

Assessment of knowledge of HIV transmission and associated factors among women of reproductive age in Sierra Leone

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Abstract

Background

Despite breakthroughs in the prevention and treatment of human immune deficiency virus/ acquired immunodeficiency syndrome (HIV/AIDS), women are disproportionately affected. Understanding HIV/AIDS is a prerequisite for adopting behaviors that reduce the risk of HIV transmission. As a result, assessing women's awareness of HIV transmission and associated factors will aid in the development of effective prevention methods. This study aimed to assess the knowledge of HIV transmission and associated factors among Sierra Leonean women of reproductive age.

Methods

A cross-sectional study was conducted on women aged 15 to 49, using data from the 2019 Sierra Leone Demographic and Health Survey (n = 14,603). The prevalence of knowledge of HIV transmission was determined. Using Stata version 14, we used simple and multivariable logistic regression to determine factors associated with HIV transmission knowledge.

Results

The weighted prevalence of comprehensive knowledge of HIV transmission was 39.73%. The odds of having comprehensive knowledge of HIV were significantly higher with increasing age, 25–30 years old (AOR 1.47, 95% CI: 1.24–1.73), 30–49 years old (AOR 1.47, 95% CI: 1.21–1.77), having secondary education (AOR 1.34, 95% CI: 1.17–1.54), richer wealth status (AOR 1.53, 95% CI: 1.21–1.94), residing in the southern region (AOR 1.53, 95% CI: 1.17–1.54), reading newspapers or magazines (AOR 1.24, 95% CI: 1.04–1.49), and using the internet (AOR 1.40, 95% CI: 1.18–1.65). While having delivered 2 or more children (AOR 0.76, 95% CI: 0.64–0.89) and belonging to Islam religion (AOR 0.81, 95% CI: 0.72–0.91) were associated with lower odds of having comprehensive knowledge of HIV transmission.

Conclusions

At the individual, household, and social/policy levels, factors linked to a higher likelihood of having comprehensive HIV transmission knowledge exist. Some of these factors can be used by HIV program planners and the government to create effective women's initiatives aimed at increasing HIV education and lowering HIV infection rates. HIV health education efforts, as well as increasing educational attainment, wealth status, and media access, are required.

Introduction

Human immune deficiency virus (HIV) is a severe global public health issue, having claimed the lives of 36.3 million people globally so far (1). Even though antiretroviral therapy (ART) has reduced HIV/AIDS-related fatalities, HIV has no cure, and the possibility of having a vaccine is not clear (2). By the end of 2020, 37.7 million people were living with HIV globally and more than two-thirds of these (25.4 million) were from the world health organization (WHO) African region (1). Women and girls accounted for 63 percent of all new HIV infections in Sub-Saharan Africa in 2020 (3). HIV affects women in western and central Africa at a disproportional rate (3). Sierra Leone is a country in West Africa and has seen a similar trend (4) of women having a higher prevalence of HIV (2.2%) (5) than men (1.1%) (6). There are signs that the pandemic is escalating, with the potential to turn into a serious public health issue unless it is stopped quickly in Sierra Leone (7).

A most recent study conducted in Sierra Leone revealed, that 38% of the women had experienced at least one of the four risk factors of HIV and 27% (unmarried) were not using condoms, 12% had other sexually transmitted infections, less than 10% had engaged in transactional sex and had many sex partners (8). The prevalence of HIV risk factors was linked to age, parity, place of residence, region, sex of household head, marital status, and working status (8). Brima N, et al. discovered that people who lived in urban areas of Sierra Leone, and those who were previously married were more likely to be HIV positive (4). According to the findings of a study conducted in Ghana, increasing age, marital status, and religion were significantly associated with increased odds of HIV infection (9). Heterosexual intercourse accounted for 75 to 80% of all HIV cases, while vertical transmission from mother to child and blood transfusions accounted for 20% of HIV infections (9).

