Prevalence and Correlates of Mobile Technology Access and Use in a Cohort of Youth Living with HIV in Nairobi, Kenya

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Abstract

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In 2017, an estimated 36.9 million people were living with HIV/AIDS globally. Of the 1.8 million new HIV cases, 590,000 occurred among youth (15-24 years) and 250,000 among adolescents (15-19 years), leading to a growing number of youth living with HIV (YLWHIV) globally. Youth have unique HIV care needs that call for targeted interventions that resonate with young people to bridge the gap in youth HIV care. The growing popularity of phone technology and social media among young people provides a unique platform to deliver public health interventions for YLWHIV to support their Antiretroviral Treatment (ART) adherence and retention in care.

OBJECTIVES:

To characterize, among YLWHIV in Kenya, the prevalence of (1) access to Internet-enabled phones and (2) social media use for any purpose and for health support; and the correlates of (1) access to Internet-enabled phones and (2) use of social media.

METHODS:

A cross-sectional study was conducted using a questionnaire among 299 youth age 14-24 receiving HIV care from three hospitals in Nairobi, Kenya. Correlates of Internet-enabled phone access and social media use were evaluated by Poisson regression with robust standard errors.

RESULTS:

We found that 166 (55.5%) YLWHIV had Internet-Enabled-Phone (IEP) access and 151(91%) of those with IEP access used social media. Among the 151 (91%) participants who had IEP access and used social media**,** 30 (19.9%) reported participating in WhatsApp based support for health and 7 (4.6%) reported participating in Facebook-based group support for health. IEP access varied significantly by clinic site: 74% of youth recruited at Kenyatta National Hospital, the national referral hospital, had access to IEP, compared with 43.4% of youth recruited at Kayole II sub-district hospital and 49% at Mbagathi district hospital, both facilities serving informal settlements (PR 2.30, 95% CI 1.66-3.20, comparing KNH vs Kayole II, and PR 1.57, 1.08-2.28, comparing Mbagathi vs Kayole II). IEP access was also significantly higher among older youth: 66.9% among youth age 20-24 vs. 47.1% among adolescents age <20 (PR 1.67, 1.36-2.03). We identified no significant correlates associated with social media use within youth with IEP access.

CONCLUSION:

The majority of YLWHIV in Nairobi had access to IEP and used social media. Access was lower, but still substantial, among low-income youth living in informal settlements. Older youth had higher access than adolescents. These data support the hypothesis that internet and social media are platforms available to and used by YLWHIV, and may have potential for delivering interventions to support linkage and adherence to HIV care.

Keywords:

Youth, mHealth, Social media, Kenya, Human Immunodeficiency Virus (HIV)

BACKGROUND AND SIGNIFICANCE:

In 2017, an estimated 36.9 million people were living with HIV/AIDS globally. Of the 1.8 million new HIV cases, 590,000 occurred among youth (15-24 years) and 250,000 among adolescents (15-19 years). In 2016 alone, 250,000 adolescents globally became newly infected with HIV, making up 73% of new HIV infections in Sub Saharan Africa. [1–3] In addition to high risk of HIV acquisition in this age group, improvements in pediatric HIV treatment over the last decade have meant children perinatally infected with HIV are surviving into adolescence, increasing HIV prevalence among youth. More than half of YLWHIV live in developing countries with 84% in Sub Saharan Africa. The Kenya Ministry of Health HIV estimates showed that the 2017 national HIV prevalence in Kenya was 4.9% with an estimated 1.5 million people living with HIV. Of these, 184,718 were youth aged 15-24 years.[4]

