Prevalence and Predictors of High-Risk Sexual Behaviour among Adolescent Girls and Young Women in Sub-Saharan Africa

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Abstract

High-risk sexual behaviors, including early sexual debut, multiple sexual partners, and inconsistent condom use, significantly increase the vulnerability of adolescent girls and young women to HIV/AIDS, especially in sub-Saharan Africa (SSA). Globally, 4000 adolescent girls and young women were infected with HIV every week in 2022. Of these, 3100 infections were in SSA. Thus, adolescent girls and young women especially in SSA appear to have been left behind in HIV response.

This study investigated the prevalence and predictors of high-risk sexual behavior among adolescent girls and young women. We fit logistic regression models using the most recent Demographic and Health survey data to examine the predictors of condom use during sex with a non-marital and non-cohabiting partner in SSA.

The study found that condom use during sex with non-marital or non-cohabiting partner was 50.0% in Cameroon, 13.7% in Ghana, 37.9% in Nigeria, 21.6% in Tanzania, and 33.7% in Zambia. Across the countries, comprehensive correct knowledge of HIV, age, wealth quintile, parity, contraceptive use, and access to the internet were significantly associated with condom non-use during sex with non-marital or non-cohabiting partner. The odds of condom non-use during sex with a non-marital or non-cohabiting partner were significantly higher among women with one or more children in all SSA countries. Contraceptive users had significantly lower odds of condom non-use during sex with a non-marital or non-cohabiting partner in all countries except Zambia.

The study found that condom use during sex with a non-marital or non-cohabiting partner was low among adolescent girls and young women in sub-Saharan Africa. The predictors of high-risk sexual behaviour vary across countries in SSA, however, our findings suggest that having at least 1 child may not be protective against high-risk sexual behaviour whereas, contraceptive use may be protective. Special attention should be given to adolescent girls and young women to increase knowledge about HIV/AIDS, prevent early onset of childbearing, address economic vulnerabilities, promote the use of condoms to reduce high-risk sexual behaviour, and prevent HIV infection and unintended pregnancy.

Keywords: Adolescent Girls and Young Women, High- Risk Sexual Behaviour, Sub-Saharan Africa

1.0 Background

In the 2016 United Nations Political Declarations on Ending AIDS, countries made commitments for adolescent girls and young women (15-24 years). Countries committed to reduce the number of new HIV infections among adolescent girls and young women from 390,000 in 2015 to below 100,000 in 2020 [1]. The number of adolescent girls and young women (aged 15–24 years) who acquired HIV in 2022, however, was nearly five times higher than the 2025 target of 50,000 [2]. Women and girls (all ages) accounted for 63% of all new HIV infections. Globally, 4000 adolescent girls and young women (aged 15–24 years) were infected with HIV every week in 2022. Of these, 3100 infections were in sub-Saharan Africa. Eighty-two per cent of adolescent girls and young women who acquired HIV in 2022 live in sub-Saharan Africa, including two-thirds in eastern and southern Africa [2]. Thus, adolescent girls and young women especially in SSA appear to have been left behind in HIV response.

High-risk sexual behaviors, including early sexual debut, multiple sexual partners, and inconsistent condom use, significantly increase the vulnerability of adolescent girls and young women (AGYW) to HIV/AIDS, especially in sub-Saharan Africa [3,4]. Despite forming a substantial portion of the global population, adolescents, specifically, those within sub-Saharan Africa often lack comprehensive sexual education, leading to harmful consequences such as sexually transmitted infections (STIs) and teenage pregnancies [5]. Socio-cultural norms (such as traditional gender roles of women – submissive to men, polygamy/multiple concurrent partners among men), economic disparities, and limited negotiation power for safe sex significantly contribute to the high HIV prevalence among AGYW [6,7].

Cameroon observed a significant decline in the prevalence of HIV from 5.55% in 2011 to 2.8% in 2018 However, there were persistent disparities in HIV infection in Cameroon in terms of age, place of residence, region, and gender. Over the same period, the prevalence rate was 3.5% for women versus 1.9% for men [8,9]. Previous studies show that young people engage in risky sexual behavior due to limited knowledge about various specific aspects of HIV [10]. This limited knowledge may influence risky sexual behavior such as irregular condom use. The work of Rwenge and others shows that 51% of young women versus 66% of young men reported using condoms during sexual intercourse in Cameroon among adolescents and young people aged 15-24 [11].

The case of Ghana is no different although there have been significant strides in reducing HIV prevalence and incidence. Adolescent girls and young women continue to exhibit higher prevalence rates compared to young men [12]. Knowledge about HIV remains high, but comprehensive correct knowledge about AIDS has seen a decline, from 28.3% in 2008 to 19.9% in 2014 among young women [13]. This decline points to gaps in effective HIV education. High-risk behaviors, such as low condom use and early sexual debut, persist among AGYW, influenced by socio-economic factors and limited

access to preventive resources [13]. A multi-faceted approach, incorporating education, economic empowerment, and cultural change is urgently required to address these behaviors.

In Nigeria, AGYW bear a disproportionate share of the HIV burden, with significantly higher infection rates compared to their male peers [14]. Despite relatively high HIV awareness, comprehensive knowledge about prevention remains low, with only 24% of AGYW adequately informed [15]. High-risk sexual behaviors are prevalent, with AGYW engaging in early sexual activity and low condom use [16]. Studies have attributed these behaviors to socio-demographic factors like lower education levels and rural residence, economic vulnerabilities, and traditional gender norms that limit girls' ability to negotiate safe sex [17,18].

In Tanzania, HIV prevalence in the general population has reduced over the years. However, statistics show a higher prevalence among women. The 2022 TDHS shows an increase in high-risk sex with only 22% of women aged 15-49 using a condom during sex with a non-marital or non-cohabiting partner versus 55% reported in the 2003-2004 AIDS indicator survey (AIS) [19]

Similarly, Zambia faces a significant HIV burden, particularly among AGYW. HIV incidence among young women is significantly higher compared to their male counterparts [20]. Despite a rise in comprehensive HIV knowledge from 34% in 2007 to 43% in 2018, condom use during premarital sex reduced from 39% in 2007 to 34% in 2018 among young women [21]

In a broader Sub-Saharan African context, Uchudi and others emphasized that early sexual debut, urban residence, media exposure, and socio-cultural norms significantly influence risky sexual behavior across the sub-region [22]. Aggarwal and others [23] found that while HIV knowledge increases condom use, it does not significantly reduce other risky behaviors like paying for sex or engaging in extramarital affairs. Woolf-King and Maisto [24] further linked alcohol consumption with heightened risky sexual behavior, suggesting that substance use exacerbates vulnerability to HIV.

