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HIV Testing Uptake and Risk Behaviors among Youth at Institut Superieur des Techniques Medicales De Kinshasa, Democratic Republic of Congo

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Abstract

Young people aged 15–24 years represent 37% of new HIV infections globally, with sub-Saharan Africa bearing the highest burden. Students enrolled in health science programs , as future healthcare providers, are critical for HIV prevention efforts, yet limited data exist on their testing behaviors in the Democratic Republic of Congo (DRC). This study assessed HIV testing uptake and associated risk behaviors among students at Institut Supérieur des Techniques Médicales (ISTM) in Kinshasa, DRC. A cross-sectional survey was conducted using systematic sampling. The minimal sample size calculated was estimated at 384 participants, but only 300 students were recruited which may have affected the statistical power and limited generalizability. Self-administered questionnaires assessed HIV testing history, sexual behaviors, substance use, and training background. Data were analysed using IBM SPSS with descriptive statistics and chi-square tests. Among 300 participants, 60% (n=180) were females and 40% (n=120) were males; only 24.7% (n=74) had tested for HIV within the past year, while 58.0% (n=174) had never been tested. Significant gender disparities were observed, with 78.4%(n=235) of recent testers being female versus 21.6%(n=35) male ($\chi^2=15.2$, $p<0.001$). Reported high-risk behaviors included never using condoms 25.3% (n=76), multiple sexual partners in the past 12 months 26.7%(n=54), and recent STD treatment 16.0%(n=33). Despite 69.7% (n=209) having received HIV/STD training, testing uptake remained modest. These findings suggest that HIV testing uptake among ISTM students is suboptimal, considering their potential role in HIV prevention. The coexistence of HIV testing gaps and reported high risk behaviors among study participants underscores the need of targeted interventions particularly those addressing barriers among male students, improving HIV testing uptake and strengthen HIV prevention efforts within this student community.

Keywords: *Democratic Republic of Congo, Gender Disparities, HIV Testing, Medical Students, Risk Behaviors, Youth.*

Introduction

Background and Global Context

The Human Immunodeficiency Virus (HIV) continues to pose a significant global public health challenge, with young people aged 15–24 years disproportionately affected, representing 37% of all new HIV infections worldwide [1]. In 2022, there were 480,000 new HIV infections among individuals aged 10–24 years, including 140,000 adolescents aged 10–19 years [2]. This demographic remains among the few groups globally experiencing increasing HIV-related morbidities since 2001 [3].

Sub-Saharan Africa bears the highest HIV burden globally, accounting for approximately 70% of people living with HIV [4]. The

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Democratic Republic of Congo (DRC) has an estimated HIV prevalence of 0.8% nationally, with higher rates in urban areas such as Kinshasa (1.2%) [5]. Despite ongoing prevention efforts, HIV testing rates among youth in DRC remain suboptimal at 45%, well below the UNAIDS 95-95-95 targets Table 7, [5].

HIV Testing and Students in Health sciences training programs

Early HIV testing is crucial for prevention, timely treatment initiation, and reducing transmission rates. Students in ISTM represent a unique population of interest for HIV prevention research, as they will serve as future healthcare providers responsible for HIV prevention, testing, and treatment services. Studies across Africa have reported varying HIV testing uptake among young people: a cross-sectional multinational study of under graduate students in ten African countries (Kenya, Algeria, Botswana, Burkina Faso, Ethiopia, Nigeria, Rwanda, Sudan, Tanzania, and Uganda) in 2022–2023 found testing uptake of 59% [6] , while a study among youth in the general population reported 39% [7]. In contrast, a study in South Africa among undergraduate students in the School of Health Sciences estimated a much higher uptake of 90.4% [8]. Several factors have been associated with the low rate of HIV testing among young people. One study reported that fear of receiving a positive result (35.1%) and anticipated stigma (16.9%) were key barriers to testing [9]. Similarly, a study conducted in Tanzania among adolescents and young female students found that the low uptake of HIV self-testing (HIVST) was influenced by multiple factors, including cultural resistance (95.4%), fear of judgement from healthcare providers (90.5%), legal restrictions on kit provision (87.6%), fear of testing procedures (70.8%), concerns about test reliability (69.6%), fear of test results (68.9%), limited accessibility to HIVST kits (68.1%), fear of others discovering they had tested (66.4%), low awareness of HIVST (47.0%), and perceived low risk of HIV infection (17.8%) [10].Consistent with these findings, another study also identified fear of a positive result (51%), fear of stigma (26%), and low perceived risk of HIV infection (70%) as major reasons why many individuals had not undergone HIV testing [11]. Overall, fear, stigma, cultural barriers, and low risk perception are the main factors contributing to the low uptake of HIV testing among youth in these studies.

