

# Assessment Of Acceptability And Success Of HIV Partner Notification Services And Associated Factors In Muhoroni Subcounty, Kisumu, Kenya

Felix Otieno Makori, Dan Onguru

(School Of Health Sciences, Jaramogi Oginga Odinga University Of Science And Technology, Kenya)

---

## Abstract:

**Background:** Human immunodeficiency virus (HIV) partner notification services (PNS) are aimed at identifying undiagnosed cases and linking individuals to treatment. This is crucial to achieving the UNAIDS first 95% target. This study assessed the acceptability and success of partner notification and associated factors among HIV positive clients in Muhoroni, Kenya.

**Materials and Methods:** This was a cross-sectional survey involving 707 HIV-positive clients from Muhoroni Sub-County, Kenya. A chi-square test was used to determine the associations between the independent variable and the acceptability of partner notification. Logistic regression was used to identify factors associated with partner notifications. All statistical analysis was done using SPSS version 26. This study aimed to evaluate the baseline characteristics and outcomes of partner notification services (PNS) among newly diagnosed HIV patients in Kisumu County

**Results:** Involving 707 participants, the majority were female (64.1%) and aged 25–34 years (42.9%). Most had secondary education (54.5%) and were in monogamous marriages (57.3%). A high acceptability of PNS was reported (93.1%). Significant differences in PNS acceptability were observed based on education level, facility level, marital status, and duration of antiretroviral therapy (ART). About ninety-four percent (531, 94%) of elicited partners underwent HIV testing, of whom a third (159, 30%) turned HIV positive. Nearly 97% (154/159) of the identified new HIV cases were linked to care. Partner notification was less likely among those who preferred provider or client referral methods compared to those opting for contract referral (OR 0.111; 95% CI: 0.043-0.286,  $p < 0.0001$  and OR 0.182; 95% CI: 0.071-0.467,  $p < 0.0001$ , respectively). Moreover, those who completed secondary education showed a twofold increased likelihood of partner notification uptake compared to those with primary education (OR 2.44; 95% CI: 1.098–5.428,  $p = 0.029$ ). Conversely, individuals on ART for 6 months to 1 year displayed a reduced likelihood of partner notification uptake compared to those on ART for less than 3 months (OR 0.245; 95% CI 0.068–0.875,  $p = 0.03$ ). However, age, gender, and income were not significantly associated with partner notification uptake.

**Conclusion:** There is need for tailored partner notification strategies, aimed at addressing disclosure challenges.

**Key Word:** HIV; partner notification services (PNS); acceptability; uptake; newly diagnosed clients; HIV testing; linkage to care; antiretroviral therapy (ART); contract referral; provider referral; client referral; sociodemographic factors; marital status; disclosure challenges; public health interventions;

---

Date of Submission: 03-12-2025

Date of Acceptance: 13-12-2025

---

## I. Introduction

Human immunodeficiency virus (HIV) remains a major global public health concern, with an estimated 39.0 million people living with HIV in 2022, alongside 1.3 million new infections and 630,000 AIDS-related deaths (UNAIDS, 2024). Although 86% of individuals worldwide are aware of their HIV status, approximately 5.5 million remain undiagnosed representing a significant gap in the HIV care continuum. Sub-Saharan Africa continues to bear the highest burden, accounting for 25.7 million people living with HIV and 660,000 new infections, where 21% of individuals remain unaware of their status (UNAIDS, 2024). In Kenya, an estimated 1.4 million adults live with HIV, with regional prevalence disparities evident in high-burden counties such as Kisumu (17.5%), Homabay (19.3%), Siaya (15.3%), and Migori (13.0%) (UNAIDS, 2023). Despite progress in testing and treatment, only 79.5% of HIV-positive Kenyans know their status, posing a barrier to achieving the 95–95–95 global targets.

To bridge the diagnosis gap, strategies such as the test-and-treat approach and Partner Notification Services (PNS) have been advanced. PNS involves identifying and offering HIV testing to sexual partners of individuals newly diagnosed with HIV (“index clients”) to facilitate early diagnosis, linkage to care, and prevention of further transmission (WHO, 2016). Effective implementation of PNS is influenced by its

acceptability, which is shaped by knowledge, perceived need, availability, accessibility, stigma, cultural norms, and trust in healthcare providers (UNAIDS, 2020a). Knowledge and understanding of PNS play a central role, particularly in settings where misconceptions, fear of disclosure, and limited awareness may deter individuals from participating (Kenya Ministry of Health, 2018). Acceptability is also affected by structural barriers such as service proximity, convenience, and health system efficiency which determine whether clients can realistically engage with the service (WHO, 2016).

Social and cultural factors further influence PNS utilization. In many communities, stigma and fear of discrimination continue to hinder HIV-related disclosure and service uptake (UNAIDS, 2020a; WHO, 2016). Trust in healthcare providers, including confidence in confidentiality and safety, enhances willingness to participate. The type of partner notified spousal, regular, or casual also affects PNS outcomes, as risk levels, relationship dynamics, and ease of follow-up differ across partner categories (Kenya Ministry of Health, 2018; UNAIDS, 2022). Identifying which partner types are most reachable and most likely to test helps optimize resource allocation and improve the efficiency of PNS programs.

The uptake of PNS is further shaped by socio-demographic and psychosocial factors such as age, gender, education level, marital status, perceived stigma, and trust in the healthcare system. Educational attainment has been associated with higher PNS uptake due to better understanding of health information, while gender dynamics and relationship power imbalances may impede notification especially for women who fear blame or violence upon disclosure (UNAIDS, 2020b; WHO, 2016). Psychosocial drivers, including stigma and confidentiality concerns, remain critical determinants in whether clients choose to notify partners or participate in follow-up services (UNAIDS, 2022).

Given the persistently high HIV burden in Kisumu County and the essential role of PNS in identifying undiagnosed individuals, understanding the factors that drive or hinder acceptability and uptake is crucial. This study therefore assessed the acceptability, utilization, and associated factors of PNS among HIV-positive clients in Muhoroni Sub-County, Kisumu. By examining how socio-demographic, psychosocial, and structural factors shape PNS engagement across different partner types, the study provides actionable insights that can inform targeted interventions, enhance the reach of HIV testing, and ultimately contribute to improved HIV prevention and treatment outcomes in high-prevalence settings.

## **II. Material And Methods**

This study employed a cross-sectional design to assess the acceptability and uptake of Partner Notification Services (PNS) among people living with HIV (PLHIV) in Muhoroni Sub-County, Kisumu County, Kenya. Muhoroni is a predominantly agricultural settlement with a population of 154,116 and approximately 10,300 PLHIV enrolled in care across 20 health facilities (Kenya HIV Estimates, 2020). The study population consisted of HIV-positive adults ( $\geq 18$  years) enrolled in care at participating facilities. Eligible participants were required to provide informed consent, be of sound mind, and have resided in the locality for at least six months. Critically ill individuals requiring emergency treatment were excluded.