To understand the high and increasing number of new HIV infections among adolescent girls and young women in SSA, and contribute to evidence to inform HIV response, this study investigated the prevalence and predictors of high-risk sexual behavior among adolescent girls and young women aged 15-24 in sub-Saharan Africa.

2.0 Methods

This study aims to investigate the prevalence and predictors of high-risk sexual behaviour among adolescent girls and young women in sub-Saharan Africa.

Study setting

This study included five countries in sub-Saharan Africa, namely Cameroon, Ghana, Nigeria, Tanzania and Zambia. The countries were selected based on high levels of risky sexual behaviour (56.6%, 89.4%, 64.3%, 78.3%, and 65.5% of women aged 15-49 reported not using a condom during sex with a non-marital, non-cohabiting partner in Cameroon, Ghana, Nigeria, Tanzania, and Zambia respectively) and availability of data for variables of interest [25]. Including the five countries located in West, East, and Southern Africa is necessary to advance our understanding of the predictors of high-risk sexual behaviour among adolescents and young women in sub-Saharan Africa.

Data Source

This study utilises data from the Demographic and Health Surveys (DHS). DHS are nationally representative household surveys that provide data for a wide range of monitoring and impact evaluation indicators in the areas of population, health, and nutrition [26]. The DHS collects information on several topics from women aged 15-49 and men aged 15-59, among them, HIV/AIDS knowledge, attitudes, and behaviour. Women and men are asked about knowledge of HIV prevention, misconceptions, stigma, higher-risk sexual behaviour, and previous HIV testing [26]. This study utilizes data from the most recent Demographic and Health Surveys for Cameroon, Ghana, Nigeria, Tanzania, and Zambia. The study utilized data from the 2018 DHS for Zambia, Cameroon, and Nigeria and data from the 2022 DHS for Ghana and Tanzania to investigate the prevalence and predictors of high-risk sexual behavior among adolescents and young women aged 15-24 in sub-Saharan Africa. The Data used for this study is publicly available upon request to the DHS program (https://www.dhsprogram.com/data/available-datasets.cfm) and were accessed on April 18, 2024.

Sample description

Demographic and Health Surveys are cross-sectional, population-based surveys that use a stratified two-stage sample design. All women aged 15-49 years who were either permanent residents of the selected households or visitors who stayed in the households the night before the survey were eligible to be interviewed. The sampling method of the DHS for each of the countries included in the study has been reported in detail elsewhere [13,16, 21, 27, 28]. The study sample included women aged 15-24 who reported having sex with a non-marital or non-cohabiting partner in the 12 months prior to the survey. The study includes weighted samples of 1617, 1841, 1923, 1287, and 1520 women age 15-

24 who reported having sexual intercourse with a non-marital or non-cohabiting in Cameroon, Ghana, Nigeria, Tanzania, and Zambia respectively. Figure 1 indicates the sample derivation process.

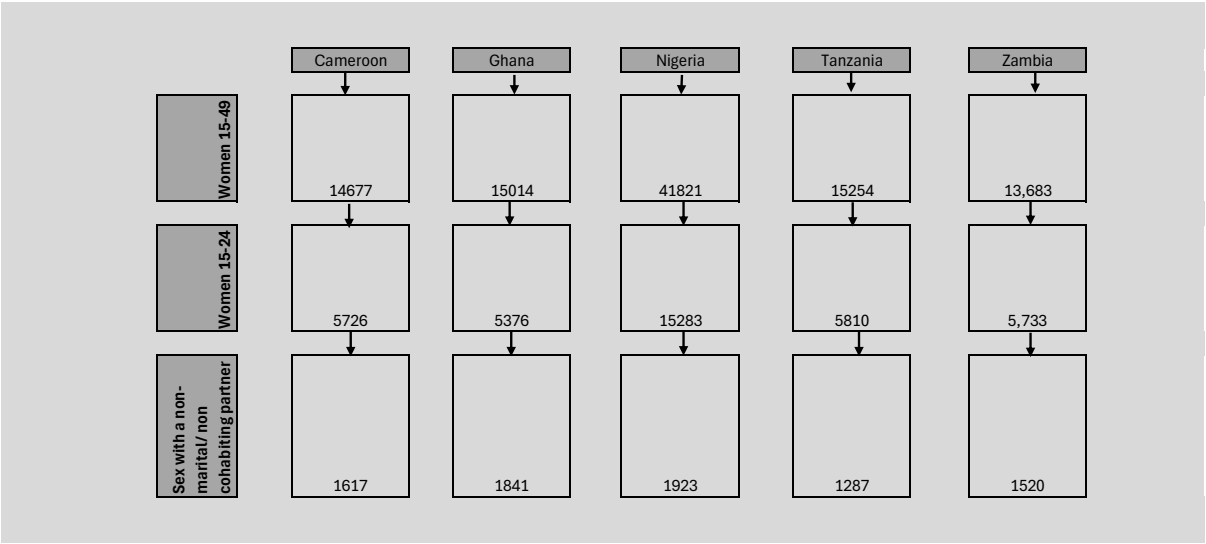

Figure 1: Sample derivation process

Variables

Outcome variable

The focus of this study is high-risk sexual behaviour. High-risk sexual behaviour was measured using the variable condom use during sex with a non-marital/non-cohabiting partner. To generate this variable, women were asked if they had intercourse with a person who was not their spouse nor lived with them in the 12 months prior to the survey. Women were further asked if they had used a condom during sex with such a partner. The women were asked about condom use during sex with their most recent partner, the partner next to the last partner, and the third next to the last partner (
[29]. Condom use with a non-marital/non-cohabiting partner is a dichotomous outcome coded "0" if a condom was used during sex with a non-marital or non-cohabiting partner and "1" if a condom was not used during sex with a non-marital or non-cohabiting partner.

Predictors

Previous studies have shown that socio-economic and demographic correlates at individual, household and community levels affect high-risk sexual behaviour among women [22, 30-36]Thus, this study investigated early sexual debut, comprehensive knowledge about HIV, age, place of residence, education, marital status, wealth index, parity, current working status, current use of contraception, use of the internet in the 12 months prior to the most recent survey, media exposure and knowledge of the fertile period. Early sexual debut was defined as sex before age 15. It was coded "0" if a woman did not have sex before age 15 and "1" if a woman had sex before age 15. This study included

comprehensive correct knowledge of HIV as one of the predictors of high-risk sexual behaviour. Comprehensive correct knowledge of HIV has been shown to mitigate against high-risk sexual behaviour [37]. Comprehensive correct knowledge about HIV among women is the percentage of women who correctly identify the two major ways of preventing the sexual transmission of HIV (using condoms and limiting sex to one faithful, uninfected partner), who reject the two most common local misconceptions about HIV transmission (Such misconceptions usually include " HIV can be transmitted by mosquito bites" and "HIV can be transmitted by supernatural means"), and who know that a healthy-looking person can have HIV [32]. Comprehensive correct knowledge about HIV was coded "1" if a woman correctly identified the two major ways of preventing the sexual transmission of HIV, rejects the two most local misconceptions about HIV and knows that a healthy-looking person can have HIV and "0" otherwise.