UNAIDS goals to control the HIV epidemic include achievement of the 90-90-90 targets by 2020. These targets are defined as 90% of all people living with HIV knowing their status, 90% of all people diagnosed receiving sustained antiretroviral therapy (ART), and 90% of all people receiving ART achieving viral suppression.[5] In 2017, 380,000 of the 940,000 AIDS related deaths occurred among young people in Eastern and Southern Africa.[6] Despite making up 4.9% of people living with HIV, youth account for 40.4% of AIDS related deaths in Sub-Saharan Africa (SSA). [7,8]This disparity is caused in part by poor ART adherence and high loss to follow-up in youth. YLWHIV have been found to have suboptimal rates of retention in care and adherence to ART as compared to older adults.[9] This is due to a number of factors. Adolescence is a period of rapid developmental change, and growing independence coupled with incomplete neurocognitive development can make it difficult for adolescents to manage their care. Many YLWHIV face discrimination from healthcare workers, experience challenges in transitioning to adult care and experience barriers to care such as timing and schedules for routine HIV care appointments.[10] Additionally, poor ART adherence has been associated with sociodemographic factors. Studies suggest YLWHIV who reside in boarding schools, shared spaces like dormitories and orphanages lack social support and privacy and experience heightened stigma, resulting in poor ART adherence.[10,11] YLWHIV are more likely to be orphans and act as care providers to their siblings, which affects their ability to keep up with ART schedules because of time and financial challenges.[9] These barriers lead to loss to clinic follow-up and poor HIV management.[13,14] There is an unmet need in meeting the second and third 90 among YLWHIV due to paucity of interventions that improve their adherence to ART,

retention in care, and viral suppression. As a vulnerable population with unique needs, YLWHIV need targeted interventions and approaches to improve their linkage and retention in care, such as peer-to-peer social support.[15] With recent advances in communication technology, mobile phones are increasingly viewed as a channel through which YLWHIV can be reached beyond the clinic to support their health and treatment. Literature from high-income countries has shown the feasibility of using mobile technology for health promotion interventions.[16] Several recent studies have evaluated the use of social media to deliver support groups to support the health of youth.[17–19] Mobile phone social media applications like "*WhatsApp*" and "*Facebook messenger"* have been identified as popular communication platforms among youth in Sub-Saharan Africa.[20] The increasing popularity of social media platforms among YLWHIV presents an attractive opportunity to use social media to deliver educational and supportive interventions that improve youth's retention in HIV care and ART adherence.[21,21] While mobile social media shows promise for use to support young people's health, few interventions have employed this platform to improve HIV care for YLWHIV.

Interactive social media applications require internet access. A crucial first step in evaluating the potential of social media to support YLWHIV is assessing access by YLWHIV to these social media platforms. Recent data from low- and middle-income countries has shown that access to mobile phones has grown dramatically over the last decade.[24] In Kenya, 2017 Hootsuite statistics show that 92% of the adult Kenyan population have access to a mobile phone, 44% have access to a smartphone, 80% of the population uses the internet at least once a week, and 58% of the population uses social media weekly.[20,25] Despite the overall population access estimates, little data exist regarding access among youth age <25, especially YLWHIV, who are generally less socioeconomically advantaged than the populations captured by published data.[9] In order to leverage the growing use of social media by youth to improve the health of YLWHIV, data are needed on access to mobile technology and social media by YLWHIV in sub-Saharan Africa.

RATIONALE:

The goal of this study was to evaluate access to internet enabled phones (IEP) and use of social media among YLWHIV and to identify the subgroups of YLWHIV who are preferentially reached by or excluded from social media. The findings from this study will be used in the design of accessible technology-based interventions to support YLWHIV outcomes.

Main Objective:

The study sought to characterize the prevalence of (1) access to Internet-enabled phones and (2) social media use for any purpose and for health support; and the correlates of (1) access to Internet-enabled phones and (2) use of social media, among YLWHIV receiving HIV care in three Kenyan hospitals.

Aim 1: Determine the prevalence and correlates of access to internet-enabled mobile phones among YLWHIV receiving HIV care from three health facilities in Nairobi, Kenya.

Our hypothesis was that the majority of YLWHIV have access to internet-enabled mobile phones and that Internet-enabled phone access among YLWHIV would be associated with age, education level, living situation, gender, and orphanhood.