The minimum sample size was calculated using Cochran's formula (Cochran, 1977), assuming a 95% confidence level, a proportion (p) of 0.5, and a margin of error of 3.68%, yielding a sample of 707 participants. Sampling was conducted proportionally across the 20 facilities based on enrollment size. Data were collected using a semi-structured questionnaire programmed in the Open Data Kit (ODK). Participants were approached after their clinic visits and interviewed privately. The questionnaire captured socio-demographic characteristics, PNS acceptability, perceived barriers and facilitators, and partner testing outcomes. Index clients who consented had their listed contacts followed for testing in accordance with national PNS protocols; however, partner test results were not disclosed to index clients to preserve confidentiality.

Instrument reliability was evaluated through a pilot test at Lumumba Comprehensive Care Clinic, and internal consistency was assessed using Cronbach's alpha, with a threshold of  $\geq 0.70$  considered acceptable. Content validity was established through expert review by HTS and PNS supervisors, followed by refinement of ambiguous items. Data were entered into Microsoft Excel and analyzed using STATA v17. Descriptive statistics (frequencies, proportions, medians, and interquartile ranges) summarized participant characteristics. Logistic regression was used to assess factors associated with PNS uptake, while qualitative responses were analyzed thematically.

Ethical approval was obtained from the Jaramogi Oginga Odinga Teaching and Referral Hospital Institutional Ethics Review Committee (JOOTRH-IERC). Additional authorization was granted by the National Commission for Science, Technology and Innovation (NACOSTI), the Kisumu County Department of Health, and facility in-charges. All participants provided written informed consent, and their confidentiality and right to withdraw were upheld throughout the study.

**Study Design:** This study employed a **cross-sectional survey design** to assess the acceptability, uptake, and outcomes of HIV Partner Notification Services (PNS) among HIV-positive clients receiving care in Muhoroni

Sub-County, Kisumu County. Both newly diagnosed and previously known HIV-positive individuals were offered PNS during their routine clinic visit, after which consenting participants were interviewed once regarding their acceptance of PNS, perceived barriers and facilitators, and partner testing outcomes. The design enabled the collection of quantitative data at a single point in time, providing a snapshot of PNS performance and associated factors within the study population.

**Study Location:** This was a tertiary care teaching hospital based study done in Department of General Medicine, at Dr. Ram Manohar Lohia Combined Hospital, Vibhuti Khand, Gomti Nagar, Lucknow, Uttar Pradesh.

**Study Duration:** Feb 2022 to July 2022.

**Sample size:** 707 patients.

**Sample size calculation:** The sample size was determined using Cochran's formula (Cochran, 1977), assuming a 95% confidence level ( $Z = 1.96$ ), a proportion ( $p$ ) of 0.5 to maximize variability, and a calculated margin of error

Cochran's sample size formula is given by:

$$n = (Z^2 \times p \times q) / d^2$$

Where:

$n$  = desired sample size

$Z$  = standard normal deviate corresponding to the desired confidence level (1.96 for 95% confidence)

$p$  = estimated proportion of individuals expected to accept PNS

$q = 1 - p$

$d$  = margin of error

Given the absence of a prior local estimate for PNS acceptance in Kisumu County, a proportion ( $p$ ) of 0.5 was assumed to maximize sample size. This is a conservative approach commonly used when the true proportion is unknown. A 95% confidence level ( $Z = 1.96$ ) was selected to ensure statistical reliability, and a margin of error ( $d$ ) of 3.68% was calculated to achieve the required precision.

Substituting the values into Cochran's formula:

$$n = (1.96)^2 \times 0.5 \times (1 - 0.5) / (0.0368)^2$$

$$n = 3.8416 \times 0.25 / 0.001354 \approx 707$$

Thus, the minimum required sample size for this study was 707 respondents, ensuring sufficient power to assess the factors influencing the uptake of Partner Notification Services (PNS) with a margin of error of  $\pm 3.68\%$  at a 95% confidence level.

**Subjects & selection method:** The samples was distributed proportionally in the health facilities depending on the number of clients enrolled in the CCC as shown in Table 1.1, based on the formula  $a=b/c*y$ :

where  $a$ = sample for facility

$b$ = enrolment per facility

$c$ = total enrolment

$y$ = calculated sample size

**Table 1.0 Sample size distribution**

Name of health facility	No. enrolled in CCC	Sample size
Chemelil GOK Health Center	720	49
Chemelil Sugar Health Centre	391	27
Kandege Health Center	194	13
Kasongo Dispensary	377	26
Kibigori Dispensary	586	40
Koru Dispensary	211	14
Makindu Dispensary	215	15
Mama Plister Blair Health Centre	445	30
Mashambani Dispensary	233	16
Masogo Sub County Hospital	1552	106
Miwani Dispensary	185	13
Mnara Dispensary	196	13
Muhoroni County Hospital	1207	82
Muhoroni Sugar Company (Musco) Dispensary	124	8
Nyang'oma Sub County Hospital	1485	101
Obumba Dispensary	268	18
Ogen Health Center	361	25

Ogra Health Centre	983	67
Rachar Sugar Belt Hospital	270	18
Tamu Health Centre	375	26
<b>Total</b>	<b>10387</b>	<b>707</b>

**Inclusion criteria:**

1. Participants who gave informed consent
2. Participants must be 18 years and above
3. Participant must be enrolled into care in the participating facility
4. Participant must be of sound mind
5. Must have been resident of the locality for at least the last six months

**Exclusion criteria:**

1. Critically ill patients in need of urgent medical care

### **III. Procedure Methodology**

The study followed a systematic procedure encompassing preparation, data collection, data management, and analysis. The preparatory phase involved obtaining ethical approval from the Jaramogi Oginga Odinga Teaching and Referral Hospital Institutional Ethics Review Committee (JOOTRH-IERC), research authorization from the National Commission for Science, Technology and Innovation (NACOSTI), and permissions from the Kisumu County Department of Health and participating facility in-charges. Following approval, the research instruments were finalized, digitized using the Open Data Kit (ODK), and pilot-tested at Lumumba Comprehensive Care Clinic to assess reliability and validity. Feedback from the pilot was used to refine ambiguous items and ensure clarity before field implementation.

During the data collection phase, trained research assistants approached eligible HIV-positive adults ( $\geq 18$  years) after their routine clinic visits in the 20 participating health facilities. After explaining the study objectives and obtaining written informed consent, interviews were conducted privately using a semi-structured ODK-based questionnaire. The tool captured socio-demographic characteristics, Partner Notification Services (PNS) acceptability, perceived barriers and facilitators, and partner testing outcomes. Index clients who consented were guided through the process of listing sexual partners and contacts for PNS, which were forwarded through the established health facility PNS system for tracing and testing. To safeguard confidentiality, partner HIV test results were not disclosed to index clients.

