Vulnerability to HIV infection among adolescent girls and young women in Nigeria

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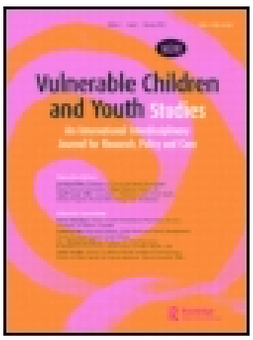

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ARTICLE

Vulnerability to HIV infection among adolescent girls and young women in Nigeria

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ABSTRACT

Adolescent girls and young women (AGYW) account for a disproportionate number of new HIV infections among young people living with HIV. This study identified factors associated with the vulnerability of AGYW to HIV infection in Nigeria. We conducted a cross-sectional survey of AGYW aged 15–24 years in three states (Akwa-Ibom, Kaduna, and Oyo) and the Federal Capital Territory (FCT) Abuja in Nigeria. We collected information on sociodemographic characteristics, risky sexual behaviors, practices, attitudes, perceptions of HIV, and related socio-cultural experiences from 4320 respondents. We identified twelve vulnerability factors and used a modified Delphi technique to assign relative weights to each. Composite vulnerability score was calculated by adding the weighted scores on all factors for each respondent and dichotomized using k-median analysis. Higher scores corresponded to higher vulnerability to acquiring HIV. More than 43% had a high vulnerability to HIV infection. Being older, of lower educational status, married, in a lower wealth quintile, and having low self-esteem were statistically significantly associated with being more vulnerable to acquiring HIV. Being knowledgeable about HIV prevention was protective but not statistically significant. We conclude that sociodemographic characteristics and self-esteem are important determinants of vulnerability to acquiring HIV among young women in Nigeria. Interventions targeted to reduce vulnerability to HIV among young women must address social-demographic and psychological risk factors.

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Introduction

Adolescents girls and young women (AGYW) are disproportionately affected by HIV. In sub-Saharan Africa, 67% of the nearly 9 million youths infected with HIV are females (Haruna & Ago, 2014). With a national prevalence at 1.4% in 2018 (Federal Ministry of Health, 2019), about 40% of the new HIV infections in Nigeria previously occurred

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among young people aged 15 to 24 years (Idele et al., 2014). Among this group, female adolescents are more likely to engage in sex earlier than boys. They often have male sexual partners older than them (Saad et al., 2013). Also, 15% of girls and 4% of boys have had sex before their fifteenth birthday (National Bureau of Statistics & UNICEF, 2017).

Varying factors drive the prevalence of HIV infection among adolescent girls and young women. (Folayan et al., 2014). Inter-generational relationships are common in Nigeria as older men are known to target young girls as sexual partners. They believe that young girls are unlikely to be sex workers and are unlikely to be infected with HIV (Oyediran et al., 2011). Besides, many women/girls engage in transactional sex and, as a result, have a high rate of partner change (UNAIDS, 2017). The National HIV/AIDS and Reproductive Health Survey (NARHS) 2012 showed that 7% of females aged 15–19 years and 8% aged 20–24 years had multiple sex partners in the preceding 12 months. Among females in these two age groups, those with multiple sexual partners had an HIV prevalence rate of 6%, those who were not sexually active 2.8%, and those with a single partner 5% (Federal Ministry of Health, 2012). Furthermore, the HIV prevalence rate was much higher amongst females who reported transactional sex than males. According to the study, about 26% of AGYW who reported a history of transactional sex were HIV positive against 7% of AGYW who did not report such practices.

The type of work adolescent girls and young women of low socioeconomic status do increase the risk of acquiring HIV (UNICEF, Joint United Nations Programme on HIV/AIDS & World Health Organization, 2002). Hawking, domestic service, and those working in and around high-risk locations such as bars, hotels, and restaurants have higher infection risks. Furthermore, unemployment or working in poorly paid jobs can lead to economic vulnerability. This vulnerability may motivate young people to sell sex or embarking on age-disparate, transactional relationships (Wamoyi et al., 2016). Cultural factors contributing to young women's vulnerability to HIV include early marriage to older men, especially those in polygamous unions (Awotidebe et al., 2014). They are also disproportionately affected by gender-based violence and its complications (Saad et al., 2013). Although adolescence and youth are a vulnerable time, interventions for HIV prevention for this age group provide opportunities for reducing the prevalence of HIV in future adult populations (Dellar et al., 2015). Therefore, the need to identify the individual, social, environmental, and systemic factors that drive adolescent girls and young women's vulnerabilities to HIV infection in Nigeria is imperative.

