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Associated Risk Factors of HIV Infection among Adolescent Girls and Young Women Seeking Services at a Tertiary Hospital in central Uganda

Iddi Matovu[1*] and Miph Musoke[1]

Abstract

Adolescent Girls and Young Women (AGYW) aged 15-24 years in Uganda's Central region face heightened HIV risk, despite the country's commitment to global HIV Infection reduction efforts for this demographic under Sustainable Development Goal 3.3. A quantitative, cross-sectional research was conducted to examine factors associated with HIV Infection among AGYW in the Central region, Uganda in order to guide the development and implementation of effective HIV risk reduction interventions.

A total of 375 AGYW aged 15-24 years with unknown HIV status were selected [1] using simple random sampling from Masaka Hospital Out-Patient Department (122) and Maternal Child Health Department (253). HIV testing was guided by the World Health Organization standards [2]. Descriptive and inferential analyses were performed using the Statistical Package for Social Sciences version 27.0.

Out of 351 AGYW interviewed and tested, 5.1% were HIV positive, a notably higher prevalence compared to the 2.9% reported among AGYW aged 15-24 in the central region for the period 2020-2021. HIV infection was significantly associated with alcohol use (AOR =0.261; 95% CI: 0.09-0.74; p = 0.011< 0.05) and stigma (AOR =4.91; 95%CI: 1.523-15.812; p = 0.008< 0.05). Limiting alcohol use and addressing HIV stigma should be a priority in reducing HIV infections among AGYW in Central region, Uganda.

Keywords: Adolescent Girls and Young Women (AGYW), HIV Infection, Risk factors

Introduction

Despite significant progress in the fight against HIV, adolescent girls and young women (AGYW) remain disproportionately affected by the epidemic [3,4]. In sub-Saharan Africa (SSA), the region most affected by HIV, AGYW aged 15-24 are three times as likely to acquire HIV as their male counterparts [5]. According to the UNAIDS report 2023, of the estimated 210,000 new HIV infections that occurred among AGYW globally in 2022, nearly two-thirds (160,000) were in SSA [4]. In Uganda, the prevalence of HIV among AGYW aged 15-24 is higher than among adolescent boys and young men (ABYM) of the same age group [3, 6]. In 2021, the HIV prevalence was estimated to be 4.2% and 2.4% among AGYW and ABYM aged 15-24 respectively [6,7].Additionally, according to the Uganda AIDS commission (UAC) report 2022-2023, AGYW accounted for over two-thirds of the new HIV infections in 2021 [3].

Affiliation:

[1]School of Post Graduate Studies and Research, Nkumba University, Uganda

***Corresponding author:**

Iddi Matovu, School of Post Graduate Studies and Research, Nkumba University, 237, Entebbe, Uganda

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This disproportionate burden of HIV in this demographic is attributed to various factors, including socioeconomic, and structural factors [8, 9, 10, 11]. Furthermore, AGYW particularly in Africa face unique challenges, including early marriages, gender-based violence, stigma and limited access to education and healthcare, which exacerbate their vulnerability to HIV [12, 13, 14, 15].

However, in different geographical contexts, each of these factors individually was not consistently associated with HIV infection among AGYW [16]. For instance, whereas high educational attainment was associated with reduced HIV infection rates in Malawi [17], for the opposite was observed in Zambia [18]. In Kenya [19] and Zimbabwe [20] early marriage was associated with increased new HIV infections. However, this contrasts with findings from Cameroon, Guinea and Lesotho [21] where early marriages did not correlate with higher HIV infection rates.

Understanding the prevalence and associated factors of HIV infection among AGYW in the central region, Uganda is crucial for informing targeted interventions and mitigating the spread of HIV among this vulnerable population. Therefore, in this study, we aimed to describe the prevalence and associated risk factors of HIV Infection among AGYW aged 15-24 years seeking care at an urban tertiary hospital in Uganda.

Materials and Methods

Study design and setting

This was a cross-sectional study which aimed to describe associated risk factors of HIV Infection among AGYW aged 15-24 years. The serosurvey was conducted between March to May 2023, among AGYW seeking services at Masaka regional referral hospital (MRRH), a public health facility serving a population of over two million people in central region, Uganda [22, 23]. The hospital offers tertiary and primary in-patient and out-patient health care services including youth friendly reproductive health services and gender-based violence support services [22]. On average, 150 AGYW seek out-patient care services from the facility daily.

Recruitment and Data Collection Procedures

All AGYW aged 15-24 years with unknown HIV status, currently residing in any of the central region study districts of Masaka, Lwengo, Sembabule, Lyantonde, Bukomansimbi, Kalungu, Rakai, and Kalangala, and attending Masaka hospital departments of MCH and OPD, were included in the study if they formally consented or assented and had parental/guardian approval (for those below 18 years of age) to participate in the study.