Aim 2: Determine the prevalence and correlates of use of social media among YLWHIV with internet enabled phone access receiving HIV care from three health facilities in Nairobi, Kenya.

Our hypothesis was that the majority of YLWHIV with Internet-enabled phones would use social media for health support and that social media use among YLWHIV would be associated with age, gender, education status, source of financial support and use of in person HIV support groups.

METHODS:

1. Background Information of the Study

This analysis was conducted using data collected as part of the Vijana-SMART study, to inform development of a social media intervention to improve ART adherence and retention in YLWHIV.

2. Study setting:

This study was conducted between December 2017 and April 2018 at three HIV care facilities in Nairobi, Kenya: Kenyatta National Hospital (KNH), a national referral hospital, Mbagathi District Hospital, and Kayole II Sub-district Hospital, which both serve informal settlements. These hospitals provide HIV management and care and other outpatient health care services.

3. Study Design:

This was a cross-sectional study.

4. Study Population:

Participants were recruited by study staff at waiting rooms of the three HIV care facilities listed above. Participants were eligible for study participation if they were aged 14-24 years. The total sample size was 299 over the three facilities. Verbal informed consent to participate was obtained from all participants prior to data collection. Consistent with Kenyan regulations, participation of minors age <18 required parental permission and minor assent. However, minors who were married, pregnant, had children or were attending care without an adult caregiver could provide independent consent. Ethical approval was obtained from the University of Washington and University of Nairobi/Kenyatta National Hospital institutional review boards. The author completed Human Subjects Protection (HSP) and Good Clinical Practice (GCP) training prior to completing this thesis.

5. Data collection:

Study staff collected data using standardized questionnaires administered using a tablet-based system, Open Data Kit (ODK). Cross sectional convenience sampling was conducted. All data were self-reported by participants. Characteristics assessed included age, gender, HIV treatment history, education level, family income, living situation, orphanhood, and employment status. Technology access measures included mobile phone access (defined by access to a phone through ownership or sharing with others at the time of the study), internet-enabled phone access, social media use (Facebook messenger, WhatsApp messenger, Instagram, Snapchat, Telegram, WeChat, Skype, Signal, Viber), wi-fi access and social media use for support with health.

6. Data Analysis:

Aim 1

Primary exposures of interest were: Age, gender, education status, living situation, orphanhood (death of parent before age 18), employment status, sources of financial support, clinic site, age at HIV acquisition, number of siblings, birth order, and use of in person support groups for health. Since participants may have

had multiple living situations, non-exclusive indicator variables were generated for (1) living with parents, (2) attending boarding school, and (3) living in multiple places. Financial support was defined as the person or people who pay for the participants' essential needs, such as food and housing. Since participants may have had multiple sources of financial support, source of financial support was categorized into the following non-exclusive categories: (1) self, (2) parents, (3) other. Self-reported age at HIV acquisition was dichotomized into age <10 (likely perinatal) and age ≥10 (likely horizontal).

Primary outcome of interest was self-reported access to internet-enabled phone (owned or shared).

Aim 2

Primary exposures of interest were age, gender, education status, education level, living situation, orphanhood, employment status, source of financial support, clinic site, age at HIV acquisition, number of siblings, birth order, wi-fi access, use of support groups

Primary outcome of interest was Social media use, defined as use of any of WhatsApp Messenger, Facebook messenger, Facebook, Viber, skype, Signal, Telegram, Instagram, Snapchat.

Secondary outcome of interest was social media use for health

7. Data analysis:

Poisson regression with robust standard errors was used to investigate whether the independent variables predict phone access and social media use among YLWHIV. The following regression equation was used: $y = b1*x + c$; where y = estimated dependent variable, c = constant, b = regression coefficient and x = independent variable . R-squared were used to determine how much variance in the dependent variable could be accounted for by the independent variables. Poisson regression with robust standard errors was used in place of logistic regression in order to provide an estimate that more closely approximated risk for common outcomes. [26]Univariable analyses were performed for each predictor of interest, and backward elimination regression was used to perform multivariable analysis. Data were analyzed using R version 3.5.1. The R package "step" was used to perform backward elimination regression.