Previous studies have shown an association between age and high-risk sexual behaviour [22,30,31]. This study included women aged 15-24. Age was coded "1" if a woman was aged between 15-19 and "2" if a woman was aged between 20-24. Place of residence is another important predictor of high-risk sexual behaviour among women. Place of residence was coded "1" if a woman resided in an urban area and "2" if they resided in a rural area. Studies have also shown that education is protective against high-risk sexual behaviour [22,30,31,33]. Thus, this study included education as one of the predictors. Education was coded "0" if a woman had no education, "1" if they had primary education,"2" if they had secondary education, and "3" if they had higher education. Studies also show that marital status may be protective against high-risk sexual behaviour [35]. Thus, this study included marital status as one of the predictors. Marital status was coded "0" if a woman was never married "1" if she was married or living together with a partner and "2" if she was widowed or divorced or separated.

Research also shows that wealth index is associated with high-risk sexual behaviour [33,34,36]. Thus, this study included wealth index as one of the predictors of high-risk sexual behaviour. Household wealth quintiles are constructed using Principal Component Analysis based on household assets and infrastructure. The details of constructing the wealth index are documented elsewhere [38]. The variable wealth index has 5 categories, poorest, poorer, middle, richer, and richest. In this study, wealth index was recoded into 3 categories "poor" coded 1, "middle" coded 2, and "rich" coded 3.

The DHS collects information on parity. In this study, parity was defined as the number of children ever born to a woman. It was coded "0" if a woman was nulliparous (has no children) and "1" if primiparous or multiparous (has one or more children). The study also included current working status as one of the variables. Current working status was coded "0" if not working and "1" if otherwise. The DHS also asked women if they were using any method of contraception at the time of the survey. Current use of contraception was coded "0" if a woman was not using a method of contraception at

the time of the survey and "1" if otherwise. The DHS also collected information on internet use in the last 12 months among women. Internet use is an important predictor of high-risk sexual behaviour, it was therefore included as one of the predictors. The use of internet was coded "0" if a woman did not use the internet in the past 12 months and "1" if otherwise.

Studies have shown that media exposure can influence sexual behaviour [35]. Media exposure was measured based on access to radio, television, or newspaper at least once a week. It was coded "0" if a woman had no access to radio, television, or newspaper at least once a week and "1" otherwise. The study also included knowledge of fertile period as one of the predictors. Knowledge of fertile period was determined by asking women the time of the month when a woman was more likely to get pregnant. Knowledge of fertile period was coded "1" if a woman was able to correctly identify the period in the ovulatory cycle and "0" otherwise.

Statistical Analysis

Data wrangling and analysis were done using STATA version 14.2. Separate analysis was performed for women aged 15-24 in each country. Sampling weights were applied in all the analyses to allow for the generalisation of the results to the respective country populations. Univariate analysis of the outcome of interest and the selected predictors was performed first, followed by an examination of the bivariate associations between condom use during sex with non-marital and non-cohabiting partner and selected socio-demographic factors.

Multivariate binary logistic regression was used to further examine the predictors of high-risk sexual behaviour (condom use during sex with non-marital and non-cohabiting partner) among adolescent girls and young women in five countries in sub-Saharan Africa. Logit models were fitted to show the association between high-risk sexual behaviour and selected predictor variables. Model I reports unadjusted odds ratios for associations between condom use during sex with non-marital and non-cohabiting partner and each of the predictor variables significant at $P<0.03$. Model II reports adjusted odds ratios. Collinearity diagnostics for the fitted logit models were performed. All covariates included in the model have a VIF less than 5 indicating no problem of multicollinearity [39,40].

3.0 Results

The analysis of the most recent DHS in Cameroon, Ghana, Nigeria, Tanzania, and Zambia shows that out of 1617, 1841, 1923, 1287 and 1520 women aged 15-24 who had sex with a non-marital or non-cohabiting partner in the 12 months prior to the most recent DHS, 51%, 86%, 62%, 78%, and 66% did not use a condom, respectively (Figure 2). Ghana had the highest percentage (86%) of condom non-use during sex with a non-marital or non-cohabiting partner while Cameroon had the lowest at 51% (Figure 2).

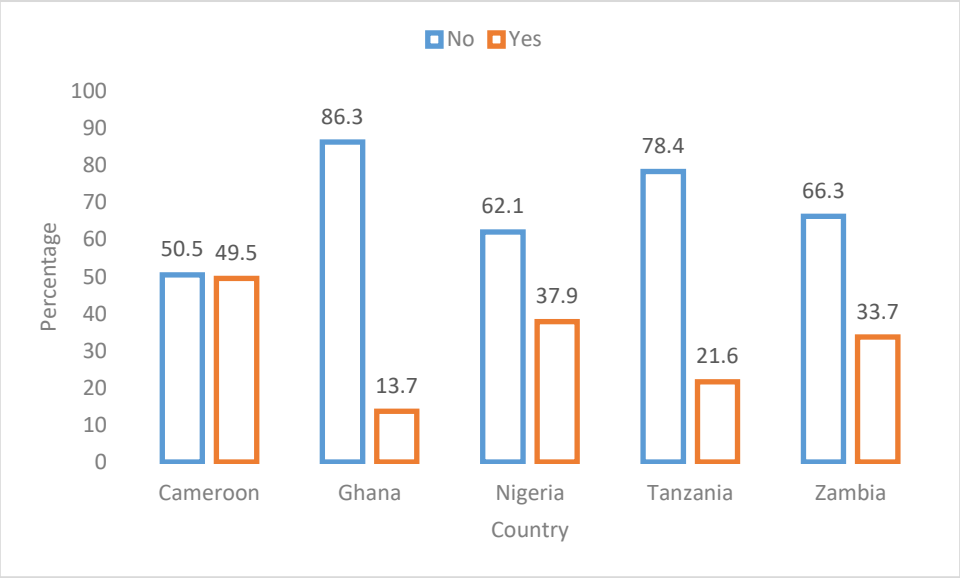

Figure 2:Condom use during sex with non-marital/non-cohabiting partner by country