The minimum sample size was calculated using the general rule of thumb for logistic regression with a precision of 5% [24]. This initial sample size of 300 was increased by 20% to account for a potential dropout rate, as necessary for a non-experimental clinical survey [25] resulting in a final desired sample size of 375. Using proportion to size allocation, we enrolled 122 and 253 respondents from the Masaka Hospital OPD and MCH department respectively, as they waited to be evaluated by the health workers. Over 30 AGYW received care at each study site daily. Simple random sampling was used by assigning random numbers to potential respondents in the clinic waiting area on each recruitment day.

A structured questionnaire adapted from the 2011 Uganda AIDS Indicator Survey [26], the 2016 Uganda Demographic and Health Survey [27], and the HIV/AIDS Tool Kit [28] was used to collect data on factors associated with HIV infection outcomes among AGYW and HIV test results. The questionnaire was piloted among 20 AGYW aged 15-24 years at a non-participating facility before the real interview to evaluate the tool's appropriateness, acceptance, and validity. It was revised until the content validity index was 0.877, exceeding the minimum recommended index of 0.7 for survey studies [29]. The questionnaire comprising 73 question items had Cronbach's alpha of 0.790, was considered reliable [29, 30], and was used to assess the study variables.

The questionnaire was administered through face-to-face interviews by trained research assistants, in either English or Luganda language depending on the participant's choice, at an appropriate venue within the health facility for privacy and confidentiality. Before participating in research activities, the research assistants received a three-day training conducted by the researcher on study scope and procedures including consent administration and data collection for the study. Both research assistants were fluent in English and Luganda.

All AGYW who were interviewed and were eligible for HIV testing were asked to voluntarily provide a blood sample. HIV testing was conducted using standard testing and quality-control procedures established by Uganda's Ministry of Health [31] in compliance with the WHO standards [2]. All AGYW diagnosed with HIV infection were linked to the ART clinic on the same day of diagnosis for further clinical management.

The study protocol was cleared by the Uganda National Council for Science and Technology (NCST) (HS2554ES) and the Clarke International University Research Ethics Committee (CLARKE-2022-453). All participants provided written informed consent prior to participation in this study. The data collection procedures adhered to all acceptable ethical standards in healthcare research [32].

Study variables

The outcome (dependent) variable was HIV infection, measured by the occurrence of newly diagnosed HIV infection among AGYW who tested positive. Data on HIV serostatus was recorded as either HIV positive or Negative (0 = No, and 1 = Yes). The predictor (independent) variables included underlying socioeconomic and structural factors

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such as marital status, education level, wealth status, alcohol consumption, stigma, discrimination, laws, health policies, and access to risk reduction services.

Statistical analysis

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 27.0 software. Both descriptive statistics (percentages and counts) and inferential statistics (chi-square and regression statistics) were employed. Pearson chi-square tests were used for bivariate analysis to quantify the association between HIV infection and associated factors. Multivariate modelling using logistic regression was conducted to evaluate the effect of risk factors on HIV infection outcomes among the AGYW aged 15-24 years. Interaction terms with a p-value <0.05 were considered statistically significant.

Results

The study achieved a sample size of 351 out of the required 375 AGYW participants aged 15-24 years, representing a 93.6% response rate among study subjects.

Demographic Attributes of AGYW in the Central Region, Uganda

Table 1 presents the demographic characteristics among AGYW in the Central region, Uganda. The study included a total of 351 participants. The majority of the respondents were Catholics 52.7% (185), followed by Anglicans 22.2% (78) and Moslems 21.4% (75). Most of the participants were Ugandan nationals 97.4% (342), primarily of the Baganda tribe 62.7%, (220). The age-group 20-24 years constituted 77.8% (273) of the paticipants. Additionally, 64.4% (226) were married or cohaniting, and 50.1% (176) had completed O'-Level secondary education.

Table 1: Demographic Charateristics of AGYW in the Central Region, Uganda

Demographic Attributes		Frequency (N = 351)	Percentage (%)
Religion	Anglican	78	22.2
	Catholic	185	52.7
	Moslem	75	21.4
	Pentecostal	11	3.1
	Others specify	2	0.6
Tribe	Muganda	220	62.7
	Munyankole/Mukyiga	89	25.4
	Munyarwada	16	4.6
	Munyoro/Mutooro	4	1.1
	Others specify	22	6.3
Nationality	Ugandan	342	97.4
	Others specify	9	2.6
Occupation	Unemployed	132	37.6
	Self employed	138	39.3
	Professional job, specify	81	23.1
Age in years	15-17	6	1.7
	18-19	72	20.5
	20-24	273	77.8
Marital Status	Single/Never married	99	28.2
	Married/Cohabiting	226	64.4
	Separated/Divorced	25	7.1
	Widowed	1	0.3
Education level	None at all	2	0.6
	Primary	111	31.6
	O'-Level secondary	176	50.1
	A-Level secondary	11	3.1
	Tertiary/University	51	14.5

Source: Primary data, 2023

HIV Prevalence among AGYW in the Central Region, Uganda

The study found an HIV positivity rate of 5.1% among the AGYW respondents aged 15-24 years in the central region, Uganda. AGYW with unsatisfactory HIV knowledge (12.5%), were more likely to acquire HIV infection, compared to those with satisfactory knowledge, 5.0%.

