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Knowledge Levels and Gaps on Preventing HIV Transmission among People Living With HIV in Kisii County, Western Kenya

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ABSTRACT

Knowledge of HIV prevention methodologies by people living with HIV (PLHIVs) is an important precursor to HIV risk reduction. This study sought to determine HIV prevention knowledge and knowledge gaps among PLHIVs in Kisii County, Western Kenya. A total 340 PLHIVs across 9 health facilities and 6 Key informants, mainly HIV managers and programmers were interviewed. We found high generalized knowledge among PLHIVs on HIV prevention, as well as on condom use, abstinence and faithfulness to a partner as prevention methods. We however found low knowledge levels on emerging biomedical prevention methods, including treatment as prevention. Similarly, despite high knowledge levels on Mother to Child Transmission (MTCT), few PLHIVs know exact phases in which MTCT can occur - pregnancy, delivery and breast feeding – with males, those depending on kin as primary income source and PLHIVs attending higher-level facilities least likely to have this knowledge. Media, health workers and HIV campaigns remain the most important communication channels for PLHIVs as regards HIV information, while peers are an important information source for males. Our observations highlight the need to further promote knowledge of various HIV prevention methodologies, especially emerging prevention methods, among specific PLHIVs socio-demographic groups that exhibit low knowledge levels.

Keywords: PLHIV; HIV Knowledge; HIV information; risk reduction; Kenya.

Contents

1	INTRODUCTION	31
2	MATERIALS AND METHODS	32
2.1	Design of the Study.....	32
2.2	Study Context	33
2.3	Sampling	33
2.4	Data Collection	33

2.5	Data Analysis.....	33
2.6	Ethics	34
3	RESULTS	34
3.1	Demographic Characteristics	34
3.2	PLHIVs Knowledge on Sexual HIV transmission.....	34
3.3	PLHIVs knowledge on Preventing Mother to Child Transmission	35
3.4	Knowledge of STI identification and treatment.....	35
3.5	Knowledge of the importance of Partner HIV Testing	36
3.6	Sources of HIV information to PLHIVs	37
4	DISCUSSIONS.....	37
5	CONCLUSION.....	40

1 INTRODUCTION

Globally, 36.9 million people were living with HIV in 2014, with the epidemic burden varying considerably between countries and regions [1]. Sub-Saharan Africa remains the single most severely affected region on the globe, with 1 in every 20 adults living with HIV [2]. By 2014, an estimated 25.8 million people were living with HIV in Sub-Saharan Africa, representing 70% of the global HIV burden [1]. Ninety two percent (92%) of pregnant women living with HIV and more than 90% of children who acquire HIV reside in Sub-Saharan Africa [3]. Kenya has an adult HIV prevalence of 5.6%, with large geographical variations both in HIV incidence and prevalence. In 2013 alone, 4,891 new infections, 1,352 adult deaths and 492 children deaths occurred in Kisii County due to AIDS related conditions making it one of the top 5 Counties with the highest HIV burden as well as one of the 5 Counties in Kenya that make up 50% of all new HIV infections [4-5].

Behavior change is widely seen as the backbone of both HIV prevention as well as care and treatment programs. HIV related behavior change among PLHIVs focuses on safer sex practices, adherence to prevention of mother to child protocols as well as enhancing the uptake and adherence to biomedical and behavioural strategies that reduce the HIV transmission risk. Behavior change strategies can focus on individuals, couples, families, peer groups, networks, institutions, and entire communities [6]. There is a range of approaches in which behavior change occurs, including educational, motivational, peer-group, skills-building and community normative approaches [7]. Knowledge and awareness form a key formative step in all these approaches, thus the need to clearly understand and foster knowledge on HIV prevention among PLHIVs. Globally, many other studies have found relationships between HIV knowledge, perceptions, attitudes, and people's behaviors. People's knowledge levels have been shown to modify their risk behaviours as well as uptake and adherence to behavioural and biomedical interventions. As such, enhancing HIV prevention knowledge among PLHIVs is a key precursor to HIV prevention [8 – 9].