Throughout data collection, supervisors conducted daily reviews of submitted forms to ensure completeness, accuracy, and quality. Corrective feedback was provided promptly to minimize errors. Collected data were exported from ODK to Microsoft Excel for cleaning, coding, and consistency checks, after which the dataset was transferred into STATA v17 for statistical analysis.

Quantitative analysis included descriptive statistics—frequencies, percentages, medians, and interquartile ranges—to summarize participant characteristics and PNS uptake patterns. Bivariate analysis was conducted to assess associations between independent variables and PNS uptake, followed by multivariable logistic regression to identify factors independently associated with PNS acceptability and uptake. Qualitative responses from open-ended questions were transcribed, organized, and analyzed thematically to complement quantitative findings and provide contextual insights.

At all stages of the procedure, ethical principles were upheld, including voluntary participation, confidentiality, privacy, and the right to withdraw at any point without consequences.

#### **Statistical analysis**

Data from the ODK server were exported into Microsoft Excel for initial cleaning, verification, and coding before being imported into STATA version 17 for statistical analysis. Data cleaning involved checking for completeness, accuracy, duplicate entries, and logical inconsistencies. Outliers were examined and corrected or removed when justified.

Descriptive statistics were used to summarize participant characteristics and key study variables. Categorical variables such as gender, marital status, and PNS uptake were summarized using frequencies and percentages. Continuous variables such as age were assessed for normality and summarized using medians and interquartile ranges (IQR), given their non-parametric distribution.

Bivariate analysis was conducted to explore associations between independent variables (socio-demographic, psychosocial, and HIV-related factors) and the primary outcome (PNS uptake). Pearson's Chi-square test was applied for categorical predictors, while the Mann-Whitney U test was used for non-normally distributed continuous variables. Variables with a p-value of  $\leq 0.20$  in bivariate analyses were considered candidates for multivariable analysis.

Multivariable logistic regression was performed to identify independent predictors of PNS uptake after adjusting for potential confounders. Adjusted odds ratios (aORs) with corresponding 95% confidence intervals (CIs) were reported. Statistical significance was set at a two-tailed p-value of <0.05. Model fitness was assessed using the Hosmer–Lemeshow goodness-of-fit test, while multicollinearity was evaluated using variance inflation factors (VIFs), with values <10 considered acceptable.

Qualitative data obtained from open-ended responses were analyzed thematically. Responses were transcribed, sorted, and grouped into emerging themes. Coding was carried out independently by two reviewers, and any discrepancies were resolved through consensus. Themes were used to supplement and contextualize quantitative findings.

All analyses were conducted in accordance with best practices for cross-sectional studies and presented using tables, graphs, and narrative descriptions to enhance clarity and interpretation.

#### IV. Result

##### Baseline Characteristics of Respondents by Partner Notification Acceptability

The study involved 707 participants, of which majority 453 (64.1%) were female, 303 (42.9%) were aged 25-34 years, while over half 383 (54.5%) had secondary education. Furthermore, majority of respondents 405 (57.3%) were in monogamous marriage. About a third 200 (28.3%) listed zero or one sexual partner, 239 (33.8%) listed two sexual partners, while 268 (37.9%) listed three or more sexual partners. Notably a high acceptance of partner notification was reported by 658(93.1%) of the respondents. The chi square test revealed significant differences in partner notification acceptability by education level ( $p<0.0001$ ), facility level ( $p<0.0001$ ), marital status ( $p<0.001$ ), and duration on antiretroviral therapy ( $p<0.0001$ ). This is summarized in Table 2.0

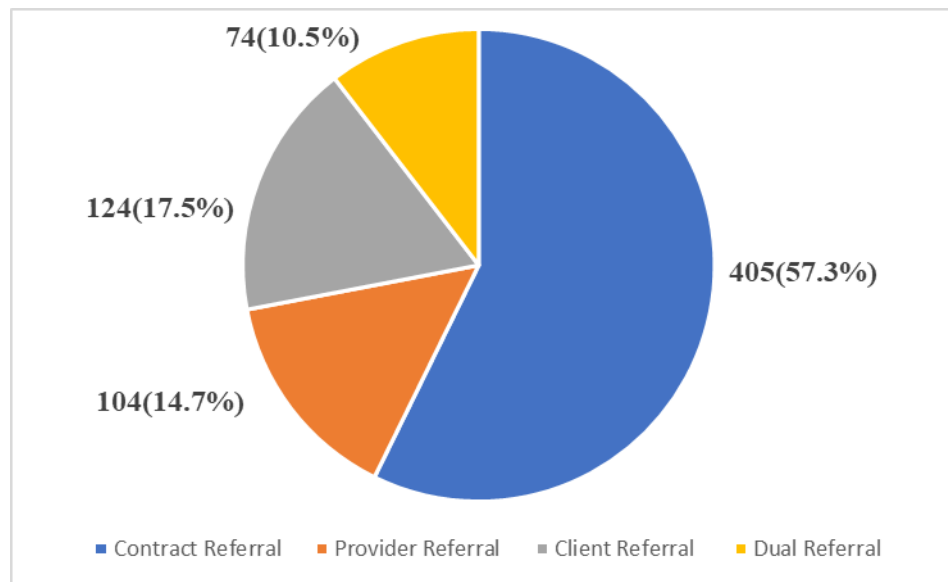
**Table 2.0: Characteristics of Respondents**

Table 2.6: Characteristics of Respondents				
Variable	Total (707)	Partner Notification Acceptability		P-Value
		No (49; 6.9%)	Yes (658; 93.1%)	
Age Category (years)				
18-24	132(18.7)	9(6.8)	123(93.2)	0.988
25-34	303(42.9)	20(6.6)	283(93.4)	
35-44	191(27)	14(7.3)	177(92.7)	
45+ years	81(11.5)	6(7.4)	75(92.6)	
Education Level				
Primary	239(34)	27(11.3)	212(88.7)	0.0001
Secondary	383(54.5)	17(4.4)	366(95.6)	
College/university	71(10.1)	1(1.4)	70(98.6)	
Never went to school	10(1.4)	4(40)	6(60)	
Gender				
Female	453(64.1)	31(6.8)	422(93.2)	0.903
Male	254(35.9)	18(7.0)	236(93)	
Facility Level				
Dispensary	209(29.6)	6(2.8)	203(97.2)	0.0001
Health Centre	199(28.1)	8(4.0)	191(96)	
Sub-County	240(33.9)	35(14.6)	205(85.4)	
County	59(8.3)	0	59(100)	
Employment Status				
Employed	78(11.2)	3(6.5)	75(11.6)	0.18
Employed part-time	133(19.1)	8(6.0)	125(94)	
Not employed	205(29.5)	7(3.4)	198(96.6)	
Self employed	256(36.8)	24(9.3)	232(90.6)	
Other	23(3.3)	4(17.4)	19(82.6)	
Marital Status				
Married Monogamous	405(57.3)	12(2.9)	393(97.1)	0.0001
Married Polygamous	104(14.7)	20(19.2)	84(80.8)	
Widow/widower	124(17.5)	17(13.7)	107(86.3)	
Divorced	74(10.5)	0	74(100)	
Number of Sexual Partners				
0-1 partner	200(28.3)	17(8.5)	183(91.5)	0.327
2 partners	239(33.8)	12(50.2)	227(94.9)	
3+ partners	268(37.9)	20(7.5)	248(92.5)	
Duration on Antiretroviral				
< 3 months	189(26.7)	5(2.6)	184(97.4)	0.0001
>3-6 months	204(28.9)	12(5.9)	192(94.1)	
>6 months-1 year	125(17.7)	28(22.4)	97(77.6)	