The Society for Family Health (SFH), Nigeria, collaborated with the Institute of Public Health (IPH), Obafemi Awolowo University, Nigeria, to develop and implement an action-research to address HIV vulnerabilities among adolescent girls and young women in Nigeria in 2016. As part of the action research, we conducted a baseline assessment in selected study locations. Our objectives were to assess the HIV vulnerability status of adolescent girls and young women in Nigeria and determine factors associated with their vulnerability status. This study is a report of our findings from the baseline assessment.

Materials and methods

This study was a cross-sectional descriptive study of adolescent females and young women between 15 and 24 years of age in three states (Akwa-Ibom, Kaduna, Oyo States) and the Federal Capital Territory (FCT) Abuja. In each state, we purposively

Table 1. Study location – states and local government areas (LGA)

States	Local Govt. Areas
Akwa-Ibom	Ikot-Ekpene
	Oron
	Eket
FCT Abuja	Bwari
	Gwagwalada
	Kuje
Kaduna	Chikun
	Lere
	Sabon'gari
Oyo	Ogbomosho North
	Ibadan North
	Afijio

FCT: Federal Capital Territory

selected three Local Government Areas (LGAs) (Table 1). We derived a minimum sample size at a 95% confidence level with a precision margin of 5%, a design effect of 1.5, and an estimate of true proportion (10–19-year-olds reporting a history of concurrent multiple sexual partners) of 27% (Aboki et al., 2014), to be 302. The sample size was adjusted upwards to 360 per LGA to account for non-responses and incomplete interviews.

A multi-stage sampling technique was employed to select respondents. A computer-assisted simple random sampling of 30 Enumeration Areas (EAs) was done from a list of all EAs in the LGA in each LGA. In each selected EA, we conducted a household listing exercise to generate a sampling frame of all eligible households (i.e., households with females aged 15–24 years). From this sampling frame, 12 households were selected per EA per LGA using a computer-assisted random selection. Data from the households was collected with the aid of a computer-assisted personal interview (CAPI) device. In selected households with more than one eligible respondent, the mobile survey application was set to select which respondent was to interview randomly. We interviewed a total of 4320 AGYW.

We collected information on the respondents' background characteristics, knowledge and use of the male and female condoms, sexual history, sexually transmitted infections (STIs) and treatment-seeking behavior, knowledge, opinions, and attitudes about HIV and AIDS, incest, rape, pregnancy, and self–esteem.

Twelve vulnerability factors were identified from extant literature (Bekker et al., 2015; Råssjö et al., 2006; Underwood et al., 2011) and operationalized (Box 1). Each operationalized vulnerability factor was given a weight derived by consensus among content-expert members of the National Prevention Technical Working Group headed by the National Aids Control Agency (NACA) in Nigeria. Using a modified Delphi approach, but with only one iteration, 20 expert-members were asked to score each factor over ten points on the degree to which they consider that it confers vulnerability to acquiring HIV among AGYW. Mean scores were calculated across each factor, and the mean scores were converted to proportions of a maximum score of one (Box 1). These final scores served as the weights for each vulnerability factor. Each item was given the corresponding weighted score for each respondent, if present and zero to indicate its absence. Using Cronbach's alpha, the scale's reliability coefficient was 0.55. Cronbach's Alpha 'if-item-deleted' did not significantly improve the overall Cronbach Alpha, therefore all items were retained. While one study

achieved Cronbach's Alpha of as high as 0.74 on a similar HIV vulnerability scale (Bradley et al., 2011), we decided to retain our 12-item scale as it is in spite of the relatively low Cronbach's Alpha.This was because the scale items are related to vulnerability to HIV from a theoretical point of view. The scores for each of the 12 factors for each respondent was summed to derive their vulnerability score. Subsequently, the k-median analysis was used to estimate a cut-off value of 1.8 to determine low/high vulnerability: scores above 1.8 were considered to indicate a high vulnerability to acquiring HIV.

Besides, 15 statements dealing with the respondents' general feelings about themselves were presented to each respondent. Each statement was scored on a Likert scale as follows: 5: Strongly agree; 4: Agree; 3: Undecided; 2: Disagree; and 1: Strongly disagree. The specific question indicated the direction of low or high self-esteem. Each question was adjusted during data analysis such that a score of 5 would consistently indicate the highest perceived self-esteem. In contrast, a score of 1 would indicate the lowest perceived self-esteem. Self-esteem status was operationalized by summing the responses to the 15 items for each respondent to get a composite self-esteem score. Using Cronbach's alpha, the scale's reliability coefficient was 0.79. Subsequently, the median of the composite score was used as the cut-off to determine low/high self-esteem status: scores above the median score of 34 were considered to indicate a high self-esteem status.