Knowledge of HIV and AIDS vary widely between population groups and geographical areas as well as technical intervention areas. Over the past decade, knowledge of sexual HIV transmission increased for women in both the richest 20% and poorest 20% urban populations in Asia, Africa and Americas [10]. In Kenya, HIV related knowledge increased in virtually every age cohort. Today, nearly all Kenyans have heard of HIV, although only 73% of adult women

and 79% of adult men know that condoms could prevent HIV transmission [11]. Most recent assessment of HIV-related knowledge reveals knowledge levels below 2013 preset targets. This is especially true for women, 58.3% of whom have comprehensive HIV knowledge, well below the 75% target for 2013. Young people are less likely than adults to exhibit accurate, comprehensive understanding of how to prevent HIV transmission. Misconceptions about HIV persist; in 2008–2009, nearly one in five adult men and almost one in four women were not aware that mosquito bites do not transmit HIV [11, 12]. Such misconceptions could go a long way in limiting the use of Positive HIV prevention methods, thus increase in both primary and secondary HIV transmissions. Over the past decade, knowledge of vertical HIV transmission has also increased significantly. For instance, the proportion of women and men who know that the risk of mother-to-child transmission can be reduced by the mother taking certain drugs during pregnancy increased from 33% in 2003 to 69% in 2009 among women and from 38% in 2003 to 70% in 2009 among men. The proportion of males and females who know that HIV transmission can occur through breastfeeding and that the risk of MTCT can be reduced by the mother taking special drugs during pregnancy, also increased significantly from 28% in 2003 to 65% in 2009 among females and from 30% in 2003 to 64% in 2009 among males. Generally, PMTCT knowledge has been noted to be lower in young women and men, those who have never had sex, women who are not pregnant as well as rural populations, and increases with education [11].

The Kenyan HIV policy framework prioritizes HIV prevention awareness and knowledge as a key pillar of both prevention and treatment services. A clear understanding by the populace on how to avoid or limit HIV transmission and acquisition is core in fostering individual risk reduction, albeit the fact that knowledge on its own is insufficient to prevent HIV transmission or acquisition [5, 12]. HIV-related knowledge has increased over the last decade in virtually every Kenyan age cohort, but prevention knowledge among PLHIVs remains largely unmeasured. In recent times, advances in biomedical HIV prevention methods have widened the range of behaviors that can be up taken by PLHIVs to reduce their transmission risk, thus programmers now advocate for increased knowledge, awareness and behavior change among PLHIVs and uptake of services that will reduce or eliminate their chances of transmitting HIV. These services include biomedical interventions such as male circumcision as well as the use of antiretroviral therapies for prevention [13]. Although many studies have explored communities knowledge level on HIV, there remains need to further explore the HIV knowledge among positives for purposes of fostering prevention with positives interventions within HIV programs, since this knowledge could foster reduction of vertical HIV transmission. This study sought to establish the level of knowledge and knowledge gaps on HIV prevention among people living with HIV in Kisii County, Western Kenya especially in the context of emerging behavioral and biomedical prevention methods.

2 MATERIALS AND METHODS

2.1 Design of the Study

This study collected both qualitative and quantitative data. Study tools were administered in order to capture both exposures and outcomes simultaneously. Participant's exposure to various HIV interventions, their level of knowledge as well as socio demographic factors were all assessed.

2.2 Study Context

Kisii County is located in Western parts of Kenya and has an estimated population of 1,152,282 with 52 % being females [14]. HIV is one of the most important public health concerns for the County [15]. This study was carried out among clients enrolled on HIV care and treatment programs in Kisii County. There were 14,615 clients active on antiretroviral treatment [16]. Kisii County, where this study was undertaken, is one of the top 5 Counties with the highest HIV burden in Kenya, as well as one of the 5 Counties that make up 50% of all new HIV infections [5].

