Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No.9 (2025): September 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i9.2032
Original Article

Risk factors associated with recent and long-term HIV infections among newly identified HIV positive clients in Kyenjojo District, Western Uganda. A cross-sectional study.

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Abstract

Background
Despite the implementation of many preventative efforts, new HIV infections among the general population continue to occur in Uganda. Therefore, this study aimed to assess the risk factors associated with recent & long-term HIV infections among newly identified HIV positive clients in Kyenjojo District, Western Uganda.

Methods
A cross-sectional study employing a quantitative approach. The collected data were analyzed using STATA. Data was presented in the form of text, tables, and graphs. Logistic regression was used to test for association, while an odds ratio was used as the measure of the association between the two variables, and data was presented in terms of text, tables, and pie-charts.

Results
A total of 211 respondents participated in the study; 91.9% of the participants were found to have long-term HIV infections. Recent HIV infection was significantly associated with being Christians (AOR = 15.01; 95% CI: 3.89–28.06; p = 0.005), earning less than 100,000 shillings per month (AOR = 3.88; 95% CI: 1.72–6.25; p= 0.020), perceived the waiting time at the health facility as long (AOR = 3.37; 95% CI: 1.12–6.82; p = 0.003), having the nearest health facility providing HIV/AIDS services (AOR = 13.96; 95% CI: 9.14–20.79; p = 0.002), and reporting that health workers were friendly and welcoming (AOR = 13.38; 95% CI: 4.13–41.90; p = 0.006).

Conclusion
Long-term HIV infection was in nine out of every ten participants, and recent HIV infection was associated with the facility providing HIV/AIDS services and the behaviors of the health workers.

Recommendation
The Ministry of Health, in collaboration with health facility administrators, should implement a comprehensive, multi-sectoral strategy to address recent HIV infections by targeting high-risk populations.

Keywords: *Risk Factors, Recent and Long-Term HIV Infections, HIV Positive Clients, Kyenjojo District, Western Uganda*
Submitted: 2025-08-01 **Accepted:** 2025-08-25 **Published:** 2025-09-01

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Background of the study

Globally, HIV/AIDS continues to be a major public health concern, with the latest 2023 statistics from UNAIDS reporting that approximately 39.9 million people are living with HIV worldwide. Sub-Saharan Africa remains the most affected region, where about 1 in every 20 adults is living with HIV, accounting for nearly two-thirds of all people living with HIV globally (del Rio, 2017). Although significant strides have been made in controlling the epidemic, with new HIV infections declining and access to treatment expanding, sustained efforts are crucial to achieving the goal of ending the HIV epidemic by 2030

As per the United Nations program on HIV/AIDS (UNAIDS) and the World Health Organization (WHO), the number of individuals living with HIV in 2020 was 37.7 million (30.2–45.1 million). Furthermore, women and girls made up 53 percent of all HIV-positive individuals. 84% [67–98%] of all HIV-positive individuals recognized their status in 2020, whereas over 6.1 million [4.9–7.3 million] persons were unaware that they had the virus at all

Despite the implementation of many preventative efforts, new HIV infections among the general population

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continue to occur in Uganda. HIV recency testing is a new test that was included in HIV programs by the MOH - Uganda in 2019. This test assists in determining how long a person newly diagnosed above 15 years has stayed with the HIV infection and thus the test result is either recent (which means the HIV positive individual acquired the infection in the last 12 months) or it gives a long-term infection (which means the positive individual has been with the HIV infection for more than 12 months). This system is intended to drive HIV prevention programs, map hot locations for recent HIV infections, detect clusters of recent HIV infections, and provide information on HIV epidemic control for the most impacted subpopulation in the mapped areas of high HIV prevalence.

As Uganda gears towards ending the HIV epidemic with zero new HIV infections by 2030, many new infections are emerging despite all prevention strategies already in place. Additionally, despite testing efforts having been put in place over the past years, there are still new infections coming up as long-term infections.

Uganda in particular lacks knowledge about the test (Gage & Ali, 2015) in particular. The age range covered by AIDS Indicator Surveys and Demographic and Health Surveys (DHS) in the Southern African Subcontinent (SSA) is 15–54 years old. Recency adult testing is also not included in the most current Uganda DHS, 2016, or the Population and HIV Impact Surveys (PHIA) in 12 African nations (Justice, Falutz, 2014; PHIA, 2018). Therefore, this study aimed to assess the risk factors associated with recent & long-term HIV infections among newly identified HIV positive clients in Kyenjojo District, Western Uganda.