RESULTS:

Participant characteristics

A total of 299 YLWHIV consented and completed the technology access questionnaire. Table 1 summarizes the characteristics of study participants. Participants were recruited from three HIV care clinics in Nairobi: 100 (33.4%) from KNH, 100 (33.4%) from Mbagathi District Hospital and 99 (33.1%) from Kayole II Sub-district Hospital. One-hundred and seventy-two participants (57.5%) were age 14-19 years. One hundred and ninety participants (63.5%) were female. Most (186, 62.2%) of the participants had completed secondary school, followed by those who had completed primary school only (62, 20.7%) and lastly those who had beyond secondary school education (51, 17.1%). A large majority (222, 74.7%) participants indicated that they lived with their parents or guardians at least some of the time, 44 (14.8%) reported staying in boarding school at least some of the time, and 54 (18.2%) reported living in more than one place. Almost half of participants (114, 41%) had experienced some kind of orphanhood: 41 (14.9%) reported having lost both their parents before age 18, 33 (12%) had lost only their mother, and 40 (14.5%) had lost only their father. Approximately half (150, 50.3%) of participants reported receiving financial support for their essential needs from their parents/guardians; 121 (40.6%) reported receipt of financial support from other relatives, friends or partners; only 4 (1.3%) reported getting support from their own paid work. Around half (129, 50.8%) of participants had been diagnosed with HIV before age 10.

PREVALENCE AND CORRELATES OF IEP ACCESS

Overall, 166 (55.5%) of participants reported having access to an IEP. Table 2 summarizes the association between participant characteristics and access to IEP. Univariable analyses indicated that IEP access varied significantly by clinic site: YLWHIV at KNH had the highest access (74.0%), followed by Mbagathi District Hospital with 49%, while Kayole II Subdistrict Hospital had the lowest at 43.4%. YLWHIV receiving clinical care from KNH and Mbagathi were 1.70 (95% CI: 1.32-2.19) and 1.13 (95% CI: 0.84-1.52) times more likely to have IEP access compared to those attending Kayole II, respectively. IEP access among 20-24-year-olds was higher than 14-19-year-olds (66.9% vs 47.1%, PR 1.42, 1,16-1.74). Female participants had lower IEP access than males (48.9% vs. 66.6%, PR 0.73, 0.60-0.89). IEP access was higher among YLWHIV who had completed more education: 27.4% of youth who had primary education (8 years of education, typically completed at age 14), 54.8% of youth who had completed secondary school (typically completed at age 18),

and 92.2% of those who had education above secondary school. Compared with youth who had stopped at primary education, youth who had completed secondary education were 2.00 (95% CI: 1.31-3.06) times more likely to have IEP access and those who had completed beyond secondary education were 3.36 (95% CI: 2.22-5.08) times more likely to have IEP access. We found no significant association between IEP access and living situation, orphanhood, source of financial support, age at HIV diagnosis and sibling number.

In multivariable analysis, participant age and facility remained associated with IEP access. Compared with participants receiving care from Kayole II, IEP access was 2.30 (95% CI: 1.66-3.20) times higher among participants receiving care from KNH and 1.57 (95% CI: 1.08-2.28) times higher among those receiving care from Mbagathi Hospital. Access among 20-24 year-olds was 1.67 (95% CI: 1.36-2.034) times higher than among 14-19 year-olds.

PREVALENCE & CORRELATES OF SOCIAL MEDIA USE AMONG THOSE WITH IEP

Among the 166 YLWHIV with IEP access, 151 (91.0%) used any social media platform. Facebook was the most commonly used platform with 138 (61.9%) using it. The second commonest was WhatsApp messenger with 131 (58.7%) YLWHIV using it. Table 3 summarizes the associations examined between participant characteristics and social media use. No significant associations were detected in univariable or multivariable analysis between any of the characteristics we examined and social media use.