2.3 Sampling

A total 340 PLHIVs and 6 health workers were interviewed. In sample size calculation, standard error was set at 5% and a 10% margin was added to the sample. Study respondents were mapped and interviewed at health facilities. Multistage sampling was used to determine study questionnaire respondents as follows. First, Health Facilities that offer HIV treatment care and support services were stratified based on their Ministry of health facility clustering. Kisii County health facilities fall between tier 2 and tier 4. Secondly, 10% of facilities in each tier were randomly selected. The sample was then proportionately allocated to the selected health facilities based on the number of HIV clients enrolled. Once at the facility, interviews were systematically administered, with the sampling interval being determined by dividing the facility's monthly number of HIV clients seen with the apportioned sample size. Six Key Informants were interviewed, being three county level HIV managers and another three Sub County level HIV managers. Key informants were purposefully selected based on their work stations as well as their areas of specialization.

2.4 Data Collection

Data was collected using two different instruments, an interviewer administered PLHIV semi-structured questionnaire and a key informant interview schedule. The PLHIV questionnaire was developed by the researcher through an analysis of study objectives and research questions to ensure these were adequately covered in both scope and depth, guided by literature review. The questionnaire was administered to individual PLHIVs by trained research assistants. Information collected by the questionnaires included demographics, information on HIV knowledge and knowledge gaps as well as various drivers to HIV knowledge, including sources of information. The Key Informant Interview guide was developed by the researcher through analyzing aspects that need in-depth professional understanding. This tool has open ended questions and was administered to HIV services managers and coordinators within the study area. The guide focused on gathering information on strengths, weaknesses, opportunities and threats for HIV related knowledge and behavior change, and offered insights on improvement points for HIV programs. The guide also captured information on various factors affecting communities' level of HIV knowledge. The guide collected professional information on best methodologies to enhance knowledge and fill in knowledge gaps among PLHIVs in Kisii County. Study tools were pre-tested, piloted and reviewed before actual use to establish their accuracy in generation of required information. The test – retest method was used to determine the tools reliability.

2.5 Data Analysis

For the PLHIV questionnaire, data was coded, entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 17, with the level of significance set at 0.05. First, descriptive statistics were drawn where frequencies, percentages and means were analyzed. Chi-square tests were also used to test association between variables. In the overall, comparison was

made among and between individuals who exhibited higher knowledge levels and those who did not, against various demographics and exposures. Key informant's recorded sessions were transcribed and rechecked after which coding and harmonization was done on the transcripts. Summaries were drawn based on the major themes. A matrix showing each participants contribution against major themes was then generated. Participant's contributions against each theme were then analyzed by combining views and determining the overall points of concurrence as well as discord between respondents. All points of concurrence and discords noted were further critiqued through literature review in order to draw conclusions and recommendations.

2.6 Ethics

Research Ethics approval was sought and obtained from the Institutional Ethics and Research Committee of Moi University [FAN IREC 1195] and a research clearance permit issued by the National Commission for Science, Technology and innovation. The study was conducted during a period of 6 months from August 2014 to February 2015.

3 RESULTS

3.1 Demographic Characteristics

Study respondents had a median age of 37 years, range of 50 years (between 18 and 68 years old) and mean age of 37.2 years. Most respondents (72.6%) were aged between 20 and 40 years old, with 7.9% aged 18 – 24 years, 31.2% aged 25 – 34 years, 38.5% aged 35 – 44 years, 18.2% aged 45 – 54 year and 4.1% aged above 55 years old. Most respondents (65.9%) were female. The majority of respondents had primary level of education and above, with 42.1% having primary level education, 40.0% having secondary level education and 13.7% having tertiary level of education. Of all respondents, 78.9% were either married or cohabiting while 8.0% were single. Thirteen percent were either widowed (6.8%), divorced (2.1%) or separated (4.2%). On religion, 92.2% of the respondents were Christians, with 59.1% being Protestants and 33.1% Catholics. Most respondents had more than one child, with only 8% having no child. The main sources of income were farming (38.6%), business (28.0%) and formal employment (15.2%) whilst 3.2% depended on remittances from kin. Six percent of the respondents lived below 1 USD a day (conversion KES 87), with the median income at KES 12,000 monthly.