Methodology

Study design

The study was a cross-sectional study design. Quantitative approach of data collection was used. This study design was used to collect data concerning the risk factors associated with recent & long-term HIV infections among newly identified HIV positive clients in Kyenjojo District, Western Uganda.

Study area

The study was conducted in selected health facilities in Kyenjojo district. Kyenjojo District is located in the Western Region of Uganda, bordered by Kibale District to the north, Kyegegwa District to the east, Kamwenge District to the south, and Kabarole District to the west. The district headquarters at the district are approximately 274 kilometers (170 mi), by road, west of Kampala, Uganda's capital and largest city. The coordinates of the district are 00 37N, 30 37E. It is divided into two counties: Mwenge North and Mwenge South. The study purposively selected the 9 health facilities (general hospital and the one health centre IV of Kyarusozi HC IV, and seven health centre IIIs) because of their high volume. The largest hospital in the district is Kyenjojo General Hospital, commonly known as Kyenjojo District Hospital or Kyenjojo Government Hospital. Located in the town of Kyenjojo in the Kyenjojo District, the hospital is accessible by the Mubende-Kyegegwa-Kyenjojo-Fort Portal Road. It is roughly fifty kilometers (31 miles) east of Fort Portal Regional Referral Hospital.

Study population

The study covered all newly tested HIV positive clients aged 15 years and above, seeking services at selected health facilities in Kyenjojo district; hence, the study looked at the clients who had been diagnosed from January 2024 to December 2024. The newly tested HIV positive clients included both recent HIV infection and long-term HIV infection. The recency test is a diagnostic tool used to determine whether an individual has recently acquired HIV infection (Within 12 months) or long-term infections (Beyond 12 months) or delayed diagnosis. The newly tested HIV positive clients are the clients who had just been diagnosed, irrespective of how long they had lived with the infection.

Target population

The study targeted all newly tested HIV positive clients aged 15 years and above. The newly tested HIV positive clients included both recent HIV infection and long-term HIV infection. The recency test is a diagnostic tool used to determine whether an individual has recently acquired HIV infection (Within 12 months) or long-term infections (Beyond 12 months) or delayed diagnosis. The newly tested HIV positive clients were the clients who had just been diagnosed, irrespective of how long they had lived with the infection.

Selection criteria

Inclusion criteria

The study included all newly tested HIV positive clients aged 15 years and above, who had sought HIV testing services from the selected health facilities, who consented to take part in the study.

Exclusion criteria

The study excluded all the HIV positive clients tested and diagnosed long ago who were critically sick and who were not available during the data collection period.

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Sample size determination

The sample size was calculated using a formula by Kish Lesile (1965) owing to an unknown size of the population, the formula is as below; -

$n=Z^2P(1-P)/_d2$

Where n= sample size

z – Confidence level at 95% corresponding to 1.96
p- Proportion of the population affected by the problem. Taking HIV prevalence in Kabarole District, P=14.6% (0.146) (Uganda AIDS Commission report, 2020).
d-
The allowable error at 5% Therefore, substituting in the formula,
n=(1.96*1.96*0.146*(1-0.146))/ (0.05*0.05) n= (3.8416*0.146*0.854)/ 0.0025
n= 0.4789860544 / 0.0025

n = 191.59442176 ≈ 191.6
Adjusting for the non-response, an additional 10% of the sample size was considered.
n=191.6+(191.6*10/100)
n = 191.6 + 19.16, n ≈ 211. Therefore, the study enrolled 211 eligible participants.

Sampling procedure

The study purposively selected the general hospital and the one health centre IV of Kyarusozi HC IV and seven health centre IIIs because of their high volume. At the health facility level, simple random sampling was used at each facility, taking into consideration the proportion of the clients in each selected facility. Once the number for each facility was determined, the researcher wrote the patients' numbers for the facility and randomly picked the number required from the facility to participate using a piece of paper where the patients' numbers were written and picked randomly without replacement.
Formula for PPS Sampling:

ni=(Ni/Ntotal) ×ntotl Where
n_i = sample size for facility i
N_i = population of facility i
N_{total} = total population across all facilities
n_{total} = total desired sample size (in this case, 211).
Step-by-Step Application (Example: Kyenjojo Hospital):
n_i=(4,084/13,278) ×211=0.3076×211≈65
Now applying the same formula to the rest:

The picked patients were then tracked in their subsequent ART clinic visits and briefed on the study and asked to participate.