Social media use for health was uncommon. Of 151 participants who used social media, 30 (19.9%) reported participating in WhatsApp-based support groups for health, 7 (4.6%) reported participating in Facebook-based group support; 17 (11.3%) reported participating in in-person support groups for their health, and 28 (18.5%) reported participating in other group support (SMS, educational websites, others).

DISCUSSION:

The results from this study show that the majority (55.5%) of YLWHIV receiving care at 3 facilities in Nairobi, Kenya, had access to IEP and a large majority of those (91.0%) used social media. However, we found that access to IEP was not uniform, with significant variations by clinic site and age, with older youth having more access than adolescents. Both associations remained significant after adjusting for other demographic characteristics. Among YLWHIV who had IEP access, none of the characteristics we examined showed any significant association with use of social media. Use of social media for health was rare: approximately 1 in 5 social media users used social media-based support for health.

The psychological and physical effects of HIV infection on YLWHIV impact their day-to-day life and consequently their retention in care. Youth aged 10-24 are disproportionately affected by HIV and commonly have poor treatment outcomes due to various factors such as insufficient family and social support, lack of financial support, orphanhood, mental health issues and challenges in accessing age-appropriate care.[27] The fear of stigma, isolation and insufficient support in schools and among the communities they reside in equally affects their retention in care.[28] YLWHIV living in boarding school or orphanages are often faced with stigma and delayed disclosure by caretakers which affects their retention in care and adherence.[29] Many are faced with challenges pertaining to keeping their appointments that are scheduled during school time or in environments that aren't adolescent friendly.[29,30] This consequently leads to loss of follow-up, poor adherence and loss from care.[27] Therefore poor ART adherence and retention in care especially among adolescents and young people calls for strategic monitoring and implementation platforms to improve HIV outcomes in this population.[31]

Peer support is a promising strategy to improving HIV outcomes among youth. Digital communication technology is a strategy that can be used to provide multi-pronged support (mental, social and psychological support) through linkage to other peers and healthcare workers while maintaining anonymity. [32] There is a need to involve healthcare workers in platforms or strategies that are already used by youth. Few interventions have used social media platforms to link youth and healthcare workers to improve HIV health outcomes.

Results from our study showed that the majority (55.5%) of YLWHIV sampled had access to Internet Enabled Phones. Phone applications that require internet access are therefore feasible platforms to communicate with YLWHIV. While these platforms reach the majority of youth, and access is likely to increase in the coming years, it is important to recognize that such approaches do not currently have universal reach, so interventions delivered through this channel would systematically exclude some subsets of the population. We found that IEP access varied significantly by age (66.9% access in youth age 20-24 vs 47.1% in adolescents age 14-19), suggesting that interventions using social media to support YLWHIV are likely to be more impactful among older youth than adolescents. Patterns of technology access also differed by community within Nairobi, and differences did not appear to be explained by individual demographic factors we measured. This finding suggests design of social media interventions to support YLWHIV should involve assessment of social media access in the target community.

We found that, among youth with IEP access, social media use was very common (91.0%) and we did not detect any significant predictors of usage. This highlights that those YLWHIV who have IEP access are already using social media, highlighting the potential of this approach to reach youth.

Overall, of the 151 YLWHIV with IEP access and use social media, 19.9% used WhatsApp support groups and 4.6% used Facebook support groups for health. This may highlight the lack of social media interventions to support the health of YLWHIV or may indicate that YLWHIV are not interested in interventions that do exist.

Our study has several limitations that should be considered in interpreting our findings. Our study used clinic-based recruitment, and therefore only captured participants seeking care at the facility. These data therefore cannot be generalized to YLWHIV who are not engaged in care or not aware of their status. We conducted the study only in Nairobi, which may not be representative of YLWHIV in other parts of Kenya. Technology use and internet access has evolved very rapidly globally with Kenya' s internet users increasing steadily from 200,000 people in December 2000 to 43,329,434 in March 2019, an estimated internet growth rate of 21,564% as of March 2019; this study represents a snapshot in late 2017-early 2018. [33]

CONCLUSION:

This study is among the first to explore IEP access and social media use among YLWHIV in sub-Saharan Africa and thus has important implications for development of youth-specific HIV programs and interventions. The substantial use of IEP and social media by YLWHIV suggests social media is a suitable platform on which to develop behavior change and adherence interventions. However, heterogeneity of IEP access and social media access across age categories (adolescents vs youth) and communities within Nairobi should be considered in designing tailored programs and interventions.