>1 year	189(26.7)	4(2.1)	185(97.9)	
---------	-----------	--------	-----------	--

#### Preferred Partner Notification Method by the Respondents

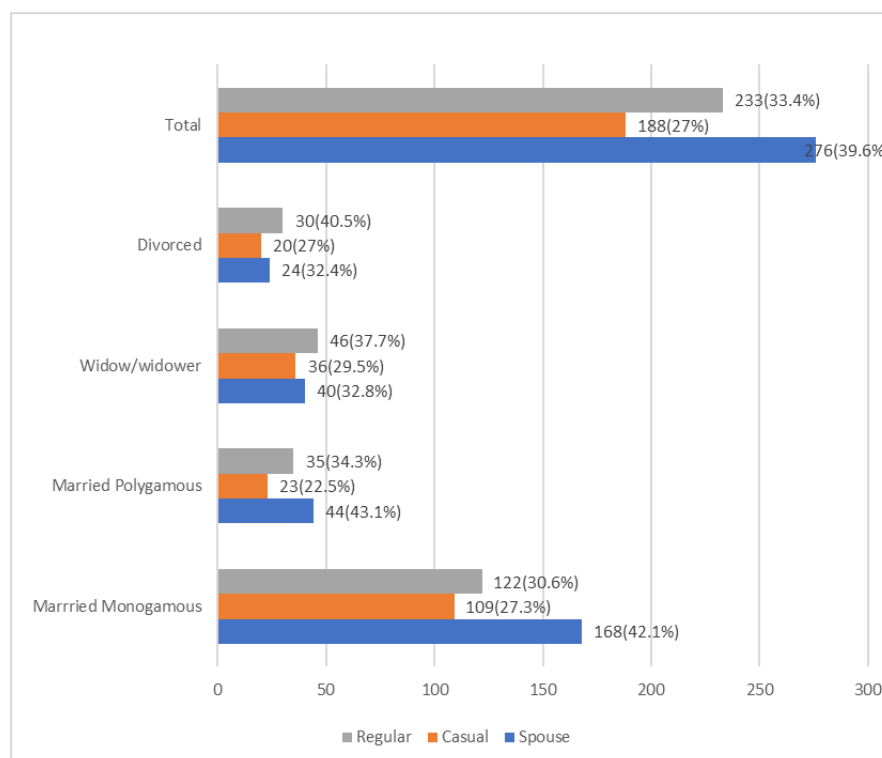
Majority of respondents 405 (57.3%) preferred their partners to be notified of their HIV status through contract referral, followed by client and provider referral 124 (17.5% and 104 (14.7% respectively). Conversely, dual referral (combining both client and provider notification) was the least preferred 74 (10.5%) method (Figure 1.0).



#### Partner notification method by the respondents

##### Marital Status of Respondents by type of Sexual Partners Elicited

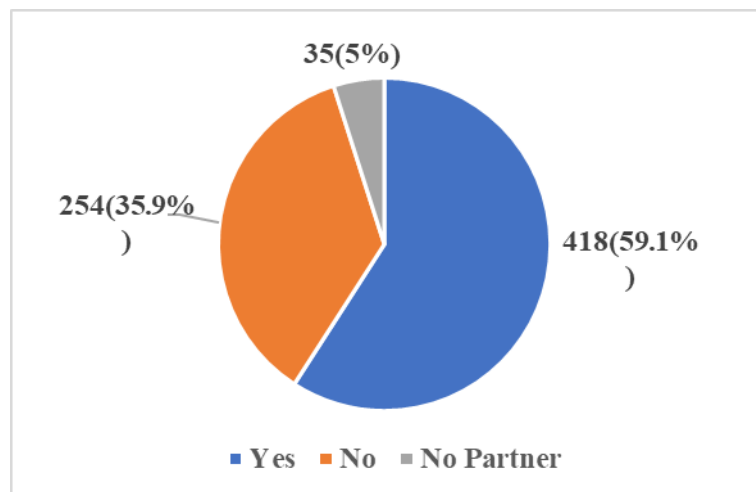
Most respondents who were in monogamous marriages elicited their spouse 168 (42.1%), followed by regular partners 122 (30.6%), and casual partners 109 (27.3%). Among those who were divorced, the majority 30 (40.5%) elicited their regular partners (Figure 2.0).



**Figure 2.0: Marital Status of Respondents by type of sexual partner elicited**

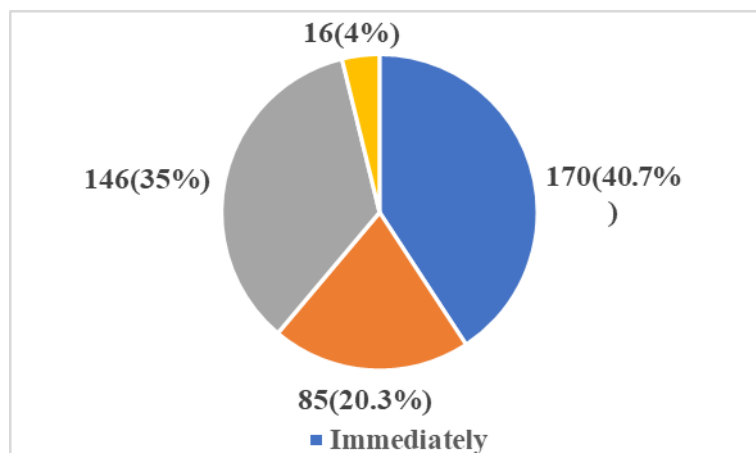
### Partner HIV Disclosure

Nearly sixty percent 418 (59.1%) of respondents had disclosed their HIV-positive status to their partners, 254 (35.9%) had not disclosed, and 5 (5%) had no partner at the time of the study (Figure 4.3).