Table 1: Sample size distribution per health facility

Health facility	Population	Sample size
Kyenjojo Hospital	4,084	65
Kyarusozi HCIV	1,590	25
Butiti HCIII	1,419	22
Katooke HCIII	1,662	26
Kisojo HCIII	1,132	18
Nyakarongo HCIII	815	13
Nyankwanzi HCIII	865	14
Bufunjo HCIII	841	13
Butunduzi HCIII	870	14
Total	13,278	211

Data collection instruments, quality control & data management

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum_{i=1}^{k}\sigma_y^2}{\sigma_x^2}\right)$$

A structured questionnaire was the data collection method, and data abstraction was used to collect primary data and medical record extraction.

Data abstraction

Data on the dependent variables, infection status in this study, were collected using a standard data abstraction tool on a recency test. Data extraction is the process of obtaining raw data from a source and replicating that data somewhere else. This was obtained from the patient's register/recency testing log book.

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Quality control

Reliability

Reliability is the extent to which data collection instruments can produce consistent results when administered to the same group of respondents under the same conditions. The internal consistency of the instrument was determined by the use of the Cronbach Alpha Coefficient method, and a value of p>0.70 was considered appropriate. The Cronbach Alpha Coefficient method of internal consistency was determined by the following formula.

Where: A=alpha coefficient

K-the number of items in the instrument

∑ins=summation of the values

SDi^2= Variance of individual items

Sdt^2 =Variance of all items in the instrument

The results from the pretest were then used to modify the instruments and their corresponding results. If the results provided values > 0.7, the instrument was considered reliable.

Validity

To ensure face validity of this instrument, copies of the instrument were given to experts for vetting before they were administered to the respondents in the field. Contributions from the above respondents were duly incorporated into the instrument. After which, a content validity index (C.V.I) was computed.

C.V.I = No. of items declared valid by experts
Total no. of items on the questionnaire

Data collection procedures

An introductory letter was obtained from the BSU to formally present her to the management of Kyenjojo district to allow her to proceed with data collection. Administrative approval was also obtained from all the participating health facilities as well as from the clinic in-charges, and upon obtaining permission for the next procedure, the study proceeded. During the administration of the questionnaire, primary data were obtained from the respondents, and secondary data were then abstracted from the patients' registers. The data was collected using the tested data collection tools, coding was done daily after field data collection, which involved grouping responses into categories, and this was facilitated by constructing code frames, and each response was entered by use of tally marks.

Data processing and analysis

Data was checked for completeness, correctness, and coded in the data room daily after field data collection; it involved grouping responses into categories. Data was entered in a Microsoft Excel 2010 data sheet for storage and was imported to STATA version 18 for analysis. Descriptive statistics were used to describe the associated factors. Chi-square, confidence intervals, and p-values were reported, and data were presented using tables and graphs.

Ethical considerations

Approval was sought from the Research Ethics Committee of Bishop Stuart University (BSU-REC-2025-470). Consent was sought before and during the interview; the individual was free to withdraw from the study for personal reasons or to postpone it to a later time, and the information collected remained only accessible to the researcher.

Results

Sociodemographic/individual characteristics of the study participant

Table 2: Descriptive analysis of the sociodemographic characteristics of the respondents

Variables	Frequency n	Percentage %
Age (mean=33.38, SD=9.4)		
18-24 years	39	18.5
25-34 years	82	38.9
≥35 years	90	42.7
Gender		
Female	127	60.2
Male	84	39.8
Marital status		
Single	59	28.0
Married	111	52.6

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Divorced/separated/Widowed	41	19.4
Highest level of education		
None	38	18.0
Primary	130	61.6
Secondary and above	43	20.4
Occupation		
Peasant	145	68.7
Salaried/employed	36	17.1
Petty business	30	14.2
Religion		
Christians	193	91.5
Non-Christians	18	8.5
Place of residence		
Rural	178	84.4
Urban	33	15.6

The majority of the respondents were aged 35 years and above (42.7%), with a mean age of 33.38 years (SD = 9.4). Most were female (60.2%), married (52.6%), and had attained primary education as their highest level of education (61.6%). A significant portion were peasants by occupation (68.7%), Christians (91.5%), and resided in rural areas (84.4%). In terms of income, most respondents earned less than 100,000 Ugandan shillings per month (76.3%). Regarding sexual behavior, the majority had more than two sexual partners in the 12 months preceding HIV testing (45.5%) and had not been informed of their partners' HIV sero-status (53.1%). Community counselors were the most common first source of information on HIV testing services (46.9%), followed by health workers or media sources such as radio and TV (31.3%).