The frequency and proportion of each vulnerability factors are presented. Poisson regression analysis with robust estimation of standard errors (Coutinho et al., 2008) was used to estimate crude and adjusted prevalence ratio to determine factors associated with vulnerability to HIV. Analyses were conducted using Stata 14. Statistical significance was set at $p < 0.05$. Ethical approval was obtained for this study from the National Health and Research Ethics Committee with approval number NHREC/01/01/2007-13/09/2016.

Results

Our results, as seen in Table 2, showed that the majority of the respondents were aged 15–19 years (53.1%), had up to secondary school education (69.0%), were never married (73.9%) and, Christians (64.8%). Table 3 shows that the most prevalent vulnerability factor was low HIV risk perception (87.9%). This was followed in order by gender-based violence (44.3%), unprotected sex (43.0%), prior STI (30.3%), early sexual debut (30.1%), poverty (20.0%), substance use (18.3%), teen pregnancy (12.6%), and early marriage (11.6%). The least prevalent vulnerability factors included rape (8.3%), multiple sexual partner (5.4%), transactional sex (4.3%), intergenerational sex (1.1%) and incest (0.3%) (Table 2). The vulnerability score had a mean of 1.9 (SD ±1.2) and a median of 1.6. Figure 1 shows the percentage of respondents with varying numbers of vulnerability factors. Among all the respondents, 31.0% had at least one vulnerability factor, and 3.7% had no vulnerability factor, while 0.1% had up to nine.

When we dichotomized the vulnerability score, 43.4% of respondents were classified as having a high vulnerability to HIV infection. Using a Poisson regression model with HIV vulnerability status as the dependent variable and adjusting for background characteristics, respondents from FCT Abuja (APR = 0.59, $p < 0.001$), Kaduna State (APR = 0.67, $p < 0.001$), and Oyo State (APR = 0.64, $p < 0.001$) had a lower prevalence of high vulnerability to HIV infection compared with those from Akwa Ibom (Table 4). Older respondents (aged 20–24 years) had a higher prevalence of high vulnerability to

Table 2. Sociodemographic characteristics of respondents

Variables	Freq. (N = 4320)	%
Age group		
15–19 years	2295	53.1
20–24 years	2025	46.9
Highest level of education		
No formal education	372	8.6
Primary	526	12.2
Secondary	2992	69.3
Higher	430	10.0
Marital status		
Married/cohabiting	1086	25.1
Divorced/separated/widow	43	1.0
Never married	3191	73.9
Religion		
Islam	1490	34.5
Orthodox (Non-Catholic Christian)	1137	26.3
Catholic Christian	358	8.3
Pentecostal Christian	1304	30.2
Others	31	0.7
Wealth quintile		
Poorest	865	20.0
Poorer	863	20.0
Middle	864	20.0
Richer	864	20.0
Richest	864	20.0

Table 3. Frequency and percentage of HIV vulnerability factors among respondents

Variables	Freq. (n = 4320)	%
Low HIV risk perception	3798	87.9
Unprotected sex	1859	43.0
Experienced STI	1310	30.3
Early sexual debut	1299	30.1
Substance use	790	18.3
Teen pregnancy	546	12.6
Early marriage	503	11.6
Rape	360	8.3
Multiple sexual partners	234	5.4
Transactional sex	184	4.3
Intergenerational sex	46	1.1
Incest	15	0.3

HIV infection (APR = 1.44, $p < 0.001$) compared with those in the age group 15–19 years. Similarly, compared with respondents with no formal education, respondents with primary education had 8% lower, secondary 4% lower, and tertiary 10% lower adjusted prevalence of high vulnerability to HIV infection. These findings were statistically significant. Though the relationship between educational level and HIV vulnerability status was statistically significant in the unadjusted model, this did not continue to be so in the unadjusted model. Married respondents had nearly three times the prevalence of high vulnerability to HIV (PR = 2.55 $p = 0.08$) compared with those that are not, and this was near twice the prevalence (APR = 1.92, $p < 0.001$) after controlling for other background characteristics. Respondents' wealth quintile showed a statistically significant association with their vulnerability status in both the unadjusted and adjusted models.