The results in Table 1 show that of the women aged 15-24 who reported having sexual intercourse with a non-marital or non-cohabiting partner, 16% had sexual intercourse before the age of 15 in Cameroon, compared with 15% in Ghana, 10% in Nigeria, 18% in Tanzania and 18% in Zambia. Most of the women included in the analyses were aged 20-24 years at the time of the survey, except for Zambia, where a higher percentage was 15-19 years. Across the five countries, Ghanaian and Tanzanian women aged 15-24 were the most knowledgeable about HIV (52%), followed by Nigerian (46%), Zambian (46%) and Cameroonian women (38%). Except for Zambia and Tanzania, a higher percentage of women aged 15-24 who reported having sex with non-marital or non-cohabiting lived in urban areas. Regarding education, most of the women reported having a secondary level of education. In addition about 9 in 10 women in all five countries reported never married status at the time of the survey. Most of the women aged 15-24 in all five countries were in the rich wealth quintile. Zambia had the highest percentage (48%) of women 15-24 who had at least one child, while, Nigeria had the lowest percentage at 14%. By working status, Zambia had the lowest percentage of women 15-24 who were working (27%) while Ghana had the highest percentage at 60%. Contraceptive use ranged from 26.2% in Nigeria to 40.7% in Cameroon. Internet use in the past 12 months was lowest in Zambia at 20% and highest in Ghana at 59%. The same pattern is observed for media exposure (access to TV, Radio, or Newspapers). Across the five countries, knowledge of fertile period ranged from 20% in Zambia to 51% in Cameroon.

Table 1: Socio-economic and demographic characteristics of adolescent girls and young women who had sex with a non-marital/non-cohabiting partner

Socio-economic and demographic characteristics of respondents who had sex with a non-marital/ non-cohabiting partner in the 12 months prior to the most recent DHS

	Cameroon DHS2018		Ghana DHS2022		Nigeria DHS2018		Tanzania DHS2022		Zambia DHS2018	
Characteristics	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**
Early Sexual debut										
No	83.8	1354	84.9	1563	89.6	1724	81.8	1056	81.5	1239
Yes	16.2	263	15.1	278	10.4	199	18.2	234	18.5	281
HIV Comprehensive Knowledge										
No	62.0	1002	48.0	884	54.2	1042	48.3	623	54.4	827
Yes	38.0	615	52.0	957	45.8	881	51.7	667	45.6	693
Age										
15-19	46.2	747	39.1	719	42.1	809	44.2	570	51.7	787
20-24	53.8	870	60.9	1122	57.9	1112	55.8	720	48.3	733
Place of residence										
Urban	66.4	1074	59.9	1101	56.1	1079	45.0	580	48.8	742
Rural	33.6	543	40.1	739	43.9	844	55.0	710	51.2	778
Education										
No education	2.5	40	2.3	43	3.7	72	6.9	89	2.5	38
Primary	13.9	224	10.2	188	6.7	128	45.7	589	31.3	476
Secondary	69.9	1130	79.7	1466	72.1	1387	45.5	588	62.0	942
Higher	13.7	223	7.8	144	17.5	336	1.9	24	4.2	64
Marital status										
Never married	90.3	1460	88.7	1633	95.7	1840	76.8	990	91.6	1392

Married/Living together	4.5	73	6.4	118	2.2	43	7.3	95	1.6	24
Widowed/Separated/Divorced	5.2	84	4.9	90	2.1	40	15.9	205	6.8	104
Wealth Index										
Poor	20.9	338	33.6	618	18.6	357	25.3	326	31.4	477
Middle	21.2	342	25.7	473	21.6	415	18.4	238	20.0	304
Rich	57.9	937	40.7	750	59.9	1151	56.3	726	48.6	739
Parity										
Nulliparous	64.4	1041	71.5	1315	86.3	1659	57.7	744	52.4	796
Primiparous/ Multiparous	35.6	576	28.5	526	13.7	264	42.3	546	47.6	724
Working Status										
Not working	57.8	935	40.3	742	42.5	817	47.0	607	70.6	1074
Working	42.2	682	59.7	1099	57.5	1106	53.0	683	29.4	446
Contraceptive use										
No	59.3	958	46.6	858	73.8	1420	66.3	855	73.2	1113
Yes	40.7	659	53.4	983	26.2	503	33.7	434	26.8	407
Internet use										
No	52.0	841	41.4	763	59.0	1135	77.8	1004	80.4	1222
Yes	48.0	776	58.6	1078	41.0	788	22.2	286	19.6	298
Media exposure										
No	34.8	562	29.0	535	44.0	847	46.6	601	47.2	718
Yes	65.2	1055	71.0	1306	56.0	1076	53.4	689	52.8	802
Correct knowledge of fertile period										
No	49.5	801	60.0	1098	74.6	1434	74.2	957	80.4	1222
Yes	50.5	816	40.0	742	25.4	489	25.8	333	19.6	298
Total	**100**	**1617**	**100**	**1841**	**100**	**1923**	**100**	**1290**	**100**	**1520**

Table 2 shows that condom use during sex with a non-marital or non-cohabiting partner was significantly associated with early sexual debut in Cameroon, Nigeria, and Zambia. Parity was significantly associated with condom use during sex with non-marital or non-cohabiting partner in all 5 countries. Contraceptive use was significantly associated with condom use with non-marital or non-cohabiting partner in all countries except Zambia. Wealth index and education were significantly associated with condom use during sex with non-marital or non-cohabiting partner in all countries except Nigeria ($P<0.05$).

Analysis by country shows that early sexual debut ($P<0.001$), place of residence ($P<0.05$), education($P<0.001$), marital status ($P<0.05$), wealth index ($P<0.001$), parity ($P<0.001$), contraceptive use ($P<0.001$), internet use ($P<0.001$) and media exposure ($P<0.001$) were significantly associated with condom use during sex with non-marital or non-cohabiting partner in Cameroon.

In Ghana, age ($P<0.05$), education($P<0.05$), wealth index ($P<0.05$), parity ($P<0.001$), working status ($P<0.05$) and contraceptive use were significantly associated with condom use during sex with a non-marital or non-cohabiting partner.

In Nigeria, early sexual debut ($P<0.05$), HIV comprehensive knowledge ($P<0.05$), age ($P<0.05$), education ($P<0.05$), wealth index ($P<0.001$), parity ($P<0.001$), contraceptive use ($P<0.001$), internet use ($P<0.001$) and media exposure ($P<0.05$) were significantly associated with condom use during sex with a non-marital or non-cohabiting partner.

In Tanzania, HIV comprehensive knowledge ($P<0.05$), parity ($P<0.05$), and contraceptive use ($P<0.05$) were significantly associated with condom use during sex with a non-marital or non-cohabiting partner.

In Zambia, early sexual debut ($P<0.05$), age ($P<0.05$), place of residence ($P<0.001$), education ($P<0.001$), wealth index ($P<0.001$), parity ($P<0.001$), internet use ($P<0.001$) and media exposure ($P<0.05$) were significantly associated with condom use during sex with a non-marital or non-cohabiting partner.