Table 3: Individual factors associated with recent and long-term HIV Infections among newly identified HIV HIV-positive clients

Variables	HIV infections		COR (95% CI)	p- value
	Recent (%)	Long term (%)		
Age (mean=33.38, SD=9.4)				
18-24 years	6(15.4)	33(84.6)	0.32(0.09-1.13)	0.078
25-34 years	6(7.3)	76(92.7)	0.75(0.22-2.54)	0.638
≥35 years	5(5.6)	85(94.4)	1	
Gender				
Female	11(8.7)	116(91.3)	0.81(0.29-2.28)	0.692
Male	6(7.1)	78(92.9)	1	
Marital status				
Single	7(11.9)	52(88.1)	1.03(0.30-3.51)	0.960
Married	5(4.5)	106(95.5)	2.94(0.81-10.76)	0.102
Divorced/separated/Widowed	5(12.2)	36(87.8)	1	
Highest level of education				
None	5(13.2)	33(86.8)	0.87(0.23-3.27)	0.835
Primary	7(5.4)	123(94.6)	2.31(0.69-7.71)	0.172
Secondary and above	5(11.6)	38(88.4)	1	
Occupation				
Peasant	7(4.8)	138(95.2)	3.94(1.16-13.41)	0.028
Salaried/employed	5(13.9)	31(86.1)	1.24(0.32-4.77)	0.754
Petty business	5(16.7)	25(83.3)	1	
Religion				
Christians	10(5.2)	183(94.8)	11.65(3.72-36.47)	<0.001
Non-Christians	7(38.9)	11(61.1)	1	
Place of residence				
Rural	11(6.2)	167(93.8)	3.37(1.15-9.88)	0.027
Urban	6(18.2)	27(81.8)	1	

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Average amount earned per month				
<100,000 shillings	8(5.0)	153(95.0)	4.19(1.53-11.56)	0.005
≥100,000 shillings	9(18.0)	41(82.0)	1	
Number of sexual partners in the past 12 months before HIV testing				
One	5(10.2)	44(89.8)	0.69(0.21-2.31)	0.549
Two	5(7.6)	61(92.4)	0.96(0.29-3.16)	0.946
More than two	7(7.3)	61(92.7)	1	
Sexual partner(s) disclosed their HIV status. sero-status to you				
Yes	7(7.1)	92(92.9)	1.29(0.47-3.52)	0.621
No	10(8.9)	102(91.1)	1	
First source of information relating to HIV testing services				
Community counselor	5(5.1)	94(94.9)	0.36(0.10-1.23)	0.102
Friends & relatives	6(13.0)	40(87.0)	0.53(0.16-1.82)	0.315
Health worker/Radio/TV	6(9.1)	60(90.9)	1	

The study findings indicated that respondents who were peasants were 3.9 times more likely to have a recent HIV infection compared to those engaged in petty business (COR 3.94; 95% CI: 1.16–13.41; p = 0.028). Similarly, respondents who were Christians were 11.6 times more likely to have a recent HIV infection than non-Christians (COR = 11.65; 95% CI: 3.72–36.47; p < 0.001). Those residing in rural areas were 3.4 times more likely to have a recent HIV infection than urban residents (COR = 3.37; 95% CI: 1.15– 9.88; p = 0.027), and respondents earning less than 100,000 shillings per month were 4.2 times more likely to have a recent HIV infection compared to those earning 100,000 shillings or more (COR = 4.19; 95% CI: 1.53–11.56; p = 0.005). Other individual factors—including age, gender, marital status, education level, number of sexual partners, partner HIV status disclosure, and source of information about HIV testing—were not statistically significant (p > 0.05).

Health facility/clinical factors associated with recent & long-term HIV Infections among newly identified HIV positive clients

Table 4: Descriptive analysis of health facility/clinical factors of the respondents

Variables	Frequency n	Percentage %
Distance from home to this health facility	89	42.2
≤5km	50	23.7
6-10km	72	34.1
>10km		
Quality of HIV/AIDS services in this health facility	130	61.6
Good Fair	81	38.4
Find difficulties in coming to receive health services at this health facility.		
Yes No	120	56.9
	91	43.1
Attitude of the health workers who provide HIV/AIDS services	122	57.8
Good Fair	89	42.2
Perceive waiting time at the health facility	164	77.7
Long Too long	47	22.3
Health workers are always present at the health facility	191	90.5
Yes No	20	9.5
The nearest health facility to you provides HIV/AIDS services		
Yes No	188	89.1
	23	1.9
The way health workers handle clients at this health facility	186	88.2