**Figure 3.0: Partner HIV disclosure**

Forty percent 170 (40.7%) of respondents disclosed their status immediately, 146(35%) took months to disclose, 85 (20.3%) took days and 16(4%) took years to disclose their status to their partner (Figure 4.4).



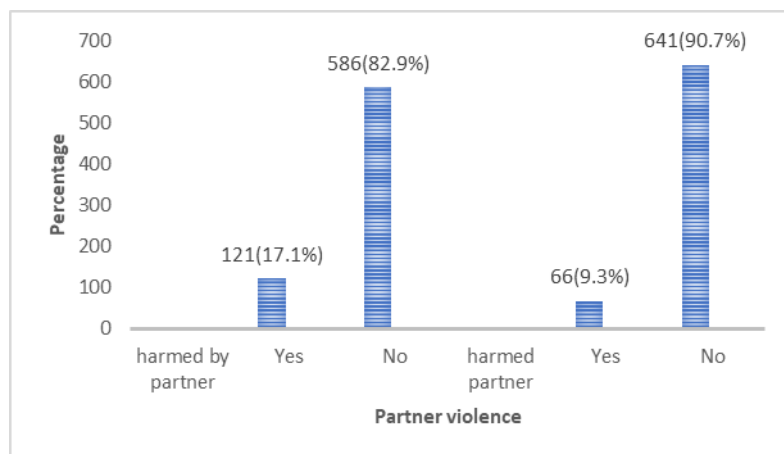
**Figure 4.0: Time to disclosure of HIV status**

Lack of knowledge on how to disclose, and cessation of support, and fear of abandonment were some of the main reasons for non- disclosure of HIV status. Table 4.2

**Table 3.0: Reason for non-disclosure of HIV Status to Sexual Partner**

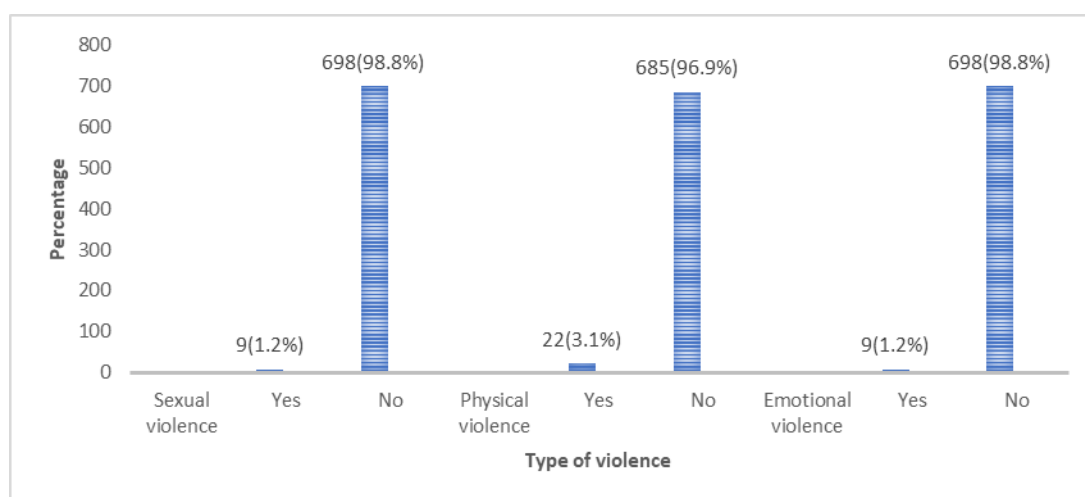
Reason	Frequency	Percentage
Don't know how to disclose	68	28.0
He might be violent	20	8.0
He might kick me out	20	8.0
He might stop giving support	54	21.0
He might run away	52	20.4
Other	7	3.0
No answer	33	13.0
<b>Total</b>	<b>254</b>	<b>100%</b>

There was some violence reported whereby, 121(17.1%) of respondents reported being harmed by their partner while 66(9.3%) reported harming their partner (Figure 4.5).



**Figure 5.0: Intimate Partner violence**

A small proportion of respondents 22(3.1%) reported experiencing physical violence, while an equal number 9(1.2%) reported experiencing emotional and sexual violence (Figure 4.6).



**Figure 6.0: Type of intimate partner violence experienced**

#### Testing Rates and Outcomes among Partners Listed by the Respondents

A total of 710 partners were elicited by the respondents, out of which 531 (94%) underwent HIV testing. Among them, 159 (30%) were newly diagnosed as positive for HIV. Notably 148 (20.8%) partners elicited were already aware of their HIV-positive status at the time of notification. The majority 77 (48.7%) of newly diagnosed cases were identified at dispensaries, followed by health centers 43 (35%), and Sub-county hospitals 34 (17.5%). The County Hospital reported the fewest newly diagnosed HIV-positive partners 5 (8.9%). This is as summarized in Table 4.0.

**Table 4.0: HIV Testing Rates and Outcomes among Partners Elicited by the Respondents**

Facility Level	Accept PNS	Sexual Partner elicited	Ratio of Partners to Index Clients	Sexual Partners eligible for testing	HIV Tested	Positivity Rate
Dispensary	203	209	1.02	165	158(96%)	77(48.7%)
Health Center	191	201	1.05	139	123(88%)	43(35%)
Sub County	205	241	1.17	200	194(97%)	34(17.5%)
County	59	59	1	58	56(97%)	5(8.9%)
<b>Total</b>	<b>658</b>	<b>710</b>	<b>1.07</b>	<b>562</b>	<b>531(94%)</b>	<b>159(30%)</b>

Nearly all clients (154/159, 96.9%) who were newly diagnosed as HIV-positive were successfully linked to care. Approximately 5 (3.1%) clients were not linked to care, with one client expressing willingness to commence care but requesting additional time to make the decision (Figure 4.7).



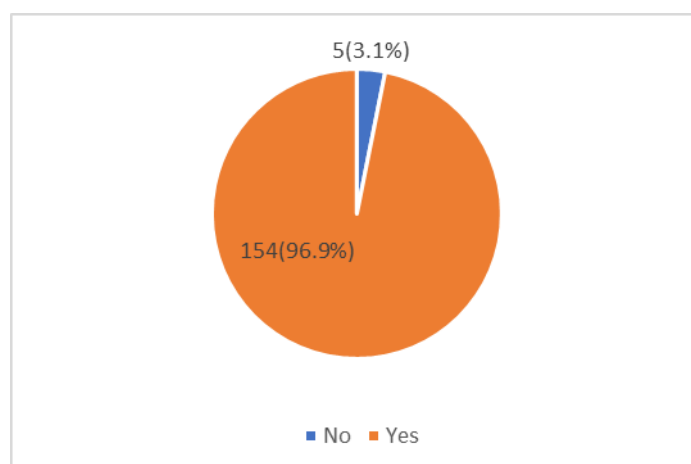


Figure 7.0 : Proportion of newly diagnosed HIV Positive Partners Linked to care

### Factors Associated with HIV Positivity among the Elicited Sexual Partners

Male partners had a lower likelihood of being HIV positive compared to female partners (OR 0.598; 95% CI; 0.401-0.893,  $p=0.012$ ). Casual sexual partners had a lower likelihood of being HIV positive compared to spouses (OR 0.341; 95% CI; 0.128-0.907,  $p=0.031$ ). Notably circumcision status was not significantly associated with HIV positivity. This is as summarized in Table 5.0.