Table 1: Baseline study characteristics of YLWHIV

Table 1. Demographic Characteristics of Study Participants (N= 299)		
Characteristic	**n**	**%**
Clinical Site		
Kenyatta National Hospital (KNH)	100	33.4
Mbagathi District Hospital	100	33.4
Kayole II Sub-district Hospital	99	33.1
Participant Age		
14-19	172	57.5
20-24	127	42.5
Participant Gender		
Male	108	36.1
Female	190	63.5
Education Level		
Up to primary school	62	20.7
Primary - secondary school	186	62.2
Above secondary	51	17.1
Living Situation*		
With parent(s) / guardian(s) / older relative(s)	222	74.7
Boarding school	44	14.8
Live in >1 place	54	18.2
Orphanhood		
Both parents died before age 18	41	14.9
Mother died before age 18	33	12.0
Father died before age 18	40	14.5
Both parents alive up to age 18	162	58.7

Financial Support*		
Parent(s) / guardian(s)	150	50.3
Self (Paid work)	4	1.3
Other(s)	121	40.6
Age at HIV Acquisition		
<10 years	129	50.8
>= 10 years	125	49.2

**Living Situation and Financial Support options are not mutually exclusive; participants could choose more than 1 option.*

TABLE 2: Correlates of internet-enabled mobile phone access among YLWHIV

Characteristic	N	IEP n (%)	Non-adjusted PR	p-value	Adjusted PR	P-value
Overall		**166 (55.5)**				
Clinical Site						
Kayole II Sub-district Hospital	99	43(43.4)	Ref			
Kenyatta National Hospital (KNH)	100	74(74.0)	1.70 (1.32-2.19)	< 0.001	2.30(1.66, 3.20)	<0.001
Mbagathi District Hospital	100	49(49.0)	1.13 (0.84-1.52)	0.432	1.57(1.08 2.28)	0.018
Participant Age						
14-19	172	81(47.09)	Ref			
20-24	127	85(66.92)	1.42(1.16-1.74)	0.001	1.67 (1.36-2.034)	<0.001
Participant Gender						
Male	108	72(66.6)	Ref			
Female	190	93(48.9)	0.73(0.60-0.89)	0.002		
Education Level						
Up to primary school	62	17(27.41)	Ref			
Primary - secondary school	186	102(54.8)	2.00(1.31-3.06)	0.001		
Above secondary	51	47(92.2)	3.36(2.22-5.08)	<0.001		
Living Situation*						
With parent(s) / guardian(s) / older relative(s)	222	124(55.85)	1.05(0.82-1.33)	0.708		
Boarding school	44	19(43.2)	0.75(0.53-1.07)	0.118		
Live in >1 place	54	29(53.7)	0.97(0.74-1.27)	0.807		
Orphanhood						
Both parents died before age 18	41	25(61.0)	Ref			
Mother died before age 18	33	18(54.5)	0.89(0.60-1.33)	0.581		
Father died before age 18	40	24(60.0)	0.98(0.69-1.40)	0.929		
Both parents alive up to age 18	162	88(54.3)	0.89(0.67-1.18)	0.423		