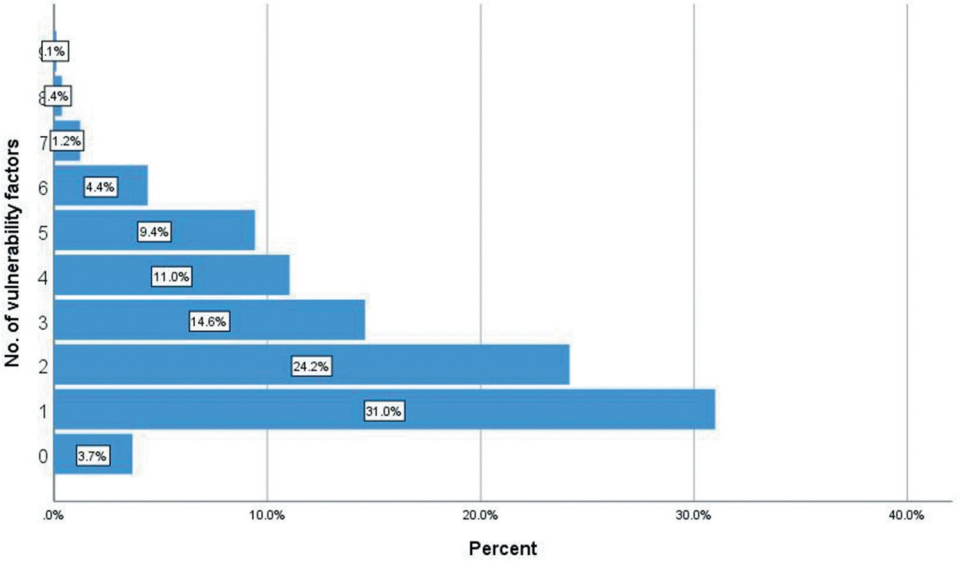

Figure 1. Percentage distribution of respondents with varying numbers of vulnerability factors.

Compared with respondents in the poorest wealth quintile, respondents in all other wealth quintiles had a 29–50% lower adjusted prevalence of high vulnerability to HIV. We also found that respondents with high self-esteem had a 12% lower prevalence of high vulnerability to HIV compared with those with low self-esteem, and this finding was statistically significant.

The respondents who had correct knowledge of HIV prevention had a slightly lower unadjusted and slightly higher adjusted prevalence of high vulnerability to HIV than those who did not have the right knowledge, but these findings were not statistically significant. Respondents' religion did not have a statistically significant relationship with the respondent's HIV vulnerability status after controlling other background characteristics. However, those who attended a religious meeting once a week or more had a higher prevalence of high vulnerability to HIV than those who did not attend any religious meeting.

Discussion

This study identified the vulnerability factors prevalent among AGYW in Nigeria. We found that a vast majority of the respondents studied perceived their risk of HIV infection as low. The importance of this finding is highlighted by Reniers et al. (2016), who showed that adolescents' tendency to engage in risky behavior reduced with an increased perception of risk. In the present study, where risk perception of HIV infection was low, there is a tendency for increased risky sexual behaviors among the respondents. Risky sexual behavior, such as unprotected sex in the study was as high as 43%. The high prevalence of unprotected sex among AGYW from this study is consistent with another study in Nigeria (Okafor et al., 2018) that reported an even higher prevalence of 74% of unprotected sex among young people in the country (Agaba et al., 2016). The high

Table 4. Poisson regression analysis of the relationship between vulnerability to HIV and selected background characteristics