One of the risk factors for spreading HIV has been identified as a lack of understanding of HIV transmission and prevention (10). Simbayi L et al. discovered that respondents' knowledge of HIV transmission and prevention is still poor (11). A study conducted in Sierra Leone found low HIV knowledge in Sierra Leone's general population and was lower in women than in men (4). They discovered that only slightly more than 30% of the general population had heard of ART and knew where to get a condom (4). However, half of those infected in Sierra Leone are unaware of their HIV infection (5) and thus unable to access therapy or change their behavior. Evidence from a study of women of reproductive age in Sub-Saharan Africa discovered that 61.44% of them lacked comprehensive information regarding HIV/AIDS (12). Accurate HIV information including mother-to-child transmission (MTCT) knowledge, is critical for women of reproductive age because it influences behavior modification and encourages the adoption of self-protective attitudes such as increased perceived vulnerability, condom use, HIV testing (13), and seeking medical advice to prevent MTCT. In the absence of intervention, the rate of HIV transmission from an HIV-positive mother to her baby ranges from 15–45%; however, with appropriate care, this rate can be lowered to around 5% (14). Women's understanding of HIV transmission was linked to living in urban areas, secondary and higher educational levels, higher wealth status, exposure to the media, (12, 15) antenatal care as well as obtaining information from health care professionals (12, 15).

There is very little research on the HIV epidemic in Sierra Leone (16). The few available studies focused on HIV prevalence, testing (4, 16),(17), risk factors (8), HIV-related stigma (18), causes of hospitalization, predictors of HIV-associated mortality (19), and other areas. There has never been any study on knowledge of HIV transmission and related factors among Sierra Leonean women of reproductive age. Yet lack of knowledge on HIV predisposes women to HIV and their babies. To make it worse, only a half of those infected with HIV know their status (5, 20), less than 50% are on antiretroviral therapy (ART) and the viral suppression rate among those on ART is unknown (5). While those who do not know their HIV status, those who are not on ART, and those who are on ART but not virologically suppressed pose a high risk of transmitting HIV to others, to reduce the number of new HIV infections in Sierra Leone, women should have the skills, knowledge, and capacity to protect themselves against HIV. This study aimed to assess the knowledge of HIV transmission and associated factors among women of reproductive age in Sierra Leone.

Methods

Secondary data from the 2019 Sierra Leone Demographic and Health Survey (SLDHS) (6) was used in this study. A nationally representative sample of households was interviewed in this survey. Statistics Sierra Leone (Stats SL) conducted this cross-sectional survey with technical assistance from an ICF intern through the DHS Program, which was financed by the United States Agency for International Development (6). The survey was conducted from May 2019 to August 2019 in both rural and urban areas of Sierra Leone (6). A stratified, two-stage cluster sampling design was used which resulted in a random selection of 13,872 households (6). Women aged 15 to 49 who were permanent residents of the selected households or guests who slept in the household the night before the survey were eligible to participate. A total of 15,574 women were interviewed in this survey. The study gathered data on household members'

demographics, sexual and reproductive health, nutritional status, mortality and morbidity rates, breastfeeding practices, preventive health behaviors, and domestic violence (6). Detailed sampling procedures can be accessed in the Sierra Leone Demographic and Health Survey (2019) final report (6).

Only a weighted sample of 14,603 women out of 15,574 women in the data set completed the eight questions about HIV transmission that we used as our outcome variable in the secondary analysis of this study.

Study variables

Outcome variable

The outcome variable in this study was comprehensive knowledge of HIV transmission. It was derived from knowing whether: a healthy person can have HIV/AIDS and transmit it to others, HIV can be transmitted to the baby during pregnancy, HIV can be transmitted to the baby during delivery, HIV can be transmitted by breastfeeding, can HIV be gotten by sharing food with a person who has HIV, can HIV be gotten from mosquito bites, reduce the risk of getting HIV: have 1 sex partner only, who has no other partners, reduce the risk of getting HIV: always use condoms during sex. The outcome variable was a combination of all these 8 different questions. Comprehensive knowledge of HIV transmission was constructed into a binary variable. Coded 1 if a woman had comprehensive knowledge. If she answered all the 8 questions correctly, she had comprehensive knowledge of HIV (12) transmission (if she said yes to; HIV can be transmitted to the baby during pregnancy, HIV can be transmitted to the baby during delivery, HIV can be transmitted by breastfeeding, a healthy person can have HIV/AIDS, reduce the risk of getting HIV: have 1 sex partner only, who has no other partners and reduce the risk of getting HIV: always use condoms during sex besides answering no to; can HIV be gotten by sharing food with a person who has HIV in addition to, can HIV be gotten from mosquito bites). If a woman did not answer all the 8 questions correctly, she demonstrated noncomprehensive knowledge of HIV transmission and it was coded 0.