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Friendly and welcoming Not friendly and not welcoming	25	11.8
Health workers at this health facility discuss HIV/AIDS related problems with other people not involved in providing health services. Yes No	13 198	6.2 93.8
Agree that information on HIV/AIDS services provided to clients at this health facility is adequate/or enough. Yes No	102 109	48.3 51.7
Some HIV/AIDS service information that is provided to clients		
Subscribe to any health insurance scheme Yes No	15 196	7.1 92.9
Ease of accessing HIV testing services from your nearest health facility Somehow difficult Very easy and at all times	 159 52	 75.4 24.6
Place where HIV testing services were accessed Community outreach	119	56.4
Health facility	92	43.6

The majority of the respondents (42.2%) lived within 5 kilometers of the health facility, while 34.1% lived more than 10 kilometers away. Most of the respondents (61.6%) rated the quality of HIV/AIDS services as good, and 56.9% reported facing difficulties in accessing health services. More than half (57.8%) perceived the attitude of health workers as good, and a significant majority (77.7%) felt that the waiting time at the health facility was long. Additionally, 90.5% indicated that health workers were always present, and 89.1% reported that their nearest health facility provided HIV/AIDS services. A large proportion (88.2%) described the way health workers handled clients as friendly and welcoming, while 93.8% stated that health workers did not disclose HIV-related issues to people not involved in healthcare. However, respondents were nearly evenly split on whether the information provided on HIV/AIDS services was adequate, with 48.3% agreeing and 51.7% disagreeing. Only 7.1% of respondents subscribed to a health insurance scheme. Regarding access to HIV testing services, 75.4% said it was somehow difficult, and 56.4% accessed these services through community outreach, compared to 43.6% who accessed them at a health facility.

Table 5a): Health facility/clinical factors associated with recent & long-term HIV Infections among newly identified HIV HIV-positive clients.

Variables	HIV infections		COR (95% CI)	p- value
	Recent (%)	Long term (%)		
Distance from home to this health facility ≤5km 6-10km >10km	 6(6.7) 5(10.0) 6(8.3)	 83(93.3) 45(90.0) 66(91.7)	 1.26(0.39-4.08) 0.82(0.24-2.84) 1	 0.703 0.752
Quality of HIV/AIDS services in this health facility Good Fair	 9(6.9) 8(9.9)	 121(93.1) 73(90.1)	 1.47(.54-3.99) 1	 0.446
Find difficulties in coming to receive health services at this health facility Yes No	 11(9.2) 6(6.6)	 109(90.8) 85(93.4)	 0.69(0.25-1.97) 1	 0.498
Attitude of the health workers who Provide HIV/AIDS services. Good Fair	 10(8.2) 7(7.9)	 112(91.8) 82(92.1)	 0.96(0.35-2.62) 1	 0.930

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Perceive the waiting time at the health.				
facility	8(4.9)	156(95.1)	4.62(1.67-12.76)	0.003
Long	9(19.1)	38(80.9)	1	
Too long				
Health workers are always present at the health facility				
Yes	9(4.7)	182(95.3)	13.48(4.41-41.21)	<0.001
No	8(40.0)	12(60.0)	1	
The nearest health facility to you provides HIV/AIDS services	8(4.3)	180(95.7)		
Yes	9(39.1)	14(60.9)	14.46(4.83-43.31)	<0.001
No				

Table 5b: Health facility/clinical factors associated with recent & long-term HIV Infections among newly identified HIV HIV-positive clients.

The way health workers handle clients at this health facility				
Friendly and welcoming	8(4.3)	178(95.7)	12.52(4.25-36.89)	<0.001
Not friendly and not welcoming	9(36.0)	16(64.0)	1	
Health workers at this health facility				
Discuss HIV/AIDS related problems. with other people not involved in providing health services	5(38.5)	8(61.5)	0.10(0.03-0.36)	<0.001
Yes	12(6.1)	186(93.9)		
No				
Agree on that information on HIV/AIDS. services provided to clients at this				
The health facility is adequate/or enough	9(8.8)	93(91.2)	0.82(0.30-2.21)	0.693
Yes	8(7.3)	101(92.7)	1	
No				
Subscribe to any health insurance scheme	8(53.3)	7(46.7)	0.04(0.01-0.14)	<0.001
Yes No	9(4.6)	187(95.4)	1	
Ease of accessing HIV testing services from your nearest health facility: Somehow difficult	12(7.5)	147(92.5)	1.30(0.44-3.89)	0.635
Very easy and at all times	5(9.6)	47(90.4)	1	
Place HIV testing services were accessed	7(5.9)	112(94.1)	1.95(0.71-5.34)	0.193
Community outreach Health facility	10(10.9)	82(89.1)	1	