3.2 PLHIVs Knowledge on Sexual HIV transmission

Most respondents (97.3%, n=334) had knowledge of some biomedical or behavioral action that PLHIVs could take to reduce HIV transmission, with knowledge on condom use (97.0%=325), abstinence (40.0%, n=325), and faithfulness to a partner (38.4%, n=331), avoiding sharing sharps (37%, n = 331), avoiding unsafe injections (22%, n = 331), ART for prevention (4.0%, n=325) and prompt STi treatment (2.5%, n=325). Few PLHIVs had knowledge that disclosure of HIV status to sexual partners (5.2%, n=325), family testing (4.3%, n=325) and psychological support (2.2%, n=325) could be associated with reduced HIV transmission risk. This study found association between knowledge of being faithful to one partner for HIV transmission prevention and main source of income ($\chi^2(4, N = 330) = 11.01, p = 0.026$) where people whose main source of income was remittances from kin were least likely to have knowledge that being faithful to a partner is a preventive option available to PLHIVs. No association was found between participant's knowledge that condom use is a preventive measure for PLHIVs against age, sex, education, marital status, religion, parity and sources of income. Similarly, no association was found between participant's knowledge that abstinence is a preventive measure for PLHIVs against age, sex, education, marital status, religion, parity and sources of income. This study

showed minimal misconceptions about the HIV transmission, with only 3% (n=331) of PLHIVs having at least one misconception; with 2.7% (n=331) indicating that kissing leads to HIV transmission and 0.3% (n=331) approving the misconception that mosquito bites could transmit HIV. No respondent approved that seeking protection from a traditional healer would be protective against HIV acquisition or transmission.

3.3 PLHIVs knowledge on Preventing Mother to Child Transmission

Most PLHIVs (89.0%, n=337) knew that HIV could be transmitted from a mother to her baby. Of these, 91.4% (n=291) knew that drugs are available that can be used to reduce the chances of HIV transmission from mother to child. Lesser proportions of respondents knew the various phases at which HIV can be transmitted from mother to child, with 50.7% (n=300) identifying transmission during pregnancy, 67.3% (n=300) identifying transmission during delivery, and 58.7% (n=300) identifying transmission through breastfeeding. This study found association between knowledge that HIV can be transmitted from mother to child during pregnancy and sex ($\chi^2(1, N = 300) = 4.02, p = 0.045$) where men were less likely to have knowledge that MTCT can occur in pregnancy, and main source of income ($\chi^2(4, N = 299) = 14.45, p = 0.006$) where PLHIVs who chose "other sources" as their main income source were less likely to have knowledge that MTCT can occur in pregnancy. The study found no association between respondent's knowledge that MTCT can occur during pregnancy and age, education, marital status, religion and parity. Respondents who chose "other sources" as their main income source did not get most income from formal employment, business, farming and remittances from kin; and had varying specific source indications. This study also found association between respondent's knowledge that MTCT can occur at delivery and sex ($\chi^2(1, N = 300) = 7.79, p = 0.005$) where men were less likely to have knowledge that MTCT can occur at delivery. We found no association between respondent's knowledge that MTCT can occur at delivery and age, education, marital status, religion, parity and sources of income. Chi square tests were also done to determine any association between respondent's knowledge that MTCT can occur during breastfeeding and these demographic variables. No association was found with age, sex, education, marital status, religion, parity and sources of income. Key informants indicated that women are better reached with PMTCT education at health facilities as compared to men mainly because they have higher exposure to health workers education before delivery as well as after delivery while attending the antenatal and post-natal clinics respectively. This study noted variation in MTCT related knowledge by health facility levels. The Kenyan health facilities are categorized into tiers, with tier 2 being the basic health facilities and tier 4 being referral facilities. The study found association between health facility levels and knowledge that MTCT could happen in pregnancy ($\chi^2(2, N = 300) = 15.70, p = 0.001$) as well as in delivery ($\chi^2(2, N = 300) = 15.37, p = 0.001$) with respondents in tier 2 facilities being more likely to have knowledge; and knowledge that MTCT could happen during breastfeeding ($\chi^2(2, N = 300) = 18.02, p = 0.001$) where respondents in tier 4 facilities were less likely to have knowledge.