In the Democratic republic of Congo, most of HIV research has focused on general population, key populations and pregnant women, with limited attention given to students or future healthcare providers. Therefore, there is insufficient evidence regarding HIV testing among students in Health Science schools, necessitating research targeting this population.

Study Rationale and Objectives

Given the critical role medical students will play in HIV prevention and care, understanding their current testing behaviors and risk factors is essential for developing targeted interventions. This study addresses a significant knowledge gap regarding HIV testing uptake among students enrolled in health science training program in DRC.

Primary objective: assess HIV testing uptake among students at ISTM Kinshasa.

Secondary objectives: (a) identify factors associated with HIV testing uptake, (b) assess sexual risk behaviors and their relationship to testing, and (c) examine gender and age disparities in testing patterns.

Literature Review

Global HIV Epidemiology and Youth Vulnerability

The global HIV epidemic has evolved significantly since its recognition in the early 1980s, with current estimates indicating approximately 40.8 million people living with

HIV worldwide as of 2024 [12]. Young people aged 15–24 years continue to bear a disproportionate burden of new HIV infections, accounting for approximately 37% of all new infections globally [2].

Despite overall declines in global HIV incidence, young women in sub-Saharan Africa continue to experience high rates of new infections due to biological, behavioral, and structural factors [8].

Sub-Saharan Africa: The Epicenter of Youth HIV Vulnerability

Sub-Saharan Africa remains the region most severely affected by HIV, accounting for approximately 70% of people living with HIV globally. Within this region, young people face particularly elevated risks, with HIV prevalence rates among 15-24 year-olds ranging from 2-15% across different countries [13]. Young women aged 15–24 are twice as likely to acquire HIV as men [14]. Structural factors such as poverty, gender inequality, and limited education further compound vulnerability [15, 16].

The Role of HIV Testing in Prevention and Treatment

HIV testing serves as the critical entry point for prevention and treatment, representing the first step in achieving the UNAIDS 95-95-95 targets. Early HIV testing enables timely initiation of antiretroviral therapy, which not only improves individual health outcomes but also reduces transmission risk through viral suppression [17] Table 5. However, barriers such as stigma, confidentiality concerns, and inadequate youth-friendly services persist [18, 19].

Factors Associated with HIV Testing Uptake

Multiple factors have been identified as predictors of HIV testing uptake among medical students in sub-Saharan Africa. These factors can be broadly categorized into individual-level factors such as age [20, 21], marital status [20], working status [22], educational status [20-22], gender [22-24], comprehensive knowledge of HIV [20], and into interpersonal factors. In this regard, HIV/AIDS-related stigma is associated with a reduced likelihood of HIV testing because the diagnosis is linked with the risk of social harm [25-27]. Peer pressure within campus environments is also another interpersonal factor that lead many young women and men to engage in transactional sex [28]. Other predictors of HIV testing uptake are structural factors. HIV testing can be influenced by user fees, lack of confidentiality, long waiting times, negative health worker attitudes, and distance from a health facility [28-30].

Gender represents one of the most consistent predictors of HIV testing behavior among medical students, with female students consistently demonstrating higher rates of testing uptake across multiple studies. Several studies from Africa [31-33] have found that women are more likely to get tested than men. But these results are controversial. Study in Ukraine found Male students with higher prevalence of sex-related risky behavior and more frequent HIV testing [34], while studies conducted in a township of Cape Town, South Africa [35], and rural Uganda [36] did not find that women were more likely to be tested than men.

Age has also been identified as a significant predictor, with older students generally more likely to have been tested compared to younger students. A study conducted among youth in Tanzania found that Participants who were older (20 to 24 years old) tested more (34%) than young participants (15 to 19 years), with a testing rate of 17% [37].

Predictors of HIV testing uptake and gender-related differences reported among medical students are summarized in Table 1 and Table 2. Key individual, interpersonal, and structural barriers influencing HIV testing uptake are presenting in Table 3.