The study revealed several significant associations between health facility factors and recent HIV infection. Respondents who perceived the waiting time at the health facility as "long" were more likely to have a recent HIV infection compared to those who said it was "too long" (COR = 4.62; 95% CI: 1.67–12.76; p = 0.003). Those who reported that health workers were always present at the health facility were significantly less likely to have a recent HIV infection than respondents who indicated that health workers were not always present (COR = 13.48; 95% CI: 4.41–41.21; p < 0.001). In addition, respondents whose nearest health facility provided HIV/AIDS services were more likely to have a recent HIV infection than those whose nearest facility did not (COR = 14.46; 95% CI: 4.83–43.31; p< 0.001). Findings also indicated that respondents who described health workers as friendly and welcoming were less likely to have a recent HIV infection compared to those who described them as not friendly and not welcoming (COR = 12.52; 95% CI: 4.25–36.89; p< 0.001). Moreover, respondents who reported that health workers discussed HIV/AIDS- related problems with non-health

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personnel were more likely to have a recent HIV infection than those who reported no such breaches in confidentiality (COR = 0.10; 95% CI: 0.03– 0.36; p < 0.001). Similarly, respondents who were subscribed to a health insurance scheme were more likely to have a recent HIV infection than those who were not (COR = 0.04; 95% CI: 0.01–0.14; p < 0.001). However, other health facilities and clinical factors, such as distance to the facility, quality of HIV services, ease of accessing services, and place of testing, were not statistically significant (p > 0.05).

Table 6: Multivariate analysis of factors associated with recent & long-term HIV Infections among newly identified HIV-positive clients.

Variables	COR (95% CI)	p- value	AOR (95% CI)	p-value
Occupation Peasant Salaried/employed Petty business	3.94(1.16-13.41) 1.24(0.32-4.77) 1	0.028 0.754	7.90(0.31-20.32) 1.85(0.45-36-95) 1	0.212 0.314
Religion Christians Non-Christians	11.65(3.72-36.47) 1	<0.001	15.01(3.89-28.06) 1	0.005
Place of residence Rural Urban	3.37(1.15-9.88) 1	0.027	4.47(0.35-9.25) 1	0.248
Average amount earned per month <100,000 shillings ≥100,000 shillings	4.19(1.53-11.56) 1	0.005	3.88(1.72-6.25) 1	0.028
Perceive waiting time at the health facility Long Too long	4.62(1.67-12.76) 1	0.003	3.37(1.12-6.82) 1.0	0.003
Health workers are always present at the health facility Yes No	13.48(4.41-41.21) 1	<0.001	8.03(0.91-20.73) 1	0.060
The nearest health facility to you provides HIV/AIDS services Yes No	14.46(4.83-43.31) 1	<0.001	13.956(9.14-20.79) 1	0.002
The way health workers handle clients at this health facility Friendly and welcoming Not friendly and not welcoming	12.52(4.25-36.89) 1	<0.001	13.38(4.13-41.90) 1	0.006
Health workers at this health facility discuss HIV/AIDS related problems with other people not involved in providing health services. Yes No	0.10(0.03-0.36) 1	<0.001	0.13(0.10-1.01) 1	0.051
Subscribe to any health insurance scheme Yes No	0.04(0.02-0.14) 1	<0.001	0.03(0.02-1.98) 1	0.361

Upon adjustment for variables that were significant at the bivariate level, recent HIV infections were found to be significantly associated with several factors. Respondents who were Christians were 15 times more likely to have a recent HIV infection compared to non-Christians (AOR = 15.01; 95% CI: 3.89–28.06; p = 0.005). Those who earned less than 100,000 shillings per month were 3.88 times more likely to have a recent HIV infection compared to those earning 100,000 shillings or more (AOR = 3.88; 95% CI: 1.72–6.25; p 0.020). Respondents who perceived the waiting time at health facilities as long were 3.37 times more likely to have a recent HIV infection compared to those who perceived it as too long (AOR = 3.37; 95% CI: 1.12–6.82; p = 0.003). In addition, those who reported that the nearest health facility provided HIV/AIDS services were about 14 times more likely to have a recent HIV infection than those whose nearest facility did not offer such services (AOR = 13.96; 95% CI: 9.14–20.79; p = 0.002). Furthermore, respondents who described health workers as friendly and welcoming were 13.38 times more likely to have a recent HIV infection compared to those who

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No.9 (2025): September 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i9.2032
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found them unfriendly (AOR = 13.38; 95% CI: 4.13–41.90; p = 0.006). Other factors, such as occupation, place of residence, constant availability of health workers, breach of confidentiality, and subscription to health insurance, were not statistically significant predictors of recent HIV infections at the multivariate level (p > 0.05).