Table 5.0: Factors Associated with HIV Positivity among the Elicited Partners

		Univariate		Multivariate		
	OR	[95% Conf. Int]	P-Value	aOR	[95% Conf. Int]	P-Value
<b>Age Category (years)</b>						
18-24 years	Ref					
25-34 years	1.28	(0.716-2.287)	0.405			
35-44 years	0.927	(0.487- 1.767)	0.82			
45+ years	0.849	(0.403-1.788)	0.667			
<b>Gender</b>						
Female	Ref					
Male	0.583	(0 .397-0.857)	<b>0.006</b>	0.598	(0 .401-0.893)	<b>0.012</b>
<b>Sexual Partner Category</b>						
Spouse	Ref					
Casual	0.246	(0.144-0 .418)	<b>0.0001</b>	0.341	(0.128-0.907)	<b>0.031</b>
Regular	0.715	(0.468-1.093)	0.122	0.723	(0.306-1.708)	0.461
<b>Partner Circumcised</b>						
Yes	Ref					
No	1.328	(0 .893-1.975)	0.16			
Don't Know	0.735	(0 .305-1.774)	0.495			
Refuse to answer	1	(empty)				
<b>Partner Relationship</b>						
Husband/Wife	Ref					
Regular Sexual Partner	0.689	(0.446-1.064)	0.093	1.127	(0.472-2.690)	0.787
Non Regular sexual Partner	0.217	(0.116-0.404)	<b>0.0001</b>	0.527	(0.180-1.542)	0.243
Boyfriend/girlfriend	0.585	(0.265-1.289)	0.184	1.042	(0.349-3.114)	0.94
Live in Partner, not married	1.775	(0.572-5.506)	0.32	2.61	(0.675-10.089)	0.164
Sex worker/freelancer	1	(empty)				

### Factors Associated with the Uptake of Partner Notification among the Respondents

A logistic regression analysis was employed to assess the factors influencing the uptake of partner notification among the respondents. Those who preferred provider or client referral methods significantly had reduced odds of partner notification uptake compared to those opting for contract referral (OR 0.111; 95% CI; 0.043-0.286,  $p<0.0001$  and OR 0.182; 95% CI; 0.071-0.467,  $p<0.0001$ , respectively). Moreover, respondents who

completed secondary education had 2.44 times increased odds of partner notification uptake compared to primary education (OR 2.44; 95% CI; 1.098-5.428,  $p=0.029$ ). Conversely, individuals on ART for 6 months to 1 year displayed a reduced likelihood of partner notification uptake compared to those on ART for less than 3 months (OR 0.245; 95% CI; 0.068-0.875,  $p=0.03$ ). However, age, gender, and income were not significantly associated with the uptake of partner notification ( $p>0.05$ ). This is as summarized in Table 4.5

**Table 6.0: Factors Associated with Partner Notification Uptake among the Respondents**

	Univariate			Multivariate		
	OR	[95% Conf. Int]	P-Value	aOR	[95% Conf. Int]	P-Value
<b>PNS comfortable Method</b>						
None(should not be reached)	Ref					
Dual referral		1 (empty)				
Provider referral	0.203	(0.026- 1.582)	0.128			
Client referral	0.426	(-.051- 3.535)	0.43			
Contract referral	2.69	(0.314- 23.00)	0.366			
<b>Preferred PNS Contact Method</b>						
Contract referral	Ref					
Provider referral	0.128	(0.060- 0.272)	<b>0.0001</b>	0.111	(0.043- 0.286)	<b>0.0001</b>
Client referral	0.192	(0.089- 0.414)	<b>0.0001</b>	0.182	(0.071-0.467)	<b>0.0001</b>
Dual referral	1	(empty)		1	(empty)	
<b>Age Category (years)</b>						
18-24 years	Ref					
25-34 years	1.035	(0.458- 2.338)	0.933			
35-44 years	0.925	(0.388- 2.204)	0.86			
45+ years	0.914	(0.313-2.672)	0.87			
<b>Education Level</b>						
Primary	Ref					
Secondary	2.741	(1.460-5.148)	<b>0.002</b>	2.44	(1.098- 5.428)	<b>0.029</b>
College/university	8.915	(1.189-66.811)	<b>0.033</b>	9.91	(1.124- 87.381)	<b>0.039</b>
Never went to school	0.191	(0.0506- 0.720)	<b>0.014</b>	0.114	(0.018- 0.722)	<b>0.021</b>
<b>Gender</b>						
Female	Ref					
Male	0.963	(0.527-1.758)	0.903			
<b>Facility Level</b>						
Dispensary	Ref					
Health Centre	0.705	(0.240- 2.071)	0.526	0.559	(0.150- 2.086)	0.387
Sub county	0.173	(0.0712-0.420)	<b>0.0001</b>	0.321	(0.0918-1.125)	0.076
County	1	(empty)		1	(empty)	
<b>Employment Status</b>						
Employed	Ref					
Employed part-time	0.625	(0.160-2.428)	0.497		(0.305- 8.289)	0.581
Not employed	1.131	(0.285- 4.489)	0.861		(0.448-10.896)	0.33
Self employed	0.386	(0.113-1.320)	0.129		(0.343- 7.154)	0.561
Other	0.19	(0.039- 0.921)	<b>0.039</b>		(0.079-2.976)	0.436
<b>Gross Income</b>						
Below 10000	Ref					
10000-20000	1.576	(0.771-3.219)	0.212			
20000-30000	2.54	(0.579- 11.132)	0.216			
Above 30000	1	(empty)				
<b>Marital Status</b>						
Maried Monogamous	Ref					
Maried Polygamous	0.128	(0.06-0.272)	<b>0.0001</b>	1	(omitted)	
Widow/widower	0.192	(0.089-0.414)	<b>0.0001</b>	1	(omitted)	
Divorced	1	(empty)		1	(empty)	
<b>Number of Sexual Partners</b>						
0-1 partner						
2 partners	1.757	(0.818-3.773)	0.148			
3+ partners	1.151	(0.586-2.260)	0.681			
<b>Duration on Antiretrovirals</b>						
< 3 months	Ref					
>3-6 months	0.434	(0.15-1.258)	0.124	0.886	(0.233-3.375)	0.86
>6 months-1 year	0.094	(0.035-0.251)	<b>0.0001</b>	0.245	(0.068- 0.875)	<b>0.03</b>

>1 year	1.256	(0.332- 4.754)	0.736	1.325	(0.31-5.666)	0.704
---------	-------	----------------	-------	-------	--------------	-------

Stigma, privacy and confidentiality, violence and discrimination were reported as some of the factors affecting partner notification uptake (Table 7.0).