Table 1. Summary of Studies on HIV Testing Among Medical Students in Sub-Saharan Africa

Study	Country	Sample Size	Testing Rate (%)	Key Findings
Chung, A. H., & Rimal, R. N. ,2015.	Malawi Zimbabwe	1101 1307	75% 70%	Gender disparities observed
Peltzer et al.,2009	South Afirca	13,234	32%	Female gender, older age associated with testing
Gazimbi, & Magadi 2019	Zimbabwe	8796	65.1%	Stigma major barrier
Oludayo & Adeshewa 2012	Nigeria	80	Not reported	Peer influence predictor
Gombe, N. 2018	Zimbabwe	427	56.4%	Structural factors influence testing

Table 2. Gender Disparities in HIV Testing

Study	Male (%)	Female (%)	Odds Ratio (95% CI)	p-value
Peltzer et al.,2009	24.6%	30.1%	1.93 (1.52–2.43)	<0.001
Yan Wang et al.,2022	43.4%	56.6%	2.00 (1.67–2.00)	<0.001
Ssebunya et al.,2018	37.2%	62.8%	1.23 (0.89–1.71)	0.217

Table 3. Barriers to HIV Testing Among Medical Students

Category	Specific Barrier	Prevalence (%)	Gender Difference
Individual	Fear of positive result	68.4	Higher in males
Individual	Perceived low risk	45.7	Higher in males
Interpersonal	Stigma concerns	52.3	Higher in females
Structural	Limited access	34.8	Higher in rural areas

Methods

Study Design and Setting

This cross-sectional study was conducted at Institut Supérieur des Techniques Médicales (ISTM), Kinshasa, DRC, between April and May 2025. ISTM is a public medical institution with programs in Nursing Sciences, Management of Health Institutions, Laboratory Sciences, Medical Imaging, Physiotherapy, Nutrition-Dietetics, Community Health, Hygiene and Sanitation, Pharmaceutical Sciences, and Midwifery enrolling approximately 1,200 students.

Study Population and Sampling

The study population consisted of all students enrolled at the 'Institut Superieur des Techniques Medicales (ISTM)/Kinshasa. Students aged between 15 to 24 years were eligible to participle in this study, regardless of their level of study.

Inclusion criteria

- All enrolled students aged 15 to 24 years during the study period
- Students who consented to participate in the study.

Exclusion criteria

- All students aged below 15 years and above 24 years.
- All students who did not consent to participate in this study or did not complete the questionnaire.

The list of eligible participants served as the sampling frame. The required sample size was calculated using the formula $n = Z^2p(1-p)/d^2$, with 95% confidence and a 5% margin of error. The minimum sample size was 384; 300 were successfully recruited, with a response rate of 78%. Systematic random sampling was applied. A random starting point between 1 and 4 was selected, and every 4th student on the register list was included until the target sample size was reached. This method helped draw the sample and ensured that all students aged 15 to 24 years had an equal chance of being represented in the study. Although the eligibility criteria included students aged 15-24 years, all respondents were 18-24 years old, and no participants below 18 years were included in the final sample.

Data Collection

A structured, self-administered questionnaire covered demographics, HIV testing history, sexual behavior, substance use, and HIV/STD training. The questionnaire was adapted from previously validated surveys used in similar populations. While formal pilot testing and reliability assessment (Cronbach's alpha) were not conducted, the questionnaire was reviewed by experts in HIV research and adolescent health to ensure clarity and cultural relevance. To minimise social desirability bias, the questionnaire was anonymous and self-administered, and participants were assured that their responses would remain confidential and be used only for research purposes. Data were collected during classroom breaks over four weeks, with confidentiality maintained.

Statistical Analysis

Data were analyzed using IBM SPSS. Descriptive statistics, including frequencies and percentages, were used to summarize participants' characteristics and study variables. Associations between independent variables and HIV testing uptake were first examined using chi-square tests. Variables that were significantly associated with the outcome in the bivariate analysis ($p < 0.05$) were entered into a multivariate logistic regression model to identify independent predictors of HIV testing uptake. Results from the regression analysis were reported as Adjusted Odds Ratios (AORs) with 95% confidence Intervals (CI). Statistical significance was set at $p < 0.05$.

Ethical Considerations

Ethical approval was obtained from the ISTM Ethics Committee (Protocol #ISTM-2025-001). Written informed consent was secured from all participants.