Financial Support*						
Parent(s) / guardian(s)	150	85(56.6)	1.05(0.85-1.29)	0.650		
Self (Paid work)	4	3(75)	1.36(0.77-2.42)	0.293		
Other(s)	121	62(51.2)	0.88(0.71-1.09)	0.244		
Age at HIV Acquisition						
<10 years	129	73(56.6)	Ref			
>= 10 years	125	70(56.0)	0.99(0.80-1.23)	0.925		
Sibling Number						
0	29	18(62.1)	Ref			
1-3	166	102(61.4)	0.99(0.73-1.35)	0.948		
>3	101	43(42.6)	0.69(0.48-0.99)	0.042		
Birth Order						
Only Child	29	18(62.1)	Ref			
First child	77	56(72.7)	1.17(0.85-1.61)	0.325		
Middle Child	115	49(42.6)	0.69(0.48-0.98)	0.038		
Last Child	78	43(55.1)	0.89(0.63-1.26)	0.504		
Monthly Income						
≤kshs 500	241	130(53.9)	Ref			
>kshs 500	58	36(62.1)	1.15(0.91- 1.45)	0.24		

**Living Situation and Financial Support options are not mutually exclusive; participants could choose more than 1 option.*

TABLE 3: Correlates of Social media Use among YLWHIV

Characteristic	IEP n	Social Media, n (%)	Non-adjusted PR (95% CIs)	P-values	Adjusted PR	P-values
Overall	**166**	**151 (91.0)**				
Clinical Site						
Kayole II Sub-district Hospital	43	40 (93.0)	Ref	Ref		
Kenyatta National Hospital (KNH)	74	68 (91.9)	0.98(0.88-1.10)	0.821		
Mbagathi District Hospital	49	43 (87.8)	0.94(0.83-1.07)	0.389		
Participant Age						
14-19	81	72 (88.8)	Ref	Ref		
20-24	85	79 (92.9)	1.05(0.95-1.15)	0.366		
Participant Gender						
Male	72	67 (93.1)	Ref	Ref		
Female	93	83 (89.2)	0.96(0.87- 1.05)	0.387		
Education Level						
Up to primary school	17	13 (76.5)	Ref	Ref		
Primary - secondary school	102	91 (89.2)	1.16(0.88-1.53)	0.046		
Above secondary	47	47 (100)	1.31(1.00-1.70)	0.267		
Living Situation*						
With parent(s) / guardian(s)	124	114 (91.9)	1.05(0.92- 1.19)	0.450		
Boarding school	19	15 (78.9)	0.85(0.67 -1.08)	0.192		
Live in >1 place	29	25 (86.2)	0.94(0.80-1.09)	0.450		
Orphanhood						
Both parents died before age 18	25	22 (88)	Ref	Ref		
Mother died before age 18	18	17 (94.4)	1.01(0.73-1.40)	0.449		
Father died before age 18	24	23 (95.8)	1.13(0.85-1.50)	0.317		
Both parents alive up to age 18	88	80 (90.9)	0.90(0.69-1.16)	0.689		

Financial Support*						
Parent(s) / guardian(s)	85	79 (92.9)	1.05(0.95-1.15)	0.354		
Self (Paid work)	3	2 (66.6)	0.73(0.33-1.63)	0.441		
Other(s)	62	57 (91.9)	1.03(0.94-1.14)	0.431		
Age at HIV Acquisition						
<10 years	73	66 (90.4)	Ref	Ref		
>= 10 years	70	65 (92.9)	1.03(0.93-1.13)	0.597		
Sibling Number						
0	18	16 (88.8)	Ref	Ref		
1-3	102	94 (92.2)	1.04(0.87-1.23)	0.682		
>3	43	38 (88.4)	0.99(0.82-1.21)	0.953		
Birth Order						
Only Child	18	16 (88.8)	Ref	Ref		
First child	56	49 (87.5)	0.98(0.81-1.19)	0.872		
Middle Child	49	45 (91.8)	1.03(0.86-1.24)	0.727		
Last Child	43	41 (95.3)	1.07(0.89-1.28)	0.435		
Monthly Income						
≤kshs 500	130	118(90.8)	Ref	Ref		
>kshs 500	36	33(91.7)	1.01(0.90-1.13)	0.864		

**Living Situation and Financial Support options are not mutually exclusive; participants could choose more than 1 option.*

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