Independent variables

Literature (12, 15, 21-27) and the socio-ecological model (28) guided us in the selection of independent variables. Individual, household, community, and social/policy elements are divided into four groups in this paradigm (28).

Individual factors

Age was grouped into 15–19 years, 20–24 years, 25–30 years, and 31–49 years. Education was categorized as no education, primary, secondary and higher. Employment was divided into unemployed or employed.

Household factors

Demographic and Health Survey generated wealth index as a composite variable using principal component analysis following an assessment of household tangible possessions. It has five categories ranging from poorest to richest. Marital status was categorized as never married, married/ cohabiting, and separated/divorced/widow. While total children ever born was grouped into zero, one child, two, and more children.

Community factors

The place of residence was divided into two categories: urban and rural. Religion was recoded into two groups: non-slam and Islam. While the region was grouped into four: eastern, northern, western, and southern.

Social/policy factors

Exposure to mass media (newspapers/magazines, television, radio, and the internet) was divided into two categories: no and yes.

Statistical analysis

All statistical analyses in Stata 14 were done using weighting, and the level of statistical significance was set to 0.05. Variance Inflation Factor (VIF) was used to test for multicollinearity amongst the predictors and the highest was 5. Descriptive statistics of the study sample's characteristics and knowledge of HIV transmission were also provided. The crude odds ratios were then calculated using bivariable logistic regressions for each independent variable separately to assess its association with the outcome variable of knowledge of HIV transmission. The crude odds ratio (COR), 95 percent confidence interval (CI), and p-values were displayed. Thereafter, significant variables were regressed collectively in a multivariable logistic regression to provide the adjusted odds ratios (AOR).

Results

Description of the study sample

A weighted sample of 14,603 women aged 15–49 years participated in this study. Of these, 39.73% had comprehensive knowledge of HIV transmission and 60.27% had noncomprehensive knowledge of HIV transmission. See Table 1. The highest prevalence of both comprehensive and non-comprehensive knowledge of HIV transmission was seen in the 30–49-year age group, the employed, the married/cohabiting, women with 2 or more children, Islam women as well as those from the western region. While women with higher education and the separated/divorced/widowed had the lowest prevalence of comprehensive and non-comprehensive knowledge of HIV transmission.

The proportion of comprehensive knowledge of HIV transmission increased with levels of wealth index, from 13.35 to 29.11%. Most of the women were uneducated (43.76%) married/cohabiting (61.80%), employed (68.52%), and had 2 or more children (57.17%). Over half (51.99%) of the sample lived in urban areas and 46.80% of these vs 56.22% in rural areas had comprehensive knowledge of HIV transmission. Most of the respondents were Islam 76.23% vs 23.77% non-Islam and the majority (41.79%) of the women stayed in the western region. More women in the western region had higher knowledge of HIV transmission than those who lived in other regions. Generally, most of the respondents did not have access to mass media (newspapers/magazines, TV, radio, and internet). Table 1 summarizes the study sample's characteristics, which are further stratified by the level of knowledge of HIV transmission.

Table 1

Characteristics of study sample and knowledge of HIV transmission prevalence in relation to socio-economic risk factors

Variables	Comprehensive knowledge	Noncomprehensive knowledge	Total sample(%)
Total sample	5,802(39.73%)	8,801(60.27%)	14,603 (100.00)
Individual factors			
Age			
15–19	1,298 (22.38)	1,903 (21.62)	3,202 (21.92)
20–24	1,036 (17.85)	1,469 (16.69)	2505 (17.15)
25–30	1,353 (23.32)	1,857 (21.10)	3,210 (21.98)
31–49	2,115 (36.46)	3,570 (40.58)	5,686 (38.94)
Education			
No education	2,138 (36.85)	4,252 (48.32)	6,391(43.76)
Primary	682 (11.76)	1,267(14.39)	1,949 (13.35)
secondary	2,610 (44.98)	2,987 (33.94)	5,597(38.33)
Higher	371 (6.40)	294 (3.35)	666 (4.56)
Employment			
Unemployed	2,010 (34.65)	2,587(29.39)	4,597 (31.48)
Employed	3,792 (65.35)	6,214 (70.61)	10,006 (68.52)
Household factors			
Wealth Index			
Poorest	775 (13.35)	1,649 (18.74)	2,424 (16.60)
Poorer	788 (13.58)	1,763(20.03)	2,551 (17.47)
Middle	969 (16.70)	1,743 (19.81)	2,712 (18.57)
Richer	1,581 (27.25)	1,711 (19.44)	3,292 (22.54)
Richest	1,689 (29.11)	1,935 (21.99)	3,625 (24.82)
Marital Status			
Never married	2,159 (37.21)	2,663 (30.26)	4,822 (33.02)
Married/cohabiting	3,336 (57.49)	5,689 (64.64)	9,025 (61.80)
Separated/divorced/widow	308 (5.30)	449 (5.10)	756 (5.18)
Total children ever born			
Zero	1,722 (29.67)	2,169 (24.65)	3,891 (26.64)
One	1,048 (18.05)	1,317 (14.97)	2,365 (16.19)

