS. It creates barriers to HIV testing and treatment, care and support networks for people infected and affected by HIV/AIDS [50,51]. Acceptance attitude of young women in DRC and Nigeria towards PLWHA was very low. Young Nigerian women aged 20-24 years had more likely to have acceptance attitude towards PLWHA than those young women aged 15-19 years. This finding were similar with findings of a study done in Kenya [52]. However young women from DRC do not show any statistical significance and similar result was reported in Ethiopia and Malaysia [53,54]. Place of residence did not show a significant association with attitudes of young women towards PLWHA in both countries. In contrast to the present finding, study in Bolivia, Botswana and Ethiopia showed different result [35,40,43]. The probability of acceptance attitude towards PLWHA increases with increasing level of education. Young women with secondary and higher education in

Nigeria have more likely to have acceptance attitude towards PLWHA than young women with no education. Similar finding was reported from a study conducted elsewhere [35,40,43,48,53]. Young Christian Nigerian women had higher positive attitude towards PLWHA than the young women with other religion. This result is in agreement with a study conducted in Botswana [43]. Young women formerly in union/living with a man from Nigeria had higher positive attitude than young women never in union. However other study in Malaysia indicated that attitude towards PLWHA was not affected by difference in marital status [54]. Even though the pattern is not uniform, young women in highest socio-economic status both in Nigeria and DRC had more likely to have highest acceptance attitudes towards PLWHA compared to young women in lower socio-economic status. Similar results have also been reported from Bolivia, Tanzania and Nigeria [40,55,56]. Young women from DRC working in agricultural sector had less likely to have positive acceptance attitude towards PLWHA than young women not working. This probably could be due to the fact that young women working in agricultural activities had more likely to live in rural areas and have limited access to education and health services. Hence limited access to accurate information about HIV/AIDS-related knowledge may yield to negative attitudes. Furthermore, young women, from Nigeria and DRC, who have adequate knowledge about HIV/AIDS have more likely to have positive acceptance attitude towards PLWHA compared to those who have inadequate knowledge about HIV/AIDS. Similar results were found in other studies [35,43,53,57]. Thus, whatever intervention made on HIV/AIDS knowledge will positively affect the attitude of the respondents as well [58].

Comparison among the countries

Generally the HIV/AIDS knowledge and acceptance attitude of the young women in both countries were very low. Comparatively after controlling all the variables, the knowledge of HIV/AIDS and attitude towards PLWHA of young women in Nigeria was found to be 1.1 and 2.5 times more than the Congolese young women, respectively. This mainly could be due to the fact that, Democratic Republic of Congo (DRC) is still struggling to emerge from two decades of armed conflict, which ravaged the country's economic and social welfare systems. According to Human Development Index report of 2014, despite the political and economic progress achieved in recent years, DRC is still one of the least developed countries, ranking 186 out of 187 with an estimated 74% of its population living in poverty.

Conclusion

The study identified, universal awareness, substantial gap in HIV/AIDS knowledge and negative attitude towards PLWHA among young women in Nigeria and DRC. Age, place of residence, education and wealth index were significantly associated with HIV/AIDS knowledge and acceptance attitude towards PLWHA. Moreover Nigerian young women had more likely to have increased knowledge on HIV/AIDS and positive attitude towards PLWHA than the Congolese women. Realizing, the specific target of 2016 Political declaration on ending AIDS, to reduce new HIV infections among young women aged 15-24 years to fewer than 100,000 by 2020 and 95% of 2010 UNGASS agreement, we are far from the thresholds. Hence young women, particularly those with lower age, living in rural, with lower educational level and low wealth index should be targeted urgently with dramatic acceleration of action and expanding of education on HIV/AIDS. Future research involving nationally representative samples for male and female, related to sexual behaviors could contribute also significantly to HIV/AIDS prevention and transmission.

Strength and Limitations

Strength

The data used in this study were nationally representative with large sample sizes from both Nigeria and DRC. Thus, the results have capacity to estimate the parameter of the whole population in both countries. Moreover the dependent variables were defined based an internationally-accepted and consistent standard method of MEASURE DHS tool.

Limitations

The present study has some limitations that need to be considered; first the study was cross-sectional in nature, which means it is difficult to establish the cause-effect relationship between the independent variable with the outcome variable. Secondly some of the independent variables were documented on self-reported basis, which may have led to recall bias among respondents. Lastly despite that the sample size of the data was large but it also had missing variables which might affect the results.

Acknowledgement

We would like to thank the Demography and Health Surveys (DHS) Program, ICF International Rockville USA, for allowing us to use the raw data for this study. We are also very grateful to the editor and anonymous reviewers for their insightful comments and suggestions.