**Table 7.0: Factors affecting Partner Notification as reported by Respondents**

Factors	Frequency	Percentage
Client related factors	191	27.01%
Stigma	303	42.85%
Privacy	190	26.87%
Confidentiality	307	43.42%
Disclosure	280	39.60%
Repercussions	167	23.62%
Blame	200	28.28%
Violence	152	21.49%
Discrimination	171	24.18%
Human resource	7	1%
Services provision	0	0.00%
Health sectors reforms	15	21.21%
Waiting time	11	1.55%
Quality of care	7	1%
Health education factor	4	0.50%
Health system factors	2	0.28%
Lack of incentives	15	2.12%

## V. Discussion

This study explored the acceptability, uptake, and outcomes of HIV Partner Notification Services (PNS) among people living with HIV (PLHIV) in Muhoroni Sub-County, Kisumu County, Kenya. The findings highlight the influence of socio-demographic, relational, and health-system factors on PNS participation and underscore the importance of client-centered, flexible strategies to optimize uptake. Gender, age, and education level significantly influenced PNS participation. Women constituted the majority of index clients (64%), consistent with national trends where women are more engaged in health services, particularly maternal and child health programs (NASCO, 2022). Despite higher engagement, women face challenges in disclosing their HIV status, including fear of blame, intimate partner violence, or abandonment, and often prefer anonymous notification methods such as provider or contract referral to minimize personal risk (WHO, 2016; Chali et al., 2021; Kennedy et al., 2015). Conversely, men, though less engaged in routine HIV care, may respond better to male-focused interventions, including workplace or peer-led approaches, highlighting the need for gender-sensitive strategies. Most index clients were aged 25–39 years, a sexually active and economically productive group more likely to access care (NACC, 2021), while younger clients (18–24 years) had lower participation, likely due to fear, unstable relationships, or limited social support (Ngure et al., 2020; Odhiambo et al., 2021), indicating a need for youth-centered interventions such as peer support, social media engagement, and confidential counseling. Education also played a key role; participants with secondary or tertiary education were more likely to engage in PNS, reflecting higher health literacy and understanding of service benefits, whereas individuals with lower education experienced stigma, misinformation, and limited confidence, emphasizing the need for simplified counseling, visual aids, and tailored communication strategies to ensure equitable access (Gebremedhin et al., 2018).

Relationship type strongly influenced PNS acceptability. Clients in stable relationships, such as married or cohabiting individuals, were more likely to participate in PNS due to trust, shared health responsibilities, and better communication, facilitating timely disclosure, ART initiation, and adherence. These findings align with previous studies demonstrating the benefits of couple-based approaches for improving HIV outcomes (Becker et al., 2018; Matovu et al., 2019; Dalal et al., 2021). Conversely, individuals in casual or transactional relationships faced substantial barriers to disclosure, often due to low trust, transient interactions, and fear of social or economic consequences (Wringe et al., 2017). Regarding notification methods, contract referral emerged as the most preferred approach (58%), balancing client autonomy with provider support and improving partner testing rates (Dalal et al., 2021; Rosenberg et al., 2015). Provider referral (27%) was critical in high-risk or abusive contexts, safeguarding client confidentiality and enhancing testing uptake. Client referral was least preferred (15%), reflecting stigma, fear, and gender power imbalances, though it may be suitable for stable, low-risk partnerships

(WHO, 2016; Choko et al., 2017). These findings underscore the need for flexible, client-centered PNS approaches that accommodate relationship dynamics and prioritize client safety.

Delayed disclosure was common, with clients often waiting until partners showed symptoms or after counseling sessions, compromising early diagnosis, timely treatment, and HIV prevention measures (WHO, 2016). Key barriers included fear of intimate partner violence, social rejection, internalized stigma, and gender power imbalances, particularly affecting women, consistent with evidence from sub-Saharan Africa showing that anticipated stigma and low social support hinder early disclosure (Oljira et al., 2024; Deribe et al., 2010). Structured disclosure support, counseling, and peer-led interventions can enhance readiness, improve timing, and facilitate safer partner notification. Index clients with multiple sexual partners faced difficulties in partner tracing due to incomplete contact information and fear of stigma, a challenge consistent with reports from Malawi and Uganda (WHO, 2019a; Dalal et al., 2021). Differentiated strategies, including hotspot-based testing, mobile outreach, and digital notification tools, are recommended for highly mobile or key populations, ensuring confidentiality and consent while improving reach.

Duration on ART was a strong predictor of PNS engagement. Clients on ART for over 12 months were more likely to participate, reflecting greater treatment literacy, psychosocial adaptation, and trust in healthcare providers. Newly diagnosed clients often require additional support to navigate emotional challenges and disclosure (UNAIDS, 2023; Kweyu et al., 2020). Integrating PNS into standard ART initiation counseling, coupled with peer support and digital tools, can enhance early participation and reduce transmission risk. The study demonstrated high PNS acceptability (93.1%) and substantial partner testing, with an HIV positivity rate of approximately 23% among tested partners, confirming PNS as a high-yield, cost-effective strategy for identifying undiagnosed infections (WHO, 2016; Dalal et al., 2021). Outcomes varied by facility due to differences in staffing, logistics, and system readiness, highlighting the need for targeted quality improvement initiatives. Linkage to ART among newly diagnosed partners was high, though follow-up gaps remain, which can be addressed through mHealth interventions, CHV engagement, and standardized dashboards.

Multivariate analysis identified education level, preferred contact method, ART duration, and gender as significant predictors of PNS uptake. Higher education promoted disclosure confidence and health literacy, phone-based notification enhanced confidentiality and emotional safety, longer ART duration supported psychosocial readiness, and female index clients were more likely to engage male partners. These predictors suggest that personalized, data-driven strategies can optimize PNS delivery, ensuring interventions are sensitive to literacy, gender, relationship context, and treatment experience. Overall, the findings emphasize the importance of client-centered, flexible PNS models that address socio-demographic, relational, and treatment-related factors, ultimately improving early HIV diagnosis, partner testing, and linkage to care in high-burden settings.

## **VI. Conclusion**

This study demonstrates that HIV Partner Notification Services (PNS) are highly acceptable and effective in identifying undiagnosed infections and linking partners to care in Muhoroni Sub-County, Kisumu County, Kenya. Socio-demographic factors such as gender, age, and education, along with relationship dynamics and duration on antiretroviral therapy, significantly influence PNS uptake. Women, individuals with higher education, clients in stable relationships, and those on long-term ART were more likely to engage in PNS, while younger clients, those with lower education, and those in casual or multiple partnerships faced barriers to disclosure and partner notification.