Table 2:Bivariate analysis of condom use during sex with a non-marital or non-cohabiting partner among adolescent girls and young women (15-24) and selected socio-economic and demographic variables

Bivariate analysis of condom use during sex with non-marital/non-cohabiting partner by selected socio-economic and demographic variables

	Cameroon DHS 2018 *N=1617*		Ghana DHS2022 *N=1841*		Nigeria DHS2018 *N=1923*		Tanzania DHS2022 *N=1287*		Zambia DHS2018 *N=1520*	
Characteristics	**%**	**P-value**	**%**	**P-value**	**%**	**P-value**	**%**	**P-value**	**%**	**P-value**
Early Sexual debut										
No	51.6		13.6		39.0		22.7		35.8	
Yes	39.0	<0.001	14.7	0.711	28.1	0.006	16.2	0.114	24.3	0.003
HIV Comprehensive Knowledge										
No	50.0		13.1		35.3		17.9		32.0	
Yes	48.7	0.654	14.3	0.584	40.8	0.031	25.1	0.017	35.7	0.212
Age										
15-19	52.2		17.2		34.2		23.6		29.6	
20-24	47.3	0.091	11.5	0.007	40.5	0.009	20.0	0.174	38.1	0.005
Place of residence										
Urban	52.6		15.0		39.0		20.6		41.3	
Rural	43.5	0.003	11.8	0.097	36.4	0.387	22.4	0.614	26.4	<0.001
Education										
No education	20.4		8.4		28.7		7.6		8.5	
Primary	40.4		7.5		31.0		21.2		24.2	
Secondary	50.9		13.8		36.4		24.1		37.1	
Higher	57.1	<0.001	22.9	0.008	48.3	0.002	21.4	0.137	69.0	<0.001

Marital status										
Never married	50.9		14.1		38.3		21.3		34.2	
Married/Living together	36.6		12.5		32.8		27.1		26.0	
Widowed/Separated/Divorced	36.7	0.005	8.7	0.559	23.2	0.174	20.6	0.552	29.2	0.514
Wealth Index										
Poor	37.6		8.7		29.1		19.4		20.7	
Middle	48.1		17.0		32.2		24.0		32.7	
Rich	54.3	<0.001	15.9	0.002	42.6	<0.001	21.7	0.612	42.5	<0.001
Parity										
Nulliparous	57.8		17.3		40.0		25.4		43.6	
Primiparous/ Multiparous	34.5	<0.001	4.9	<0.001	24.6	<0.001	16.4	0.002	22.8	<0.001
Working Status										
Not working	52.2		16.8		38.6		22.3		33.6	
Working	45.8	0.039	11.7	0.020	37.3	0.627	21.0	0.724	33.9	0.922
Contraceptive use										
No	37.0		10.3		30.7		18.9		32.6	
Yes	67.8	<0.001	16.7	0.002	58.2	<0.001	26.9	0.025	36.7	0.162
Internet use										
No	44.3		12.5		32.6		21.5		28.7	
Yes	55.2	<0.001	14.6	0.315	45.4	<0.001	21.8	0.937	54.1	<0.001
Media exposure										
No	41.2		14.0		34.4		19.8		27.1	
Yes	54.0	<0.001	13.6	0.865	40.6	0.017	23.2	0.236	39.6	0.001
Correct Knowledge of fertile period										
No	48.0		14.2		38.7		21.8		32.3	
Yes	51.1	0.247	13.1	0.577	35.4	0.313	21.0	0.821	39.6	0.069

Table 3 shows the unadjusted associations between socio-demographic correlates and condom use during sex with non-marital or non-cohabiting partner by country. The results show that the odds of condom non-use during sex with a non-marital or non-cohabiting partner were significantly higher among women who had early sexual debut in Cameroon [UOR 1.668 95% CI 1.299,2.143], Nigeria [UOR 1.635 95%CI 1.148,2.328] and Zambia [UOR 1.739 95% CI 1.203, 2.514]. In Tanzania, the odds of condom non-use during sex with a non-marital or non-cohabiting partner were significantly lower [UOR 0.650 95% CI 0.457,0.926] among women with correct comprehensive knowledge of HIV. The results also show that the odds of condom non-use during sex with a non-marital or non-cohabiting partner were higher among women aged 20-24 in Ghana [UOR 1.600 95%CI 1.136,2.254] but lower among women aged 20-24 in Nigeria [UOR 0.763 95% CI 0.622,0.936] and Zambia [UOR 0.684 95%CI 0,525, 0.891]. The results also show higher odds of condom non-use during sex with a non-marital or non-cohabiting partner among women in rural areas compared with women in urban areas in Cameroon [UOR 1.438 95% CI 1.129, 1.831] and Zambia [UOR 1.962 95% CI 1.479,2.604]. In Cameroon and Zambia, women with primary[UOR 0.379 95% CI 0.173,0.834; UOR 0.291 95% CI 0.0860, 0.985] secondary [UOR 0.248 95%CI 0.116,0.532; UOR 0.157 95% CI 0.047, 0.523] and higher level [UOR 0.193 95% CI 0.085,0.441; UOR 0.042 95%CI 0.0106,0.165] of education had lower odds of condom non-use during sex with non-marital or non-cohabiting partner compared with women with no education respectively.

Women in the middle and rich wealth quintile except women in the middle wealth quintile in Nigeria had lower odds of condom non-use during sex with a non-marital or non-cohabiting partner. In all five countries, women with one or more children had higher odds of condom non-use compared with women with no children. In Ghana, women who were working had higher odds [UOR 1.524 95% CI 1.069, 2.203] of condom non-use during sex with non-marital or non-cohabiting partners compared with women who were not working. The results show that women who reported using contraceptives at the time of the survey had significantly lower odds of condom non-use during sex with a non-marital or non-cohabiting partner in Cameroon [UOR 0.279 95% CI 0.218, 0.357], Ghana [UOR 0.571 95% CI 0.403,0.809], Nigeria [UOR 0.318 95% CI 0.244, 0.414] and Tanzania [UOR 0.634 95% CI 0.425,0.946] compared to those who were not using contraceptives. In Cameroon [UOR 0.645 95% CI 0.510, 0.816], Nigeria [UOR 0.583 95% CI 0.460, 0.739] and Zambia [UOR 0.342 95% CI 0.251, 0.464], women who reported having used the internet in the last 12 months had lower odds of condom non-use during sex with non-marital or non-cohabiting partner compared with women who reported not using the internet in the last 12 months. Women who were exposed to media in Cameroon [UOR 0.598 95% CI 0. 474, 0.754], Nigeria [UOR 0.766 95% CI 0.616, 0.953] and Zambia [UOR 0.567 955 CI 0.429, 0.750] had lower odds of condom non-use during sex with a non-marital or non-cohabiting partner compared to women who had no media exposure.