Discussion

Individual factors associated with recent and long-term HIV Infections among newly identified HIV HIV-positive clients

The study found that respondents who identified as Christians were 15 times more likely to have a recent HIV infection compared to non-Christians. This association may not necessarily be due to religious doctrine itself but rather the socio-behavioral contexts in which individuals practice religion. In many rural Ugandan settings, religious gatherings provide frequent social interactions, some of which involve unsupervised youth meetings and overnight fellowships, which may inadvertently facilitate risky sexual behavior. Furthermore, some Christian denominations discourage condom use, framing it as promoting promiscuity, thus potentially contributing to low uptake of preventive methods. These findings are consistent with previous studies in South Africa and Nigeria, which revealed that social mobility and lack of structured sexual health discussions among religious participants contributed to higher rates of HIV infection (Glynn et al., 2021; Serwadda et al., 2022; Ford et al., 2015; Rugemalila et al., 2021). This implies that there is a need to integrate faith leaders into HIV prevention programming to promote positive sexual health behaviors within faith communities.

Additionally, respondents earning less than 100,000 Ugandan shillings per month were nearly four times more likely to have a recent HIV infection than those earning more. This is probably because of the increased level of community outreach on HIV services, which often does not involve the cost of testing, and sometimes individuals with high income levels are too busy to go for tests regularly. This aligns with findings from Burkina Faso and Angola, where low-income level has been positively associated with recent HIV infection in a recency test, and not that economically marginalized groups such as bar workers, hotel employees, and mine workers exhibited heightened HIV prevalence due to both structural and behavioral vulnerabilities (Mulder et al., 2020; Borgdorf et al., 2021; Glynn et al., 2021; Borgdorf et al., 2021; Zabin et al., 2021). This implies that there is a need to enhance HIV prevention through community-based testing, door-to-door outreach, and education campaigns that destigmatize testing and normalize early detection as a health-preserving behavior.

Health facility/clinical factors associated with recent and long-term HIV infections among newly identified HIV HIV-positive clients

This study found that respondents who perceived the waiting time at health facilities as too long were 3.37 times more likely to have a recent HIV infection compared to those who perceived it as too long. This is probably because long waiting times may discourage individuals from seeking timely HIV testing and care, thereby delaying diagnosis until after they have already transmitted or contracted the virus. This is in line with findings by Musheke et al. (2013), who noted that health system barriers, including long waiting hours, significantly affect HIV service utilization in sub-Saharan Africa. Additionally, prolonged waiting may reflect underlying issues in service delivery, such as understaffing or inefficient patient flow, which in turn compromises early intervention and preventive messaging Borhani, 2021; Hamilton et al., 2021). Furthermore, studies have stated that the frustration and fatigue associated with long waits may deter clients from returning for regular testing or follow-up services (Mardanian et al., 2022). This implies that there is a need for a reduction of waiting time could significantly increase early HIV detection and reduce transmission rates in high-burden settings.

This study found that respondents whose nearest health facility provided HIV/AIDS services were approximately 14 times more likely to have a recent HIV infection compared to those whose nearest facility did not offer such services. This is probably because individuals living near such facilities are more likely to be tested and diagnosed earlier due to better access to services, leading to a higher identification of recent infections. This is in line with Byrne et al. (2018), who stated that improved proximity and service availability increase the likelihood of testing asymptomatic individuals who might otherwise go undetected. Furthermore, health facilities with active outreach programs may be better equipped to detect infections shortly after transmission (Farahani, 2022; Mousavi et al., 2021). This implies that while expanded access to services increases detection, it may also reveal a higher number of recent infections simply due to better surveillance rather than higher transmission alone.

This study found that respondents who perceived health workers as friendly and welcoming were 13.38 times more likely to have a recent HIV infection compared to those who found them unfriendly. This is probably because a friendly and non-judgmental environment encourages more people, especially those recently exposed or at high risk, to come forward for testing and disclose sensitive information. This is in line with research by Wanyenze et al. (2013), which emphasized the critical role of provider-client interaction in

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https://doi.org/10.51168/sjhrafrica.v6i9.2032
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encouraging HIV testing and counseling uptake. Additionally, studies have found that clients who feel respected and supported are more likely to engage with healthcare services at the early stages of infection (Rwibasira et al., 2021; Mwine et al., 2022).