Background characteristics	Prevalence ratio	p-value	Adjusted prevalence ratio	p-value
State				
Akwa-Ibom	1.00		1.00	
FCT Abuja	0.73 (0.67–0.81)	<0.001	0.59 (0.53–0.66)	<0.001
Kaduna	1.03 (0.95–1.12)	0.49	0.67 (0.6–0.74)	<0.001
Oyo	0.67 (0.6–0.74)	<0.001	0.64 (0.58–0.7)	<0.001
Age group				
15–19 years	1.00		1.00	
20–24 years	1.98 (1.84–2.13)	<0.001	1.44 (1.33–1.55)	<0.001
Educational level				
No formal education	1.00		1.00	
Primary	0.64 (0.58–0.71)	<0.001	0.92 (0.84–1)	0.05
Secondary	0.52 (0.48–0.55)	<0.001	0.96 (0.88–1.05)	0.39
Higher	0.46 (0.4–0.53)	<0.001	0.90 (0.76–1.05)	0.19
Marital status				
Single/Divorced/Widowed	1.00		1.00	
Married	2.55 (2.41–2.71)	<0.001	1.92 (1.78–2.08)	<0.001
Religion				
Islam	1.00		1.00	
Orthodox (Non-Catholic Christian)	0.96 (0.88–1.05)	0.35	1.04 (0.94–1.15)	0.46
Catholic Christian	0.94 (0.83–1.07)	0.37	1.12 (1–1.27)	0.06
Pentecostal Christian	0.86 (0.78–0.93)	<0.001	0.99 (0.9–1.1)	0.89
Others	0.70 (0.42–1.17)	0.17	0.68 (0.45–1.03)	0.07
Religiosity (attendance at meetings)				
Does not attended	1.00		1.00	
More than once a week	0.92 (0.84–1)	0.04	1.04 (0.95–1.14)	0.39
Once a week or less	1.15 (1.05–1.25)	<0.001	1.18 (1.08–1.27)	<0.001
Wealth quintile				
Poorest	1.00		1.00	
Poorer	0.62 (0.57–0.67)	<0.001	0.71 (0.65–0.77)	<0.001
Middle	0.58 (0.53–0.63)	<0.001	0.66 (0.6–0.72)	<0.001
Richer	0.47 (0.43–0.52)	<0.001	0.58 (0.53–0.65)	<0.001
Richest	0.37 (0.33–0.42)	<0.001	0.50 (0.44–0.57)	<0.001
Knowledge of HIV prevention				
Does not know HIV prevention	1.00		1.00	
Knows about HIV prevention	0.97 (0.9–1.05)	0.42	1.01 (0.94–1.09)	0.73
Self-esteem				
Low	1.00		1.00	
High	0.80 (0.75–0.86)	<0.001	0.89 (0.83–0.95)	<0.001

proportion of adolescents who reported the experience of STIs was also high at 30.3%. This finding is very worrying as the presence of STIs increases the risk of transmission of HIV. For instance, STI such as *Herpes Simplex Virus* (HSV-2), *Treponema pallidum* (Syphilis), *Neisseria gonorrhea, Trichomonas vaginalis*, and Bacterial vaginosis (BV) is associated with HIV infection among women engaging in high-risk sexual behavior, as reported in a study in Uganda (Vandepitte et al., 2011). We recommend that HIV prevention programs for AGYW continue to target interventions that promote self-awareness of the risks of contracting HIV and reduce those risks.

According to national-level data, the median age of sexual initiation for a nationally representative sample of Nigerian women was 17.2 years (National Population Commission (NPC) [Nigeria] & ICF, 2019). Similarly, in our study, about a third of the respondent had initiated sex before 18 years. The early age of sexual debut predisposes young girls to risky sexual behavior and to acquiring HIV infection. In a systematic

review by Stöckl et al. (2013), the authors demonstrated that the timing of sexual debut influences the use of condoms. The authors reported that the odds of using a condom at a late sexual debut were higher compared with those who had an early sexual debut. Also, the likelihood of having multiple sexual partners was significantly higher among respondents who had early sexual debut (OR = 2.29, p-value<0.001) compared to those who had late sexual debut. Their review also showed a positive association between early sexual debut and higher HIV risky behavior later in life. Invariably, early sexual initiation is linked to unprotected sex and re-enforces the chances of contracting an STI. We recommend that HIV prevention for AGYW include interventions that target girls in early adolescence (before 15 years), focusing in part on delaying sexual debut.

Furthermore, HIV vulnerability prevalence increased with age in this study. It may be explained from the perspective that the older AGYWs have a higher exposure to more sexual encounters and frequent risky experiences than their younger peers. More young women need to be exposed to sexuality and HIV prevention education to reduce their risk of HIV. The finding that AGYW with higher education were less vulnerable to HIV is consistent with another study in Uganda, where HIV prevalence decreased with a higher educational level (Vandepitte et al., 2011). Education has consistently remained a protective factor against adverse health outcomes. For example, from a nationally representative survey among AGYW in South Africa, having a higher education was associated with a decreased likelihood of HIV infection (Zuma et al., 2010). We recommend using age-appropriate and innovative sexuality education to use multiple interventions and focus on cognitive skills towards sexual-risk behaviors.