Table 3: Unadjusted associations between socio-demographic factors and condom use during sex with non-marital/ non-cohabiting partner among adolescent girls and young women aged 15-24 in sub-Saharan African countries

Unadjusted associations between socio-demographic correlates and condom use during sex with non-marital/non-cohabiting partner by country										
	Cameroon		Ghana		Nigeria		Tanzania		Zambia	
Characteristics	**UOR**	**95%CI**	**UOR**	**95%CI**	**UOR**	**95%CI**	**UOR**	**95%CI**	**UOR**	**95%CI**
Early Sexual debut										
No	1	[1,1]			1	[1,1]			1	[1,1]
Yes	1.668***	[1.299,2.143]			1.635**	[1.148,2.328]			1.739**	[1.203,2.514]
HIV Comprehensive Knowledge										
No							1	[1,1]		
Yes							0.650*	[0.457,0.926]		
Age										
15-19			1	[1,1]	1	[1,1]			1	[1,1]
20-24			1.600**	[1.136,2.254]	0.763**	[0.622,0.936]			0.684**	[0.525,0.891]
Place of residence										
Urban	1	[1,1]							1	[1,1]
Rural	1.438**	[1.129,1.831]							1.962***	[1.479,2.604]
Education										
No education	1	[1,1]	1	[1,1]	1	[1,1]			1	[1,1]
Primary	0.379*	[0.173,0.834]	1.129	[0.374,3.407]	0.894	[0.427,1.873]			0.291*	[0.0860,0.985]
Secondary	0.248***	[0.116,0.532]	0.575	[0.223,1.480]	0.700	[0.368,1.334]			0.157**	[0.0472,0.523]
Higher	0.193***	[0.085,0.441]	0.310*	[0.106,0.907]	0.430*	[0.217,0.850]			0.042***	[0.0106,0.165]
Marital status										
Never married	1	[1,1]								
Married/Living together	1.793*	[1.043,3.083]								

Widowed/Separated/Divorced	1.789**	[1.156,2.769]								
Wealth Index										
Poor	1	[1,1]	1	[1,1]	1	[1,1]			1	[1,1]
Middle	0.650**	[0.473,0.892]	0.463***	[0.320,0.670]	0.863	[0.620,1.200]			0.539**	[0.372,0.780]
Rich	0.506***	[0.382,0.671]	0.502**	[0.333,0.759]	0.553***	[0.410,0.746]			0.353***	[0.259,0.481]
Parity										
Nulliparous	1	[1,1]	1	[1,1]	1	[1,1]	1	[1,1]	1	[1,1]
Primiparous/ Multiparous	2.602***	[1.953,3.469]	4.098***	[2.461,6.824]	2.041***	[1.457,2.859]	1.731**	[1.231,2.435]	2.609***	[2.001,3.403]
Working Status										
Not working			1	[1,1]						
Working			1.534*	[1.069,2.203]						
Contraceptive use										
No	1	[1,1]	1	[1,1]	1	[1,1]	1	[1,1]		
Yes	0.279***	[0.218,0.357]	0.571**	[0.403,0.809]	0.318***	[0.244,0.414]	0.634*	[0.425,0.946]		
Internet use										
No	1	[1,1]			1	[1,1]			1	[1,1]
Yes	0.645***	[0.510,0.816]			0.583***	[0.460,0.739]			0.342***	[0.251,0.464]
Media exposure										
No	1	[1,1]			1	[1,1]			1	[1,1]
Yes	0.598***	[0.474,0.754]			0.766*	[0.616,0.953]			0.567***	[0.429,0.750]
Correct Knowledge of fertile period										
No										
Yes										

*Exponentiated coefficients; 95% confidence intervals in brackets * p < 0.05, ** p < 0.01, *** p < 0.001*

To measure the magnitude of association between selected predictors and condom non-use during high-risk sex, we fit a survey-weighted logistic regression model. Table 4 reports the adjusted odds ratios of the association between condom non-use during sex with a non-marital or non-cohabiting partner with selected socio-economic and demographic variables. Separate models were fitted for each country (Only variables significant at P<0.03 at the bivariate analysis stage were included in the models). The results show that the odds of condom non-use during sex with a non-marital or non-cohabiting partner were significantly lower among women in the middle and rich wealth quintile compared with women in the poor wealth quintile in Ghana and Zambia. The results also show that the odds of condom non-use during sex with a non-marital or non-cohabiting partner were significantly higher among women aged 15-24 with at least one child compared with women with no children in all 5 countries. In addition, the odds of condom non-use during sex with a non-marital or non-cohabiting partner were significantly lower among women who were using a method of contraception compared with non-users in Cameroon, Ghana, Nigeria, and Tanzania.

In Cameroon, the results show that primiparous or multiparous women had higher odds [AOR 2.467 95% CI 1.767, 3.446] of condom non-use during sex with non-marital or non-cohabiting partner compared with nulliparous women. The results also show that contraceptive users had lower odds [AOR 0.287 95% CI 0.221, 0.374] of condom non-use during sex with non-marital or non-cohabiting partners compared with contraceptive non-users.

In Ghana, women aged 20-24 had higher odds [AOR 1.655 95% CI 1.120, 2.445] of condom non-use compared with women aged 15-19. The results also show that women in the middle [AOR 0.480 95% CI 0.330,0.698] and rich [AOR 0.621 95% CI 0.388, 0.995] wealth quintile had lower odds of condom non-use during sex with a non-marital or non-cohabiting partner compared to women in the poor wealth quintile. Further primiparous or multiparous women had significantly higher odds [AOR 3.292 95% CI 1.928, 5.621] of condom non-use during sex with a non-marital or non-cohabiting partner compared with nulliparous women. In addition, contraceptive users have lower odds [AOR 0.287 95% CI 0.221, 0.374] of condom non-use during sex with a non-marital or non-cohabiting partner compared to non-users.

In Nigeria, primiparous or multiparous women have higher odds [AOR 1.736 95%CI 1.235, 2.439] of condom non-use during sex with a non-marital or non-cohabiting partner compared to nulliparous women. In addition, contraceptive users have lower odds [AOR 0.523 95% CI 0.350,0.782] of condom non-use during sex with non-marital or non-cohabiting partner compared with non-users.

In Tanzania, women with correct comprehensive knowledge of HIV have lower odds [AOR 0.646 95% CI 0.453, 0.921] of condom non-use during sex with a non-marital or non-cohabiting partner compared with women with no correct comprehensive knowledge of HIV. The results also show that primiparous or multiparous women have higher odds [AOR 2.081 95% CI 1.466, 2.954] of condom non-use during sex with a non-marital or non-cohabiting partner compared with nulliparous women. Further, contraceptive users have lower odds [AOR 0.523 95% CI 0.350, 0.782] on condom non-use during sex with non-marital or non-cohabiting partner compared to non-users.