% and Number in Table 1 are weighted. (Unweighted N = 14,434). Missing *****=11

Variables	Comprehensive knowledge	Noncomprehensive knowledge	Total sample(%)
Two and more	3,033 (52.28)	5,3155 (60.39)	8,348 (57.17)
Community Factors			
Residence			
Rural	3,262 (56.22)	3,748 (42.59)	7,010 (48.01)
Urban	2,540 (43.78)	5,052 (57.41)	7,593 (51.99)
Religion			
Non-Islam	1,640 (28.27)	1,831 (20.81)	3,472 (23.77)
Islam	4,162 (71.73)	6,969 (79.19)	11,131 (76.23)
Regions			
Eastern	1,051 (18.12)	1,854 (21.06)	2,905 (19.89)
Northern	1,135 (19.56)	1,910 (21.70)	3,045 (20.85)
Western	2,462 (42.43)	3,640 (41.36)	6,102 (41.79)
Southern	1,155 (19.90)	1,397 (15.87)	2,552 (17.47)
Social and Policy Factors			
Reads newspaper or magazines*****			
NO	5,129 (88.46)	8,240 (93.70)	13,369 (91.62)
Yes	669 (11.54)	554 (6.30)	1,223 (8.38)
Watches TV			
NO	3,991 (68.79)	6,281 (71.36)	10,676 (73.96)
Yes	1,811 (31.21)	2,520 (28.64)	3,758 (26.04)
Listens to radio			
NO	2,909 (50.13)	4,961 (56.37)	7,869 (53.89)
Yes	2,894(49.87)	3,840 (43.63)	6,734 (46.11)
Uses internet			
NO	4,672 (80.53)	7,907 (89.85)	12,579 (86.14)
Yes	1,130 (19.47)	894 (10.15)	2,023 (13.86)
% and Number in Table 1 are weighted. (Unweighted N = 14,434). Missing *****=11			

Knowledge of HIV transmission among women of reproductive age in Sierra Leone

A total of 39.73% of respondents had comprehensive knowledge of HIV transmission. The majority (86.89%) of respondents agreed that having only one sex partner with no other partners reduces the risk of acquiring HIV and that using condoms always during sex reduces the risk of acquiring HIV (78.45%), Table 2. Furthermore, 69.12%, 72.31%, and

77.12% of respondents correctly identified HIV transmission during pregnancy, delivery, and breastfeeding, respectively. See Table 2.

Table 2
Knowledge of HIV transmission among women of reproductive age in Sierra Leone

Variables	Frequency	Percentage
Can HIV be transmitted during pregnancy?		
Yes	10,093	69.12
No	4,510	30.88
Can HIV be transmitted during delivery?		
Yes	10,559	72.31
No	4,043	27.69
Can HIV be transmitted by breastfeeding		
Yes	11,262	77.12
No	3,341	22.88
Can HIV be gotten by sharing food with a person who has HIV?		
No	8,455	57.9
Yes	6,148	42.1
Can HIV be gotten from mosquito bites?		
No	8,455	57.9
Yes	6,148	42.1
A healthy-looking person can have HIV		
Yes	9,984	68.37
No	4,619	31.63
Reduce the risk of getting HIV: have 1 sex partner only, who has no other partners		
Yes	12,689	86.89
No	1,914	13.11
Reduce the risk of getting HIV: always use condoms during Sex		
Yes	11,456	78.45
No	3,147	21.55
Comprehensive knowledge(Women who answered all the above questions correctly)		
Yes	5,802	39.73%
No	8,801	60.27%
The correct answers to the questions assessing knowledge of HIV transmission in Table 2 are bolded.		