The preference for contract and provider-assisted referral methods highlights the importance of flexible, client-centered approaches that prioritize safety, confidentiality, and psychosocial support. Challenges such as delayed disclosure, incomplete partner information, and fear of stigma underscore the need for structured counseling, peer support, and digital notification tools to enhance participation, particularly among high-risk or newly diagnosed clients.

Overall, the findings emphasize that tailored, context-specific strategies addressing socio-demographic, relational, and health-system factors are essential for optimizing PNS. Integrating these strategies into routine HIV care can improve partner testing, early diagnosis, and linkage to antiretroviral therapy, contributing significantly to HIV epidemic control and the achievement of UNAIDS 95-95-95 targets.

## **References**

- [1]. Becker, S., Reznick, O., & Ochieng, J. (2018). Couple-Based Approaches For Improving HIV Outcomes In Sub-Saharan Africa. *AIDS Care*, 30(12), 1505–1512. <https://doi.org/10.1080/09540121.2018.1471111>
- [2]. Chali, A., Mwanza, J., & Wanjiru, H. (2021). Gendered Experiences Of HIV Disclosure Among Index Clients In Kenya. *BMC Public Health*, 21, 1891. <https://doi.org/10.1186/S12889-021-11891-3>
- [3]. Choko, A. T., Corbett, E. L., Stallard, N., Maheswaran, H., Lepine, A., & Dinh, T. H. (2017). Uptake, Acceptability, And Effectiveness Of HIV Partner Notification Services: A Systematic Review. *Plos Medicine*, 14(11), E1002456. <https://doi.org/10.1371/Journal.Pmed.1002456>
- [4]. Cochran, W. G. (1977). *Sampling Techniques* (3rd Ed.). John Wiley & Sons.

- [5]. Dalal, S., Johnson, C. C., Fonner, V., Kennedy, C., Siegfried, N., Figueroa, C., & Baggaley, R. (2021). Improving HIV Partner Notification Outcomes: Evidence From Sub-Saharan Africa. *AIDS*, 35(9), 1451–1460. <https://doi.org/10.1097/QAD.0000000000002938>
- [6]. Deribe, K., Woldemichael, K., Wondafrash, M., Haile, A., & Amberbir, A. (2010). Disclosure Experience And Associated Factors Among HIV-Positive Individuals In Ethiopia. *BMC Public Health*, 10, 78. <https://doi.org/10.1186/1471-2458-10-78>
- [7]. Gebremedhin, A., Woldemichael, K., & Abebe, M. (2018). Health Literacy And HIV Service Utilization Among PLHIV In Sub-Saharan Africa. *International Journal Of Health Planning And Management*, 33(4), E1081–E1092. <https://doi.org/10.1002/Hpm.2648>
- [8]. Kennedy, C. E., Yeh, P. T., Johnson, C. C., Baggaley, R., & Fonner, V. (2015). Strategies To Improve HIV Partner Notification In Low- And Middle-Income Countries. *Cochrane Database Of Systematic Reviews*, 2015(9), CD010295. <https://doi.org/10.1002/14651858.CD010295.Pub2>
- [9]. Kenya Ministry Of Health. (2018). Guidelines On HIV Partner Notification Services In Kenya. Nairobi: Ministry Of Health.
- [10]. Kweyu, M., Mwaura, E., & Mbugua, F. (2020). HIV Treatment Literacy And Engagement In Care Among Newly Diagnosed Adults In Kenya. *African Journal Of AIDS Research*, 19(2), 165–172. <https://doi.org/10.2989/16085906.2020.1762495>
- [11]. Matovu, J. K., Makumbi, F., Wanyenze, R. K., Kairania, R., & Nuwaha, F. (2019). Couple-Based HIV Interventions For Improved Disclosure And Testing In Uganda. *BMC Public Health*, 19, 1527. <https://doi.org/10.1186/S12889-019-7855-2>
- [12]. NACC. (2021). Kenya HIV Estimates Report 2021. Nairobi: National AIDS Control Council.
- [13]. NASCOP. (2022). Kenya HIV Testing Services Guidelines. Nairobi: National AIDS & STI Control Programme.
- [14]. Ngure, K., Heffron, R., Mugo, N., Irungu, E., & Celum, C. (2020). HIV Partner Notification Experiences Among Youth In Kenya: Barriers And Facilitators. *Journal Of Adolescent Health*, 66(3), 300–307. <https://doi.org/10.1016/J.Jadohealth.2019.08.014>
- [15]. Odhiambo, C., Were, E., & Muriuki, J. (2021). Youth-Focused Strategies To Improve HIV Disclosure And Partner Notification In Kenya. *AIDS Research And Therapy*, 18, 56. <https://doi.org/10.1186/S12981-021-00382-7>
- [16]. Oljira, L., Mekonnen, T., & Abera, M. (2024). HIV Disclosure And Psychosocial Outcomes In Sub-Saharan Africa: A Systematic Review. *BMC Public Health*, 24, 987. <https://doi.org/10.1186/S12889-024-16011-2>
- [17]. Rosenberg, N. E., Pettifor, A. E., De Bruyn, G., Westreich, D., & Langa, D. (2015). Acceptability And Outcomes Of HIV Partner Notification In South Africa. *Plos ONE*, 10(12), E0143781. <https://doi.org/10.1371/Journal.Pone.0143781>
- [18]. UNAIDS. (2020a). Global AIDS Update 2020: Seizing The Moment. Geneva: UNAIDS.
- [19]. UNAIDS. (2020b). HIV Prevention Gap Report 2020. Geneva: UNAIDS.
- [20]. UNAIDS. (2022). Global HIV & AIDS Statistics — 2022 Fact Sheet. Geneva: UNAIDS.
- [21]. UNAIDS. (2023). Kenya HIV Epidemic Estimates 2023. Geneva: UNAIDS.
- [22]. UNAIDS. (2024). Global HIV & AIDS Statistics — 2024 Fact Sheet. Geneva: UNAIDS.
- [23]. World Health Organization. (2016). Guidelines On HIV Self-Testing And Partner Notification: Consolidated Guidelines On HIV Testing Services. Geneva: World Health Organization.
- [24]. World Health Organization. (2019a). Partner Notification In HIV Testing Services: Operational Guidance. Geneva: World Health Organization.
- [25]. Wringe, A., Moshabela, M., Bukenya, D., Kintu, A., & Marston, M. (2017). Social And Relational Influences On HIV Disclosure And Partner Notification In Sub-Saharan Africa: A Qualitative Synthesis. *AIDS Care*, 29(10), 1252–1263. <https://doi.org/10.1080/09540121.2017.1324867>