In Zambia, women aged 20-24 have lower odds [AOR 0.684 95% CI 0.509, 0.920] of condom non-use during sex with non-marital or non-cohabiting partners compared with women aged 15-19. Women with secondary level education [AOR 0.608 95%CI 0.412,0.896] and women with higher level education [AOR 0.634 95% CI 0.404, 0.995] have lower odds of condom non-use during sex with a non-marital or non-cohabiting partner compared with women with no education. Further, primiparous or multiparous women have higher odds [AOR 2.537 95% CI 1.875, 3.431] of condom non-use during sex with non-marital or non-cohabiting partner compared with nulliparous women. In addition, women who reported using the internet in the 12 months prior to the survey have lower odds [AOR 0.598 95% CI 0.410, 0.873] of condom non-use during sex with non-marital or non-cohabiting partner compared with women who reported not using the internet in the 12 months prior to the survey

Table 4: Adjusted associations between socio-demographic factors and condom use during sex with non-marital/ non-cohabiting partner among adolescent girls and young women age 15-24 in sub-Saharan Countries

Adjusted associations between socio-demographic factors and condom use during sex with non-marital/non-cohabiting partner by country

	Cameroon		Ghana		Nigeria		Tanzania		Zambia	
Characteristics	**AOR**	**95%CI**	**AOR**	**95%CI**	**AOR**	**95%CI**	**AOR**	**95%CI**	**AOR**	**95%CI**
Early Sexual debut										
No	1	[1,1]			1	[1,1]			1	[1,1]
Yes	1.147	[0.835,1.576]			1.223	[0.842,1.775]			1.024	[0.678,1.547]
HIV Comprehensive Knowledge										
No							1	[1,1]		
Yes							0.646*	[0.453,0.921]		
Age										
15-19			1	[1,1]	1	[1,1]			1	[1,1]
20-24			1.655*	[1.120,2.445]	0.901	[0.707,1.149]			0.684*	[0.509,0.920]
Place of residence										
Urban	1	[1,1]							1	[1,1]
Rural	0.892	[0.659,1.209]							1.118	[0.764,1.637]
Education										
No education	1	[1,1]	1	[1,1]	1	[1,1]			1	[1,1]
Primary	0.514	[0.223,1.186]	1.026	[0.319,3.299]	0.960	[0.452,2.042]			0.309	[0.090,1.059]
Secondary	0.440	[0.191,1.013]	0.722	[0.258,2.020]	1.113	[0.580,2.134]			0.260*	[0.0768,0.880]
Higher	0.428	[0.165,1.114]	0.404	[0.119,1.366]	0.948	[0.453,1.987]			0.152**	[0.0364,0.631]
Marital status										
Never married	1	[1,1]								
Married/Living together	1.021	[0.564,1.847]								

Widowed/Separated/Divorced	0.869	[0.523,1.445]								
Wealth Index										
Poor	1	[1,1]	1	[1,1]	1	[1,1]			1	[1,1]
Middle	0.85	[0.602,1.201]	0.480***	[0.330,0.698]	1.012	[0.728,1.408]			0.608*	[0.412,0.896]
Rich	0.832	[0.569,1.218]	0.621*	[0.388,0.995]	0.773	[0.550,1.088]			0.634*	[0.404,0.995]
Parity										
Nulliparous	1	[1,1]	1	[1,1]	1	[1,1]	1	[1,1]	1	[1,1]
Primiparous/ Multiparous	2.467***	[1.767,3.446]	3.292***	[1.928,5.621]	1.736**	[1.235,2.439]	2.081***	[1.466,2.954]	2.537***	[1.875,3.431]
Working Status										
Not working			1	[1,1]						
Working			1.320	[0.906,1.923]						
Contraceptive use										
No	1	[1,1]	1	[1,1]	1	[1,1]	1	[1,1]		
Yes	0.287***	[0.221,0.374]	0.582**	[0.407,0.833]	0.341***	[0.261,0.445]	0.523**	[0.350,0.782]		
Internet use										
No	1	[1,1]			1	[1,1]			1	[1,1]
Yes	0.905	[0.657,1.245]			0.833	[0.585,1.187]			0.598**	[0.410,0.873]
Media exposure										
No	1	[1,1]			1	[1,1]			1	[1,1]
Yes	0.790	[0.601,1.040]			0.959	[0.731,1.260]			1.06	[0.750,1.498]
Correct Knowledge of fertile period										
No										
Yes										

Exponentiated coefficients; 95% confidence intervals in brackets * p < 0.05, ** p < 0.01, *** p < 0.001

4.0 Discussion

This study set out to investigate the prevalence and predictors of high-risk sexual behavior among adolescent girls and young women in sub-Saharan Africa. We analysed 1617, 1841, 1923, 1287 and 1520 women aged 15-24 who reported having sex with a non-marital or non-cohabiting partner in the 12 months prior to the most recent DHS survey in Cameroon, Ghana, Nigeria, Tanzania, and Zambia respectively. The results show that 51%, 86%, 62%, 78% and 66% of women aged 15-24 who had sex with a non-marital and non-cohabiting partner did not use a condom. This indicates a high prevalence of risky sexual behaviour among adolescents and young women in sub-Saharan Africa. According to Murewahenhema et al., [41] many AGYW in SSA are economically marginalized and therefore are unable to negotiate condom use. In addition, AGYM in SSA face personal, societal, and health systems-based barriers to contraceptive uptake [42].

Strikingly, women who had at least one child had significantly higher odds of condom non-use compared to those with no children in all five countries. Our findings are consistent with the findings of Rwenge et al., [11], who also found that having at least one child is negatively associated with condom use and aligns with previous research indicating that once women begin childbearing, they often deprioritize condom use, perceiving it as unnecessary in stable or long-term relationships [43]. However, our findings stand in contrast to findings from studies suggesting that multiparous women are more likely than primiparous women to use contraceptives [44,45]. While childbearing is often assumed to deter risky sexual behavior, our study suggests otherwise. Further research into the socio-cultural dynamics influencing postpartum condom use is therefore imperative.

Contraceptive use was a significant predictor of condom use across the selected countries except Zambia. In Cameroon, Ghana, Nigeria, and Tanzania, women who used a method of contraception had significantly lower odds of condom non-use during sex with non-marital or non-cohabiting partner compared with non-users. This, finding, reinforces the need for family planning programs to integrate condom promotion alongside other contraceptive methods. Studies have shown that incorporating STI prevention messages into contraceptive counseling increases the likelihood of dual method use [46], a strategy that has proven effective in reducing both unintended pregnancies and STI transmission in sub-Saharan Africa [47].