Factors associated with having comprehensive knowledge of HIV transmission among women of reproductive age in Sierra Leone

Multivariable regression

After adjusting for other variables, being 25–30 years old (AOR 1.47, 95% CI: 1.24–1.73), and 30–49 years old (AOR 1.47, 95% CI: 1.21–1.77) were associated with higher odds of having comprehensive knowledge of HIV transmission compared to being 15–19 years old, see Table 3. Secondary education (AOR 1.34, 95% CI: 1.17–1.54), richer wealth status (AOR 1.53, 95% CI: 1.21–1.94), residing in the southern region (AOR 1.53, 95% CI: 1.17–1.54), reading newspapers or magazines (AOR 1.24, 95% CI: 1.04–1.49), and using the internet (AOR 1.40, 95% CI: 1.18–1.65) were associated with higher odds of having comprehensive knowledge of HIV transmission, Table 3. While having delivered 2 or more children (AOR 0.76, 95% CI: 0.64–0.89) and belonging to Islam religion (AOR 0.81, 95% CI: 0.72–0.91) were associated with lower odds of having comprehensive knowledge of HIV transmission, see Table 3.

Table 3

Factors associated with having comprehensive knowledge of HIV transmission among women of reproductive age in Sierra Leone

	Crude model			Adjusted model		
	COR	P-value	[95% CI Interval]	AOR	P-value	[95% CI Interval]
Knowledge on HIV transmission						
Individual factors						
Age of respondent(ref:15–19)						
20–24	1.033	0.610	0.91–1.17	1.15	0.059	0.99–1.33
25–30	1.068	0.285	0.95–1.20	1.47	0.000	1.24–1.73
30–49	0.868	0.009	0.78–0.96	1.47	0.000	1.21–1.77
Education (ref: no education)						
Primary	1.072	0.315	0.94–1.23	1.03	0.736	0.89–1.18
Secondary	1.738	0.000	1.58–1.92	1.34	0.000	1.17–1.54
Higher	2.51	0.000	1.98–3.17	1.25	0.123	0.94–1.66
Education (ref: unemployed)						
Employed	0.79	0.000	0.71–0.87	1.02	0.715	0.91–1.14
Household factors						
Wealth quintile(ref: poorest)						
Poorer	0.95	0.605	0.79–1.15	0.99	0.946	0.82–1.21
Middle	1.18	0.071	0.99–1.42	1.14	0.177	0.94–1.38
Richer	1.97	0.000	1.62–2.39	1.53	0.000	1.21–1.94
Richest	1.86	0.000	1.52–2.27	1.23	0.127	0.94–1.61
Marital status(ref: Never married)						
Married/living together	0.72	0.000	0.66–0.79	0.95	0.474	0.84–1.09
Separated/Divorced/Widow	0.85	0.074	0.70–1.02	0.98	0.856	0.80–1.21
Total children ever born(ref: zero)						
One	1.00	0.971	0.90–1.12	0.96	0.533	0.84–1.10
2 and more	0.72	0.000	0.66–0.79	0.76	0.001	0.64–0.89
Community factors						
Residence(ref: Rural)						
Urban	0.58	0.000	0.50–0.67	0.82	0.075	0.66–1.02
Religion(ref: non-Islam)						
Islam	0.67	0.000	0.59–0.75	0.81	0.001	0.72–0.91

P significant at < 0.05, COR = crude Odds Ratio, AOR = Adjusted Odds Ratio. The significant findings are bolded.

	Crude model			Adjusted model		
Regions(ref: Eastern)						
Northern	1.05	0.680	0.84–1.31	1.11	0.409	0.87-1.41
Western	1.19	0.079	0.98–1.45	0.93	0.471	0.75-1.14
Southern	1.45	0.002	1.15–1.85	1.53	0.001	1.20–1.96
Social and Policy factors						
Reads newspapers or magazines(ref: no)						
Yes	1.94	0.000	1.65–2.28	1.24	0.019	1.04–1.49
Watches TV(ref: no)						
Yes	1.13	0.060	0.99–1.29	0.93	0.220	0.83–1.04
Listens to radio(ref: no)						
Yes	1.29	0.000	1.17–1.42	0.99	0.830	0.88 – 1.10
Uses internet (ref: no)						
Yes	2.14	0.000	1.85–2.47	1.40	0.000	1.18 1.65
P significant at < 0.05, COR = crude Odds Ratio, AOR = Adjusted Odds Ratio. The significant findings are bolded.						