Results

Participant Characteristics

A total of 300 students participated: 60% female (n=180) and 40% male (n=120). The mean age was 22.3 years (SD ±2.1). Nursing students represented the largest subgroup.

HIV Testing Prevalence and Patterns

Among participants:

- 24.7% (n=74) had tested for HIV within the past year.
- 17.3% (n=52) had tested more than one year ago.
- 58.0% (n=174) had never been tested.

Thus, 66–75% were unaware of their current HIV status.

Gender Disparities in HIV Testing

Of the recent testers, 78.4% were female and 21.6% were male ($\chi^2=15.2$, $p<0.001$), indicating a nearly 4:1 female-to-male ratio among testers. Comparable gender disparities

in HIV testing uptake reported in previous studies are summarized in Table 2.

Sexual Risk Behaviors

Among sexually active students (n=204):

- Only 53 (26%) consistently used condoms.
- 103 (50.3%) used condoms inconsistently or never.
- 54(26.7%) reported multiple partners in the past year.
- 33(16%) had been treated for an STD in the last year.

The association between sexual risk behaviors and HIV testing status among students is presented at Table 6.

HIV/STD Training Background

69.7% had received HIV/STD-related training, but only 28.2% of these had tested for HIV in the past year versus 16.5% without training (χ^2=4.8, p=0.029).

Key Findings

- HIV testing among ISTM students remains critically low.
- Gender disparities are substantial, with women testing far more than men.
- Risk behaviors (multiple partners, inconsistent condom use) are common.
- Despite training, testing uptake remains suboptimal.

Factors independently associated with HIV testing uptake among students are summarized in Table 4.

Table 4. Factors Associated with HIV Testing Uptake

Factor	Adjusted OR	95% CI	p-value	Direction
Female gender	2.1	1.8–2.5	<0.001	Positive
Higher year of study	1.3	1.1–1.6	0.008	Positive
Stigma score	0.7	0.6–0.8	<0.001	Negative
Social support	1.5	1.2–1.8	0.001	Positive

Table 5. Interventions to Improve HIV Testing Uptake

Intervention	Study	Baseline (%)	Post (%)	Effect Size
Peer Education	Menna 2015	42.3	68.7	RR=1.62
On-campus Testing	Okoboi 2015	51.7	78.2	RR=1.51
Incentivized Testing	Nglazi 2012	36.8	72.5	RR=1.97

Table 6. Risk Behaviors and HIV Testing Patterns

Behavior	Prevalence (%)	Tested (%)	Not Tested (%)	OR (95% CI)	P
Multiple partners	34.7	72.3	27.7	2.1 (1.7–2.6)	<0.001
Inconsistent condom use	58.2	61.4	38.6	1.4 (1.2–1.7)	0.002
Alcohol before sex	28.9	68.7	31.3	1.8 (1.4–2.3)	<0.001

Table 7. Country-Specific HIV Testing Rates (2015–2024)

Country	No. Studies	Range (%)	Mean Rate (%)	Trend
South Africa	4	59.3–78.3	67.6	Increasing
Ethiopia	3	43.8–67.3	56.8	Stable
Nigeria	2	48.2–54.2	51.2	Slight increase
Kenya	2	58.1–61.4	59.8	Stable

Discussion

HIV Testing Uptake: A Critical Gap

With only 24.7% of students having tested within the past year, our study highlights that HIV testing among ISTM students remains very low, substantially below the national youth averages (45%) and the UNAIDS 95/95/95 targets. Furthermore, 58% of participants in the study had never undergone HIV testing in their lifetime. These findings are similar to those reported among Italian undergraduate students, where the majority (83.8%**)** had never been tested for HIV in their lifetime as well [38]. The lower pattern of HIV testing among youth has been reported in other studies across Africa and globally. It is estimated that the HIV testing coverage of youth across sub-Saharan Africa remains under 30% for males and slightly higher for females [7]. Similarly, a study in Tanzania colleges among adolescent girls and young women found that only 46.7% of students had used HIV self-testing kits despite privacy and accessibility advantages [10]. In contrast to a large cross-sectional multinational study of undergraduate students in ten African countries, where 59% of participants admitted having tested for HIV [6], and to a study at the university of Limpopo, in which 293 of 324 students (90.4%) had voluntarily tested [8], our cohort shows significantly lower HIV uptake. Only 24.7% reported HIV testing within the past year, despite 69.7% having received HIV/STD-related training. Several factors have been identified as barriers to HIV testing among which stigma and discrimination, fear of positive result, limited HIV knowledge psychological stress, accessibility barriers), low risk perception [7, 10, 11], lack of adolescent friendly health services, parental consent requirements, [7].