Associated Factors of HIV Infection

Association between HIV Infection and Socioeconomic Factors

Table 2 presents the results of the multivariate logistic regression analysis for the association between socioeconomic factors and HIV Infection outcomes among AGYW in the Central region, Uganda. Alcohol use was significantly associated with an increased likelihood of HIV infection at the bivariate analysis level (COR= 0.281; 95%CI: 0.108-0.733; p = 0.009< 0.05). After controlling for confounders, alcohol use (AOR =0.261; 95%CI: 0.09-0.74; p = 0.011< 0.05) remained significantly associated with HIV infection outcomes among AGYW in Central region.

Association between HIV Infection and Structural Factors

Table 3 presents the results of the multivariate logistic regression analysis for the association between structural factors and HIV Infection outcomes among AGYW in Central region, Uganda. Stigma (COR= 5.437; 95%CI: 0.777-16.637; p = 0.003< 0.05) was found to be significantly associated with HIV Infection outcomes at the bivariate analysis level. After adjustment for confounders, stigma (AOR =4.91; 95%CI: 1.523-15.812; p = 0.008< 0.05) remained significantly associated with HIV infection outcomes at the multivariate analysis level.

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Table 2: Multivariate logistic regression analysis model results for the association between socioeconomic factors and HIV Infection outcomes among AGYW in Central region, Uganda.

Variables		Serostatus						
Socioeconomic Factors		Negative (%)	Positive (%)	N	COR (95%CI)	*p* -Value	AOR (95%CI)	*p* -Value
Age	15-19	100	0	78	1		1	
	20-24	93.4	6.6	273	1		1	
Marital Status	Unmarried	92.8	7.2	125				
	Married	96	4	226	.535 (.207- 1.384)	0.197	.528(.19-1.49)	0.227
Education	Utmost Primary	92.9	7.1	113				
	Secondary	96.3	3.7	187	.510 (.180 -1.448)	0.206	.544(.18-1.65)	0.283
	Tertiary	94.1	5.9	51	.820 (.208- 3.229)	0.777	.922(.2-4.16)	0.916
Alcohol use	No	89	11	82				
	Yes	96.7	3.4	269	.281 (.108- .733)	0.009**	.261(.09-.74)	0.011**
Wealth	Low	94.6	5.5	165				
	Middle	93	7	86	1.3 (.447-3.781)	0.63	1.247(.4-3.89)	0.704
	High	97	3	100	.536 (.142- 2.029)	0.359	.444(.11-1.82)	0.259
SGBV	No	95	5.1	317				
	Yes	94.1	5.9	34	1.176(.259 -5.346)	0.834	1.567(.3-8.18)	0.594
Knowledge	Unsatisfactory	87.5	12.5	8				
	Satisfactory	95	5	343	.365 (.042 -3.138)	0.359	.359(.03-3.92	0.401
Attitude	Poor	100	0	41	1		1	
	Good	94.2	5.8	310	1		1	

**Significant at 5% level. Source: Primary data, 2023

Table 3: Multivariate logistic regression analysis model results for the association between structural factors and HIV Infection outcomes among AGYW in Central region, Uganda.

Variables		Serostatus						
Structural factors		Negative (%)	Positive (%)	N	COR (95%CI)	*p* -Value	AOR (95%CI)	*p*-Value
Stigma	Yes	96	4	324				
	No	81.5	18.5	27	5.437 (.777 -16.637)	0.003	4.91 (1.523-15.812)	0.008**
Discrimination	Yes	95.9	4.1	294				
	No	89.5	10.5	57	2.765 (.993-7.701)	0.052	2.31 (.793-6.715)	0.125
Laws	Unrestrictive	92.2	7.8	77				
	Restrictive	95.6	4.4	274	.542 (.197 -1.495)	0.237	0.44 (.152-1.28)	0.132
Health Policies	Unfavourable	94.8	5.2	348	1		1	
	Favourable	100	0	3	1		1	
Access to risk reduction services	Unsatisfied	96.7	3.3	30				
	Satisfied	94.7	5.3	321	1.622 (.208-12.628)	0.644	1.48 (.18-12.278)	0.714

**Significant at 5% level. Source: Primary data, 2023

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Discussion

AGYW aged 15-24 years in Sub-Saharan Africa, including Uganda and its Central Region, are disproportionately affected by HIV infection compared to their male peers [3, 4, 33]. This research aimed to identify factors associated with HIV infection among AGYW seeking services at a tertiary hospital in central Uganda.