References

- World Health Organization (2016) 10 facts on HIV/AIDS.
- Unaids (2012) Fact sheet: Adolescents, young people and HIV-UNAIDS.
- Dellar RC, Dlamini S, and Karim QA (2015) Adolescent girls and young women: Key populations for HIV epidemic control. *J Int AIDS Soc* 18: 19408.
- UNAIDS (2014) The GAP report.
- Martin J (2016) World AIDS Day: A Focus on Adolescent Girls.
- Fleischman J (2015) Addressing HIV risk in adolescent girls and young women.
- Chen PF (2008) HIV/AIDS prevention among young people in East and South-East Asia in the context of reproductive and sexual health. *Asia Pac Popul J* 23: 7Á28.
- Unaids (2016) HIV prevention among adolescent girls and young women.
- Oljira L, Berhane Y, Worku A (2013) Assessment of comprehensive HIV/AIDS knowledge level among in-school adolescents in eastern Ethiopia. *J Int AIDS Soc* 16.
- Ochako R, Ulwodi D, Njagi P, Kimetu S, Onyango A (2011) Trends and determinants of comprehensive HIV and AIDS knowledge among urban young women in Kenya. *AIDS Res Ther* 8: 11.
- Tulloch HE, Balfour L, Kowal J, Tasca GA, Angel JB (2012) HIV knowledge among Canadian-born and sub-Saharan African-born patients living with HIV. *J Immigr Minor Health* 14: 132-139.
- Bamise O, Bamise C, Adedigba M (2011) Knowledge of HIV/AIDS among secondary school adolescents in Osun state, Nigeria. *Niger J Clin Pract* 14: 338-344.
- Odu O, Asekun EO, Bamidele JO, Egbewale BE, Amusan OA, et al. (2008) Knowledge, attitudes to HIV/AIDS and sexual behaviour of students in a tertiary institution in south-western Nigeria. *Eur J Contracept Reprod Health Care* 13: 90-96.
- Oyo-Ita A, Ikpeme BM, Etokidem AJ, Offor JB, Okokon EO, et al. (2005) Knowledge of HIV/AIDS among secondary school adolescents in Calabar-Nigeria.
- Ayanniyi AA, Monsudi KF, Oduola TK, Olatunji Fo, et al. (2015) Awareness and knowledge of HIV and its effect on ocular health among the Nigerian graduate youth corps. *Adv Pediatr Res* 2.
- Shokoohi M, Karamouzian M, Mirzazadeh A, Haghdoost AA, Rafierad AA, et al. (2016) HIV knowledge, attitudes and practices of young people in Iran: Findings of a National Population-Based Survey in 2013. *PLoS ONE* 11: e0161849.
- Rahman MM, Kabir M, Shahidullah M (2009) Adolescent knowledge and awareness about AIDS/HIV and factors affecting them in Bangladesh. *J Ayub Med Coll Abbottabad* 21: 3-6.
- Appiah-Agyekum NN, Suapim RH (2013) Knowledge and awareness of HIV/AIDS among high school girls in Ghana. *HIV/AIDS (Auckland, NZ)* 5: 137-144.
- Aomreore A, Alikor E, Nkanginieme K (2003) Survey of knowledge of HIV infection among senior secondary school 3 (SSS3) students in Port Harcourt. *Niger J Med* 13: 398-404.
- Dimbuene ZT, Defo BK (2011) Fostering accurate HIV/AIDS knowledge among unmarried youths in Cameroon: Do family environment and peers matter? *BMC Public Health* 11: 1.
- UNAIDS (2016) PREVENTION REPORT GAP.
- Genberg BL, Kawichai S, Chingono A, Sendah M, Chariyalertsat S, et al. (2008) Assessing HIV/AIDS stigma and discrimination in developing countries. *AIDS Behav* 12: 772-780.
- Maman S, Mbwapo JK, Hogan NM, Weiss E, Kilonzo GP, et al. (2003) High rates and positive outcomes of HIV-serostatus disclosure to sexual partners: Reasons for cautious optimism from a voluntary counseling and testing clinic in Dar es Salaam, Tanzania. *AIDS Behav* 7: 373-382.
- Ugarte WJ, Högberg U, Valladares EC, Essén B (2013) Measuring HIV and AIDS-related stigma and discrimination in Nicaragua: Results from a community-based study. *AIDS Educ Prev* 25: 164-178.
- Mohamed BA, Mahfouz MS (2013) Factors associated with HIV/AIDS in Sudan. *Biomed Res Int* 2013: 971203.
- Organization WH (2006) Preventing HIV/AIDS in young people: Evidence from developing countries that works.
- Unaids (2015) 2016–2021 Strategy on the fast-track to end AIDS.
- UN (2014) AIDS deaths fall, but millions unaware of HIV-positive status, warns UN report.
- Thanavanh B, Harun-Or-Rashid M, Kasuya H, Sakamoto J (2013) Knowledge, attitudes and practices regarding HIV/AIDS among male high school students in Lao People's Democratic Republic. *J Int AIDS Soc* 16: 17387.
- UNAIDS (2015) Core Epidemiology Slides(PPT).
- DHS (2016) The demographic health survey: Available datasets.
- DHS (2016) HIV/AIDS survey indicators database.
- Ngayimbasha A, Chen PJ (2011) AIDS awareness among women and its influence on attitude toward people living with HIV/AIDS in Burundi. *East Afr J Public Health* 8: 61-66.
- Nketiah-Amponsah E, Aful-Mensah G (2013) A review of HIV/AIDS awareness and knowledge of preventive methods in Ghana. *Afr J Reprod Health* 17: 69-82.
- Deribew A, Abebe G, Apers L, Jira C, Tesfaye M, et al. (2010) Prejudice and misconceptions about tuberculosis and HIV in rural and urban communities in Ethiopia: A challenge for the TB/HIV control program. *BMC Public Health* 10: 1.
- Jha PK, Narayan P, Nair S, Ganju D, Sahu D, et al. (2015) An assessment of comprehensive knowledge of HIV/AIDS among slum and non-slum populations in Delhi, India. *Open J Prev Med* 5: 259-268.
- UN (2001) Declaration of commitment on HIV/AIDS.
- Mushi DL, Mpembeni RM, Jahn A (2007) Knowledge about safe motherhood and HIV/AIDS among school pupils in a rural area in Tanzania. *BMC Pregnancy Childbirth* 7: 1.
- Ray S, Ghosh T, Mondal PC, Basak S, Alauddin M, et al. (2011) Knowledge and information on psychological, physiological and gynaecological problems among adolescent school girls of eastern India. *Ethiop J health Sci* 21: 183-189.
- Terán CC, Urizar GD, Blazquez CG, Ferreras AB, Rubio RO, et al. (2015) Knowledge, attitudes and practices on HIV/AIDS and prevalence of HIV in the general population of Sucre, Bolivia. *Braz J Infect Dis* 19: 369-375.
- Samkange-Zeeb FN, Spallek L, Zeeb H (2011) Awareness and knowledge of sexually transmitted diseases (STDs) among school-going adolescents in Europe: A systematic review of published literature. *BMC Public Health* 11: 727.