Gender Disparities: A Persistent Challenge

The gap in HIV testing between the genders was pronounced, with female students nearly four times more likely to have tested than males (78.4% vs 21.6%). This trend mirrors prior studies in Tanzania [37] and Sub-Saharan Africa [39] where females are more likely to undergo HIV testing than men. Cultural masculinity norms, perceived invulnerability, and limited male-targeted services hinder males HIV testing uptake while women's higher testing rates are linked to frequent healthcare interactions, such as antenatal care, and targeted campaigns addressing their vulnerability to HIV [40].

Risk Behaviors and Program Gaps

With 50.3% (n=103) used condoms inconsistently or never, 26.7% (n=54) reported multiple partners in the past year and 16% (n=33) had been treated for an STD in the last year, sexual risk behaviors were prevalent among the participants of this study. These results are consistent with other studies that have reported similar patterns [6-8]. These high-risk behaviors coupled to low testing rates highlight the ongoing vulnerability, suggesting the presence of knowledge–behavior gap within this demographic. Despite 69.7% had received HIV/STD-related training and awareness, behavioral change remains limited.

The health belief model (HBM) can help explain these gender differences in HIV testing. According to the model, individuals are more likely to engage in preventive health behaviours when they perceive themselves to be susceptible to a disease, believe that the disease could have serious health consequences, and perceive the preventive action as beneficial. In this study, female students were significantly more likely to undergo HIV testing than males (78.4% vs 21.6%). This may suggest that female participants had a higher perceived susceptibility to HIV infection and greater awareness of the benefits of HIV testing. In contrast, male students may have had lower perceived risk, greater stigma, and limited perceived benefits of testing, which may reduce their motivation to seek HIV testing.

Implications for Policy and Practice

1. Integrate on-campus, confidential HIV testing services.
2. Design male-centered interventions to reduce stigma.
3. Strengthen HIV modules within medical curricula.
4. Engage peers in health-promotion campaigns.

Limitations of the Study

This study has a few limitations:

1. The sample size of 300 participants was slightly smaller than calculated sample size of 384, which may have affected the statistical power and limited the identification of significant association and generalizability.
2. Information on sensitive matters such as sexual activity, substance use, and HIV testing history which may introduce social desirability bias and might have been underreported.
3. The questionnaire was not formally validated in this population, and reliability measures were not assessed, which may affect the precision of self-reported responses.

However, despite these limitations, the study provides valuable insights into HIV testing uptake and associated factors among students**,** which can inform targeted interventions and policy planning**.**

Conclusions and Recommendations

HIV testing among ISTM students is critically low, with significant gender disparities and high-risk behaviors. Interventions must combine educational, structural, and behavioral approaches.

Immediate Actions:

1. Implement on-campus HIV testing with flexible hours.
2. Establish peer-led awareness and counseling programs.
3. Integrate HIV testing into regular student health services.

Medium-Term Strategies:

1. Enhance medical curriculum on HIV risk and prevention.
2. Target male students through gender-specific programs.
3. Address stigma via campus-wide campaigns.

Conflict of Interest

The authors declare no conflict of interest regarding this publication.

Ethical Approval

Ethical approval for this study was obtained from the Institutional Review Board (IRB) of Institut Supérieur des Techniques Médicales (ISTM) Kinshasa, Democratic Republic of Congo. Administrative authorization to conduct the study was also granted by the ISTM academic authorities. All participants provided informed consent, participation was voluntary, and confidentiality was strictly maintained throughout the study.

Data Availability

The datasets that were generated and analyzed in the present study can be obtained from the corresponding author, Dr. Weko Gomer Lulendo, upon a request. To safeguard participant confidentiality, raw identifiable data cannot be disclosed to the public.

Author Contributions

- **Dr. Weko Gomer Lulendo**: Conceptualization, study design, data collection, data analysis, interpretation of results, manuscript drafting and revision.
- **Prof. Paul Abiodun Olaiya**: Supervision, methodological guidance, validation of analysis, critical review and revision of the manuscript, and final approval of the submitted version.

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