The results showed an HIV prevalence of 5.1% among AGYW aged 15-24 in the central region of Uganda. HIV infection was found to be significantly associated with alcohol use (AOR =0.261; 95%CI: 0.09-0.74; p = 0.011< 0.05) and stigma (AOR =4.91; 95%CI: 1.523-15.812; p = 0.008< 0.05).

Our findings show a remarkably higher HIV positivity rate of 5.1% compared to 2.9% reported among AGYW aged 15-24 in the central region of Uganda for the period 2020-2021 [6]. This increased prevalence underscores the need to scrutinize the current practices and policy decisions related to HIV prevention for AGYW in this region. It also highlights the inadequate progress being made towards the goal of ending the HIV/AIDS pandemic by 2030 [6,33].

The study results revealed that most HIV-positive respondents had low HIV knowledge implying that AGYW with better HIV knowledge were more likely to adopt appropriate behaviours to minimize their HIV risk. Improved HIV knowledge among AGYW has been reported to influence increased prevention behaviours such as condom use in other African nations [34].

In SSA, HIV/AIDS awareness is lower among women than men, with women constituting 58% of those with low awareness; where as they make up only 50% of those with high awareness [21]. In the same population, low HIV knowledge, specifically the knowledge of routes of HIV transmission, increased risky sexual behaviours and incident HIV infection outcomes [34]. These findings underscore the critical need to promote HIV awareness for infection prevention among AGYW. Satisfactory HIV knowledge emerges as a key factor in reducing HIV infections within this population. Therefore, it is essential to incorporate these insights when designing interventions aimed at reducing HIV infection rates among AGYW, with a strong emphasis on enhancing HIV knowledge. AGYW should be well-informed about how HIV is acquired, transmitted, prevented, and understand what factors increases their risk of HIV infection, to effectively minimize such risks.

The finding that alcohol use is significantly associated with HIV infection outcomes aligns with previous research in other countries. For example, a study conducted in South Africa [35] found that alcohol use was associated with an increased risk of HIV infection. Similarly, a study in Canada [36] reported that alcohol use was a significant predictor of HIV infection among young women.

However, a surprising finding in this study was that although alcohol intake was associated with HIV infection, the majority of AGYW respondents (11.0%) with HIV-positive outcomes had never used alcohol, compared to the 3.4% who had used alcohol. Further research is needed to explore the underlying factors and mechanisms that may explain this unexpected result. Nonetheless, our findings highlight the importance of targeting AGYW aged 15-24 with interventions that incorporate multiple preventive approaches. These efforts should aim to increase their awareness and utilization of various HIV risk reduction services.

HIV Stigma has been found to be a crucial fator in shaping responses to HIV Infections in some communities [37] while it is not significant in others [38]. For example, in the United States, stigma was found not to have a statistically significant effect on HIV testing and PPeP use [39].

However, in this study, HIV stigma was found to be significantly associated with HIV infection among AGYW aged 15-24 years. This finding is consistent with past studies conducted in Egypt [40] and South Africa [41] that reported a statistically significant relationship between Stigma and HIV infection. Stigma impacts HIV infection by causing AGYW whether living with or without HIV, to fear seeking HIV information, prevention, and treatment services, as well as hesitating to disclose their HIV status [42]. The effects of stigma include individual reluctance to undergo HIV testing and a lack of empowerment to implement HIV prevention measures [43]. In addition, some cultural expectations such as condoning early marriages, glorifying non-marital sex, having multiple sexual partners, and seeking children especially male children, outside marriage, increase stigma among AGYW. This in-turn can negatively impact positive behavioural and biological practices for HIV infection prevention [37]. Structural interventions targeted at overcoming stigma aim to bring about collective community change [44], particularly those targeting specific high-risk subpopulations like AGYW [45]. Therefore, structural interventions to mitigate the negative effects of HIV stigma among AGYW in the central region should focus on transforming the broader context in which individual AGYW and their communities perceive stigma and HIV infection.

Conclusion

Alcohol use and HIV stigma were identified as factors that predicted HIV infection among AGYW in the Central Region of Uganda. Addressing these factors is crucial for improving HIV prevention and care outcomes in this population. Further research is needed to better understand the complex interplay of these factors and their impact on HIV risk among AGYW.

Recommendations

In light of the above findings, the study recommends that the MOH in collaboration with MoES and the MoGLSD,

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should strengthen the capacities of individuals, groups, and institutions to limit Alcohol use among AGYW in order to reduce new HIV infections in Central Uganda. Additionally, the MoH should develop training manuals for AGYW, families, communities, and institutions, to deliver necessary structural interventions to address HIV stigma among the AGYW aged 15–24 years in Central Uganda.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

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