Discussion

This study assessed knowledge of HIV transmission and associated factors among Sierra Leonean women aged 15–49. Our analysis found that 39.73% of the women had comprehensive knowledge of HIV transmission. This study's prevalence was almost like that seen in a study conducted on Sub-Saharan African women of reproductive age (38.56%) (12). The prevalence of comprehensive knowledge of HIV in other studies done in Uganda (23.1%) (27), Ethiopia (25.2%) (29), South Sudan (21.21%) (21), and Bolivia (31%) (22) was lower than for our study. Contrary to our findings, a study conducted in Bangladesh (52.2%) (23) and Pakistan (68%) (24) found a higher prevalence of knowledge of HIV/AIDS transmission among women. The discrepancy in the prevalence reported in this study and prior studies did elsewhere could be attributable to differences in respondents' socioeconomic and sociocultural factors between nations (12). While our study focused explicitly on assessing knowledge of HIV transmission and associated determinants, the studies mentioned above looked at HIV knowledge and a few dimensions of HIV transmission.

The fact that 22.88–31.63% of Sierra Leonean women of childbearing age are unaware that a healthy person can have HIV and transmit it (31.63%), that HIV can be transmitted during pregnancy (30.88%), delivery (27.69%) and during breastfeeding (22.88%), is a major setback in the fight against the disease. Yet evidence indicates the pandemic appears to be escalating and has the potential to become a significant public health problem in Sierra Leone (7). Given that only half of the HIV-positive people are aware of their illness (5) and 38% of women have HIV risk factors (8), this is unsurprising. HIV patients who are uninformed of their HIV status, those who are not on ART, and those who are on ART but are not virologically suppressed all have a high risk of spreading the virus to others. For example, not knowing that a healthy-looking person can be infected with HIV may lead to unprotected sexual encounters with an infected person. From that perspective, educating women about HIV is paramount. Evidence suggests that having comprehensive knowledge of HIV is critical to controlling the epidemic (30). WHO states that having a good understanding of HIV/AIDS is a necessary (but often insufficient) condition for adopting behaviors that lower the risk of HIV transmission (31). This

research has important public health implications in terms of developing effective public health interventions to lower HIV/AIDS incidence in Sierra Leone.

Increasing age was significantly associated with higher odds of having comprehensive knowledge of HIV transmission in our study. This means that women above the age of 20 knew more about HIV transmission than women under the age of 20. This could be attributed to the scarcity of comprehensive sexuality education programs for adolescents (32). It could also be explained by social aversion to discussing sex and sexual issues with their peers and family members, which would further limit their ability to obtain HIV-related information (25). As a result, greater HIV/AIDS information and education for young women, particularly those aged 15 to 19 in Sierra Leone, is required. Making sure that young people know how to prevent HIV infections and where they can safely access HIV prevention, sexual and reproductive health services is a critical component of HIV responses (33), especially before sexual debut. In support of our findings, evidence shows that one in every four (23%) young women in Western Africa has comprehensive knowledge about HIV prevention (32). Similar to our result, a study which was conducted among women of reproductive age in sub-Saharan Africa revealed that older age was associated with comprehensive HIV knowledge (12). When compared to older pregnant women, Amoran, Olorunfemi E et al. discovered that teenage pregnant women who were more vulnerable to HIV/AIDS infection were less likely to have HIV knowledge and to use prevention of mother to child transmission (PMTCT) services (34). A study done in Sub-Saharan Africa found, that teenage girls aged 15–19 years account for 80% of all HIV infections among adolescents (35). Furthermore, a Nigerian study discovered that the prevalence of HIV among female teenagers was 7.4%, compared to 1.8% among older women (34). Contrary to our findings, a study done in South Sudan showed that being a young woman was protective against low knowledge of HIV (21).