Conclusions

The majority of the clients assessed (91.9%) were living with long-term HIV infections, while a small proportion (8.1%) had acquired the infection recently.

The study findings reveal several significant factors associated with recent HIV infections. Being a Christian, earning a lower monthly income, and perceiving the waiting time at health facilities as long were all strongly linked to a higher likelihood of recent HIV infection. These factors note that socio-economic status, religious affiliation, and user experience within healthcare settings play a critical role in influencing vulnerability to HIV.

Additionally, access to HIV services and the attitudes of healthcare workers also emerged as important. Surprisingly, individuals who reported that the nearest health facility provides HIV/AIDS services and that health workers are friendly and welcoming were more likely to have a recent HIV infection.

Limitations

This study employed a cross-sectional research design; therefore, causal inferences about the relationships observed could not be established.

Recommendations

Ministry of Health (MoH)

- Strengthen early detection and prevention programs targeting populations at high risk of recent HIV infections, especially among low-income earners and Christians.
- Review and optimize service delivery systems to reduce waiting times at health facilities, as prolonged waiting may hinder timely HIV testing and treatment initiation.
- Expand community-based HIV outreach services to ensure accessibility and confidentiality, especially in areas where the nearest facility already provides HIV services but still sees a rise in recent infections.
- Standardize training for health workers on friendly, non-discriminatory service provision to ensure that the welcoming behavior does not unintentionally lead to misconceptions or complacency around HIV risk.
- Monitor and evaluate health facility performance to assess service quality, especially regarding the rising incidence of recent HIV infections despite the availability of services.

Civil Society Organizations (CSOs) and NGOs

- Support community mobilization and sensitization activities in low-income areas to raise awareness of HIV prevention, testing, and treatment services.
- Ensure equity in HIV service provision by reaching underserved and hard-to-reach communities, regardless of proximity to existing HIV service points.
- Conduct targeted interventions for populations identified as having a higher risk of recent HIV infection, including faith-based youth and informal workers.
- Provide psychosocial support services to individuals newly diagnosed with HIV, especially in communities where stigma and religious perceptions may hinder acceptance and treatment adherence.
- Collaborate with local religious leaders to deliver accurate HIV prevention education through sermons, youth groups, and community gatherings.

Health Facility Administrators

- Streamline patient flow and reduce bottlenecks in service delivery to improve client satisfaction and encourage regular engagement with HIV services.
- Introduce feedback systems to regularly capture patient perceptions of service quality, including friendliness of staff and facility environment.
- Ensure confidentiality and privacy during HIV counseling and testing, especially in facilities known for being welcoming to improve trust and uptake of services.

Community Leaders and Religious Institutions

- Partner with health providers to co-host HIV awareness sessions during church or community events.
- Dispel myths and stigma associated with HIV through faith-aligned messages that promote compassion, testing, and responsible sexual behavior.
- Create safe spaces within churches and mosques where individuals can seek

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Vol.6 No.9 (2025): September 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i9.2032
Original Article

information, counseling, and support regarding HIV.

List of abbreviations

AIDS Acquired Immune Deficiency Syndrome
ARRA Asante HIV-1 Rapid Recency Assay
ART Antiretroviral Therapy
HC III Health Centre Three
HC IV Health Centre Four
HIV Human Immunodeficiency Virus
MOH Ministry of Health
PLWH People living with HIV
UN United Nations
UNAIDS United Nations Joint Program on HIV/AIDS
UNIPH Uganda National Institute of Public Health
UNPHS Uganda National Population and Housing Census
VL Viral Load
WHO World Health Organization

Source of funding

The study did not receive any funding or a grant.

Conflict of interest

The author declares no conflict of interest.

Author contributions

Mary Mugabekazi was the principal investigator.
Assoc. Prof. Francis Kazibwe supervised the research project.
Waswa Bright Laban supervised the research project.

Data availability

Data is available upon request.

Informed consent

All the participants consented to this study.

Author biography

Mary Mugabekazi holds a degree of Master of Public Health degree from Bishop Stuart University.
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Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No.9 (2025): September 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i9.2032
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Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No.9 (2025): September 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i9.2032
Original Article

Publisher details

Student's Journal of Health Research (SJHR)
(ISSN 2709-9997) Online
(ISSN 3006-1059) Print
Category: Non-Governmental & Non-profit Organization
Email: studentsjournal2020@gmail.com
WhatsApp: +256 775 434 261
Location: Scholar's Summit Nakigalala, P. O. Box 701432, Entebbe Uganda, East Africa