Economic status played a significant role in determining condom use across the selected countries. In Ghana and Zambia, women from poorer wealth quintiles were more likely to engage in high-risk sexual behavior. This is consistent with findings of Ewemooje, et al. [48], who observed that living in poorer households increases risky sexual behavior among AGYW. Sserwanga et al. [30], also observed a strong inverse relationship between household wealth and risky sexual behavior. Economic hardship may lead

to coping strategies such as engaging in high-risk sexual behavior [49,50]. In such circumstances, poor women not only struggle to negotiate safe sex but also have limited access to condoms [41]. This reinforces the connection between financial empowerment and access to sexual health resources [51]. Women with greater financial means are more likely to access sexual health education, contraception, and have greater autonomy to negotiate condom use. Conversely, economic vulnerability often correlates with dependency on partners, who may prioritize personal preferences over safe sexual practices. However, in contrast to Ghana and Zambia, wealth status did not significantly impact condom use in Cameroon, Nigeria and Tanzania. This suggests that behavioral and cultural factors may have a stronger influence on protective behaviors than economic status alone [37,52].

Interestingly, our findings show varying effects of age on high-risk sexual behaviour. In Ghana, women age 20-24 had higher odds of condom non-use during sex with non-marital or non-cohabiting partner while the reverse was true for Zambia. This reinforces the strong influence of behavioural and cultural factors on high-risk sexual behaviour [37,52]. This finding highlights the need for age specific interventions in the respective countries targeted at adolescents and young women.

Surprisingly, comprehensive correct knowledge of HIV was not found to be significantly associated with high-risk sexual behaviour in all countries except Tanzania. In Tanzania, women who had correct comprehensive knowledge of HIV had significantly lower odds of condom non-use compared to those who lacked such knowledge, emphasizing the importance of comprehensive sexuality education targeted at AGYW.

Further, education and access to internet were only found to be significantly associated with high-risk sexual behaviour in Zambia. Women with secondary and higher education are less likely to engage in high-risk sexual behaviour compared with women with no education. Women with access to the internet are less likely to engage in high-risk sexual behaviour compared to women with no access to internet. These findings are consistent with a study by Sserwanga et al., [30] which found that younger women with no secondary education and without access to the internet were more likely to have engaged in risky sexual behaviours. Our findings and those of Sserwanga seem to suggest that these women may have more knowledge. According to Uchidi et al.,[22], exposure to formal education is expected to mitigate people's vulnerability to risky sexual practices, not only by increasing their knowledge and skills in sexual and reproductive health, their self-esteem and their sense of discomfort with risky sexual activities, but also by motivating them to think optimistically about their future and to emulate the healthy behaviour exhibited by the educated people they are familiar with. Consequently, education and access to internet may be protective against high-risk sexual behaviour.

Limitations

This study makes an important contribution to what is known about the prevalence and predictors of high-risk sexual behaviour in SSA. However, it is not without limitations. Firstly, while this study provides valuable insights, further research is needed to explore the underlying reasons for the low condom use among AGYW. Qualitative studies could provide a deeper understanding of sociocultural norms and individual perceptions affecting condom use. Secondly, the use of DHS data which is cross-sectional in nature limits our analyses to only show association and not causality. Longitudinal data would help track changes over time and evaluate the impact of targeted interventions. Further, we were unable to investigate the influence of socio-cultural norms on high-risk sexual behaviour due to lack of data on such variables in the DHS. Lastly, the most recent DHS data for the 5 countries analysed was not uniform, thus, the analysis represents the situation is SSA in the 2018 -2022 period rather than a specific point in time.

5.0 Conclusions

This study found that condom use during high-risk sex is low among AGYW in SSA. Across the countries, comprehensive correct knowledge of HIV, age, wealth quintile, parity, contraceptive use, and access to the internet were significantly associated with condom non-use during sex with non-marital or non-cohabiting partner. The study shows that the predictors of high-risk sexual behaviour vary across countries in SSA, however, the study found that having at least one child was not protective against high-risk sexual behaviour among AGYW in all SSA countries studied. Further, contraceptive use was found to be protective in all countries except Zambia. This study makes an important contribution to what is known on the prevalence and predictors of high-risk sexual behaviour among adolescent girls and young women in SSA. It provides evidence for HIV response among AGYW in SSA to halt and reverse the spread of HIV in this group of women. Based on the findings of this study, we recommend the integration of condom advocacy into existing family planning programs to encourage both STI prevention and contraception, ensuring that women have comprehensive reproductive health choices. Special attention should be given to adolescent girls and young women to increase knowledge about HIV/AIDS, prevent early onset of childbearing, address economic vulnerabilities, promote the use of condoms to reduce high-risk sexual behaviour, and prevent HIV infection and unintended pregnancy. In addition, there is a need for further research to explore the predictors of high-risk sexual behaviour among AGYW beyond the individual and household level predictors to inform a holistic response to this emergency among AGYW in SSA.

Abbreviations

AGYW: Adolescent Girls and Young Women; AIDS: Acquired Immuno-Deficiency Syndrome; AOR: Adjusted Odds Ratio; CI: Confidence Interval; DHS: Demographic and Health Survey; HIV: Human

Immuno-Deficiency Virus; IRB: Institutional Review Board; SSA: Sub-Saharan Africa; STI: Sexually Transmitted Infections; UOR: Unadjusted Odds Ratio

Declarations

Ethics approval and consent to participate

Measure DHS provided authorisation for the use of the DHS data for Cameroon, Ghana, Nigeria, Tanzania, and Zambia for purposes of this study on April 18, 2024. National and international Institutional Review Boards (IRBs) in the respective countries and at ICF approved the protocols for the DHS survey methodology and all instruments prior to data collection. During data collection, informed consent to participate in the survey was obtained from all women. Therefore, the authors of this paper did not seek ethical clearance or informed written consent from women. In addition, there has been no attempts to either identify survey participants in the dataset or use the dataset for any other purposes other than that approved by the DHS Program. Furthermore, all methods were carried out in accordance with relevant guidelines and regulations.

Consent for Publication

Not Applicable

Availability of Data and Materials

The Data used for this study is publicly available upon request to the DHS program https://dhsprogram.com/data/available-datasets.cfm and were accessed on April 18, 2024.

Competing Interests

The authors declare that they have no competing interests

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Author Contributions:

All authors contributed to the conception and design of the study; ETN acquired the data, performed the statistical analysis, tabulation, and data interpretation. ETN, LBA, ST, ASA and ASK conducted the literature review and contributed to writing the introduction and discussion of findings. All authors reviewed the first draft and the final version of the manuscript.

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