Secondary education was found to be associated with a higher likelihood of having comprehensive knowledge of HIV transmission when compared to the uneducated. Similar to our study, HIV-related knowledge was found to be relatively poor among women with low literacy levels in a study conducted in Nigeria (36). This is because women with a higher level of education have a better understanding of HIV information, better access to health care, access to information (25), and engagement in HIV/AIDS public education programs. To benefit uneducated women, HIV transmission and prevention information should be distributed verbally or in pictorial forms rather than in text. Other studies found that having primary (22)(37), secondary (31) (26, 37) or higher education (9, 22, 32)(37) was associated with a higher likelihood of having good HIV knowledge (9, 22, 31, 32)(38). In our study, primary and higher education had no statistically significant relationship with the knowledge of HIV transmission.

Being in the richer wealth quintiles was significantly linked to higher odds of having comprehensive knowledge of HIV transmission compared to the poorest in our study. A study done in Nigeria found individuals in the upper wealth quintile were less than half as likely as those in the lower wealth quintile to have low HIV-related knowledge in the general population (36). Other studies done in Malawi (37), Ghana (26), and Sub-Saharan Africa (38) found that the rich have more comprehensive HIV knowledge than the poor. Women in low wealth quintiles confront several obstacles, including limited access to HIV-related information due to economic constraints (36). Furthermore, wealth influences the distribution of socioeconomic variables like education, economic opportunities, and mass media exposure in both direct and indirect ways (37). While women in higher socioeconomic quintiles can afford to access HIV information through media and health facilities, women in lower socioeconomic quintiles may lack transport funds to health centers and to gain access to HIV-related media. Our findings suggest that future HIV awareness and education campaigns should target disadvantaged women, particularly those who are worse off due to wealth disparities and empower them economically.

Women who read newspapers or magazines and those who used the internet had higher odds of comprehensive knowledge of HIV transmission compared to those who did not. This is not surprising given that mass media has been consistently linked to comprehensive HIV/AIDS knowledge among respondents (38–40), including how the HIV spreads,

and preventive behaviors (41). Evidence shows women who read newspapers or magazines, listened to the radio, and watched television had higher odds of having comprehensive knowledge of HIV/AIDS, according to a study done in Ethiopia (29). Additionally, a study conducted in Uganda revealed that exposure to mass media such as print media, radio, and television enhanced the probability of adolescents' having HIV-related knowledge (42). Though only reading newspapers/magazines and using the internet were found to be associated with a higher likelihood of having comprehensive knowledge of HIV transmission in our study, watching television and listening to the radio had no statistical association in multivariable analysis. In contrast to our findings, an Ethiopian study indicated that HIV/AIDS-related mass media exposure had no significant impact on HIV/AIDS-related knowledge in the total population (43).

Living in Southern Sierra Leone was also associated with higher odds of having comprehensive HIV knowledge. Though the reason behind this finding is not clear to us. We recommend a study to be conducted in this region to find out why living in the Southern region is associated with a higher likelihood of having comprehensive HIV transmission knowledge compared to staying in the eastern region. The HIV transmission knowledge promoting factors that will be found in women staying in southern Sierra Leone can be copied and replicated in the eastern region.

When compared to nulliparous mothers, women with 2 or more children had a lower likelihood of having comprehensive knowledge of HIV transmission in our study. This is a surprising finding because women with two or more children are assumed to have received antenatal (ANC) and postnatal care (PNC) for each child. Evidence shows that HIV/AIDS health education sessions in health institutions during pregnancy or postnatal care are associated with good awareness of HIV/AIDS transmission (44). Our findings may be attributed to Sierra Leone's poor antenatal and delivery services (45). The findings highlight the importance of the health sector monitoring the quality of antenatal and postnatal services including HIV health education as well as HIV prevention services provided to women in Sierra Leone. Improved integration of HIV services with sexual and reproductive health services, as well as antenatal care, is required (32) to educate women on HIV transmission and prevention. Belonging to the Islam religion was also associated with lower odds of having comprehensive knowledge of HIV transmission compared to non-Islam. This may be due to lack of openness about HIV/AIDS because it is associated with negative activities such as sexual activity, which is prohibited in Islam (46). It is important to consider HIV awareness programs aimed at women of Islam denomination while involving Muslim leaders, as well as adapting HIV prevention programs to Islamic religious values in order to improve program acceptability.