42. Idele P, Gillespie A, Porth T, Suzuki C, Mahy M, et al. (2014) Epidemiology of HIV and AIDS among adolescents: Current status, inequities and data gaps. *J Acquir Immune Defic Syndr* 66: S144-S153.
43. Majelantle R, Keetile M, Bainame K, Nkawana P (2014) Knowledge, opinions and attitudes towards HIV and AIDS among Youth in Botswana. *J Glob Econ* 2: 108.
44. Bankole A, Singh S, Woog V, Wulf D (2004) Risk and protection: Youth and HIV/AIDS in sub-Saharan Africa.
45. Hazarika I (2010) Knowledge, attitude, beliefs and practices in HIV/AIDS in India: Identifying the gender and rural–urban differences. *Asian Pac J Trop Med* 3: 821-827.
46. Veinot TC, Harris R (2011) Talking About, Knowing About HIV/AIDS in Canada: A Rural-Urban Comparison. *J Rural Health* 27: 310-318.
47. Maimaiti N, Shamsuddin, Abdurahim A, Tohti N, Maimaiti R (2010) Knowledge, attitude and practice regarding HIV/AIDS among University students in Xinjiang. *Glob J Health Sci* 2: 51.
48. Mulu W, Abera B, Yimer M (2014) Knowledge, attitude and practices on HIV/AIDS among students of Bahir Dar University. *Sci J Pub Health* 2: 78-86.
49. Takyi BK (2003) Religion and women's health in Ghana: Insights into HIV/AIDS preventive and protective behavior. *Soc Sci Med* 56: 1221-1234.
50. Ransome D (1990) Prevention and care: Trinidad's twin messages. *AIDS Watch* 9: 5-7.
51. Genrich GL, Brathwaite BA (2005) Response of religious groups to HIV/AIDS as a sexually transmitted infection in Trinidad. *BMC Public Health* 5: 121.
52. Chiao C, Mishra V, Sambisa W (2009) Individual-and community-level determinants of social acceptance of people living with HIV in Kenya: Results from a national population-based survey. *Health Place* 15: 742-750.
53. Lifson AR, Demissie W, Tadesse A, Ketema K, May R, et al. (2012) HIV/AIDS stigma-associated attitudes in a rural Ethiopian community: Characteristics, correlation with HIV knowledge and other factors, and implications for community intervention. *BMC Int Health Hum Rights* 12: 1.
54. Rahnama R, Rampal L, Lye MS, Rahman HA (2011) Factors influencing students' attitude towards HIV/AIDS in a public university, Malaysia. *Glob J Health Sci* 3: 128.
55. Amuri M, Mitchell S, Cockcroft A, Andersson N (2011) Socio-economic status and HIV/AIDS stigma in Tanzania. *AIDS Care* 23: 78-82.
56. Dahlui M, Azahar N, Bulgiba A, Zaki R, Mansur OO, et al. (2015) HIV/AIDS related stigma and discrimination against PLWHA in Nigerian population. *PLoS ONE* 10: e0143749.
57. Mall S, Middelkoop K, Mark D, Wood R, Bekker LG (2013) Changing patterns in HIV/AIDS stigma and uptake of voluntary counselling and testing services: The results of two consecutive community surveys conducted in the Western Cape, South Africa. *AIDS Care* 25: 194-201.
58. Hamra M, Ross MW, Orrs M, D'Agostino A (2006) Relationship between expressed HIV/AIDS-related stigma and HIV-beliefs/knowledge and behaviour in families of HIV infected children in Kenya. *Trop Med Int Health* 11: 513-527.