Our result showed that low self-esteem was significantly associated with high vulnerability to HIV. The result corroborates with a finding by Enejoh et al. (2016) from a study in Jos, Nigeria, which demonstrated that both male or female folks who had low self-esteem were about two times more likely to be sexually active compared with those with high self-esteem. Other findings, specifically in Southern Nigeria, also support this position (Mercy & Peter, 2014). Apart from educational status, poverty is another important structural driver of vulnerability to HIV, as shown in this study. It creates a basis for adopting risky behaviors such as transactional and intergenerational sex to make ends meet (Pettifor et al., 2018). HIV prevention interventions that have pyscho-social components are necessary for building self-esteem among AGYW especialy those with other background characterisitics that increase their vulnerability to HIV such as poverty. In particular, we recommend interventions that include empowerment for income generation.

The vulnerability of AGYW to HIV varied from state to state in this study. Our findings correlate with the HIV prevalence in the study states in which HIV prevalence from the 2018 Nigerian Aids Indicator and Impact Survey (NAIIS) for Akwa-Ibom State was 5.5%, FCT Abuja was 1.6%, Kaduna was 1.1%, and Oyo State was 0.9% (Federal Ministry of Health, 2019). It underscores the need for targeted interventions even within the same country since the population of AGYW is not homogenous in terms of their risk profiles.

Although we found being knowledgeable about HIV prevention as a protective factor, its relationship with HIV vulnerability was not statistically significant. Similarly, the respondent's religion was not statistically significantly related to HIV vulnerability. Curiously, religiosity – particularly attendance at religious meetings – was associated with a higher prevalence of high vulnerability to HIV. These findings present opportunities for further study. Ogunsanmi and Agbede (2020) demonstrated the usefulness of

peer-led education and mobile phone messaging on adolescents' knowledge of sexuality issues. The question to ask is what knowledge on HIV prevention is most useful to reduce HIV vulnerability among AGYW. It will also be interesting to know how the multi-cultural and multi-religion status of a country like Nigeria is associated with and responds to HIV infection vulnerability among AGYW.

In conclusion, this study's findings support the fact that personal characteristics such as age, marital status, education status, wealth status, and self-esteem are key factors to consider in designing interventions to prevent HIV among adolescent girls and young women. Hence, a one-size-fits-all intervention approach without understanding the local context will help prevent HIV among adolescent girls and young women in Nigeria.

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Box 1. Vulnerability factors to acquiring HIV among female adolescents and young people

Vulnerability factor	Operational definition	Weight
Unprotected sex	Engaging in Unprotected sex: A respondent was classified as having unprotected sex if she has ever had sexual intercourse and reported that her male partner never used or is not currently using, or at any time failed to use a male condom with her.	0.9
Experienced rape	Ever experienced rape: A respondent was classified as having experienced rape if she has ever been forced to have sexual intercourse against her wish.	0.9
Transactional sex	Engaging in transactional sex: A respondent was classified as engaging in transactional sex if she reported ever having sex in exchange for money/favor or gifts.	0.8
Multiple sex partner	Engaging in multiple sexual partnerships: A respondent was classified as engaging in multiple sexual partnerships if she reported having more than one sexual partner in the last year before the survey.	0.8
Ever had STI	Experience of sexually transmitted infections: a respondent was classified as having experienced sexually transmitted infection if she reported ever having an abnormal genital discharge, genital itching, genital sore/ulcer or genital rash in the past 12 months before the survey.	0.8
Low HIV risk perception	Having low personal HIV risk perception: A respondent was classified as having low personal HIV risk perception if she rated her chances of getting HIV as low or no risk at all, out of three possible options of high, low and no risk at all.	0.7
Substance use	Engaging in substance abuse: A respondent was classified as engaging in substance use if she reported ever doing any of the following – smoked, used alcohol, marijuana, glue, heroin, amphetamine, tramadol, cough syrup, or any other related substance.	0.7
Early sex debut	Had early sexual debut: A respondent was classified as a victim of early sexual debut if she had her first sexual intercourse before the age of 18 years.	0.7
Inter-generational sex	Engaging in intergenerational sex: A respondent was classified as engaging in intergenerational sex if she reported having sexual intercourse with a person at least ten years older than her.	0.6
Teenage pregnancy	Victim of teenage pregnancy: a respondent was classified as being a victim of teenage pregnancy if she had ever been pregnant when she was less than 18 years old.	0.6
Early marriage	Experienced early marriage: A respondent was classified as having early marriage if she was ever married and her first marriage occurred before the age of 18 years.	0.5
Experienced incest	Experiencing incest: A respondent was classified as having experienced incest if she reported ever having sex with a known relation.	0.4

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