Strengths And Limitations

This study used the most recent SLDHS data which was collected using standardized techniques and validated questionnaires, ensuring both internal and external validity of the results. Our results are generalized to all women in Sierra Leone since we employed a large sample size that was nationally representative and sample weight was applied. Despite its strengths, there are several drawbacks to consider. Since the data used was cross-sectional, causality could not be established. In addition, the study may have biases such as recall and interviewer bias. To appease the interviewer, participants may have offered good responses (social desirability bias). We were unable to estimate the magnitude of these biases.

Although only 39.73% of women of reproductive age had comprehensive knowledge of HIV transmission, this may not be the main reason for HIV transmission in women and why the prevalence of HIV in women in Sierra Leone is two times that of men. Cultural norms that discriminate against women may partly be to blame, even though they were not reflected in the SDHS survey. Regardless, the study presents important insights that can help public health officials in Sierra Leone to address inequitable noncomprehensive HIV transmission knowledge among women of reproductive age.

Conclusion

In Sierra Leonean women of reproductive age, comprehensive knowledge of HIV was found to be 39.73%. The findings also revealed that increasing age, secondary education, richer wealth status, residing in the southern region, reading newspapers or magazines, and using the internet were associated with higher odds of having comprehensive knowledge of HIV transmission. While having delivered 2 or more children and belonging to Islam were significantly associated with lower odds of having comprehensive knowledge of HIV transmission in our study. To address this epidemic, effective women's initiatives focusing on HIV health education should target disfavoured women such as Muslims (Islam), pregnant/postnatal mothers, girls before sexual debut, uneducated, and women from low wealth status. Inequalities in education, wealth, and access to media, particularly newspapers and magazines, as well as the internet should be eliminated also. Our findings suggest that health educators and HIV program planners in Sierra Leone should make use of the mass media and offer more HIV related messages via newspapers, magazines, the internet, ANC/PNC points, schools, and mosques besides mass campaigns to improve HIV transmission knowledge among women of reproductive age and the information should be tailored understandably.

Abbreviations

EA Enumeration area

AOR Adjusted Odds Ratio

CI Confidence Interval

COR Crude Odds Ratio

DHS Demographic Health Survey

SLDHS Sierra Leone Demographic Health Survey

OR Odds Ratio

ART Antiretroviral Therapy

HIV/AIDS Human Immune Deficiency Virus

AIDS Acquired Immunodeficiency Syndrome

Declarations

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No funding was obtained for this study.

Availability of data and materials

The data set used is openly available upon permission from the MEASURE DHS website (URL: <https://www.dhsprogram.com/data/available-datasets.cfm>). However, authors are not authorized to share this data set

with the public, but anyone interested in the data set can seek it with written permission from the MEASURE DHS website (URL: <https://www.dhsprogram.com/data/available-datasets.cfm>). The corresponding author, Luwedde Mary, has data used for analysis during the current study.

Author contributions

LM conceived the idea, drafted the manuscript, performed analysis, interpreted the results, and drafted the subsequent versions of the manuscript. QS reviewed the first draft and drafted the subsequent versions of the manuscript. All authors read and approved the final manuscript.

Ethics approval and consent to participate

This study used secondary data from the Demographic and Health survey for Sierra Leone, 2019. The Demographic Health Survey program was asked for permission to download Sierra Leone Demographic Health Survey data. We were permitted to download the survey data for statistical reporting and analysis, but we were cautioned to keep the data confidential. There were no personal identifiers for the individual survey participants in the data we used for this study. It was anonymized. This study was carried out in conformity with the Declaration of Helsinki's relevant guidelines and regulations.

The ICF Institutional Review Board (IRB) examined and approved procedures and questionnaires for the Sierra Leone Demographic Health Survey of 2019. Sierra Leone IRB reviewed the protocols for the Survey. The ICF IRB ensured that the survey followed US Department of Health and Human Services regulations for human subject protection, while the Sierra Leone IRB ensured that the survey complied with Sierra Leone laws and norms.

Before each interview, an informed consent statement was read to the respondent, who had a right to accept or decline to participate. The respondent had a right to refuse to answer any question or to withdraw from the survey at any time. A parent or guardian provided consent before participation by a child or adolescent. Interviews were performed as privately as possible. Each respondent's interview data files were identified only by a series of numbers, including enumeration area (EA) number, household number, and individual number. After data processing, questionnaire cover sheets containing these identifier numbers were destroyed, and EA and household numbers were randomly reassigned.

Consent for publication

Not applicable.

Competing interests

All authors declare that they have no competing interests.

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