3.4 Knowledge of STI identification and treatment

Most PLHIVs (94%, n=287) knew of a place where they could access STI treatment, but a lesser proportion (55%, n=287) knew symptoms of STIs, both for men and female, with the most common known symptom being burning pains on urination. This is shown in Table 1.

Table 1: Sexually transmitted infections symptoms knowledge

(n = 340) Symptom	In Males		In females	
	Number	Percent	Number	Percent
Abdominal pain	106	31%	105.0	31%
Genital discharge/dripping	101	30%	110.0	32%
Foul Smell	86	25%	124.0	36%
Burning pains on urination	187	55%	165.0	49%
Redness Inflammation of genital area	13	4%	22.0	6%
Swelling of Genital area	24	7%	25.0	7%
Genital Sores ulcers	32	9%	43.0	13%
Genital Warts	11	3%	9.0	3%
Others STI symptoms	63	19%	71.0	21%

Table 2: Variation between information sources with demographics

N=340 Demographics		Information source (% Yes)				
		Media	Peers	Posters	HIV Campaigns	Health Workers
Age	18 – 24	19 (5.6%)	0 (0.0%)	1 (0.3%)	9 (2.6%)	15 (4.4%)
	25 – 34	88 (25.9%)	4 (1.2%)	3 (0.9%)	15 (4.4%)	52 (15.3%)
	35 – 44	102 (30.0%)	11 (3.2%)	10 (2.9%)	40 (11.8%)	56 (16.5%)
	45 – 54	48 (14.1%)	5 (1.5%)	2 (0.6%)	14 (4.1%)	30 (8.8%)
	55 and above	11 (3.2%)	2 (0.6%)	2 (0.6%)	4 (1.2%)	7 (2.1%)
	Total	268 (78.8%)	22 (6.5%)	18 (5.3%)	82 (24.1%)	160 (47.1%)
Sex	Male	99 (29.1%)	12 (3.5%)	7 (2.1%)	32 (9.4%)	52 (15.3%)
	Female	169 (49.7%)	10 (2.9%)	11 (3.2%)	50 (14.7%)	108 (31.8%)
	Total	268 (78.8%)	22 (6.5%)	18 (5.3%)	82 (24.1%)	160 (47.1%)
Highest level of Education attained	No formal education	10 (2.9%)	0 (0.0%)	0 (0.0%)	1 (0.3%)	9 (2.6%)
	Primary	116 (34.1%)	7 (2.1%)	5 (1.5%)	36 (10.6%)	63 (18.5%)
	Secondary	102 (30.0%)	12 (3.5%)	8 (2.4%)	32 (9.4%)	63 (18.5%)
	Tertiary education	35 (10.3%)	3 (0.9%)	5 (1.5%)	11 (3.2%)	24 (7.1%)
	Total	263 (77.4%)	22 (6.5%)	18 (5.3%)	80 (23.5%)	159 (46.8%)
Marital Status	Single	21 (6.2%)	0 (0.0%)	2 (0.6%)	7 (2.1%)	8 (2.4%)
	Married/Cohabiting	221 (65.0%)	17 (5.0%)	15 (4.4%)	58 (17.1%)	131 (38.5%)
	Divorced	6 (1.8%)	0 (0.0%)	0 (0.0%)	3 (0.9%)	3 (0.9%)
	Separated	5 (1.5%)	4 (1.2%)	1 (0.3%)	5 (1.5%)	7 (2.1%)
	Widowed	13 (3.8%)	0 (0.0%)	0 (0.0%)	6 (1.8%)	10 (2.9%)
	Total	266 (78.2%)	21 (6.2%)	18 (5.3%)	79 (23.2%)	159 (46.8%)
Religion	Christian (Protestant)	163 (47.9%)	15 (4.4%)	13 (3.8%)	44 (12.9%)	105 (30.9%)
	Christian (Catholic)	85 (25.0%)	6 (1.8%)	3 (0.9%)	25 (7.4%)	45 (13.2%)
	Muslim	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Others	16 (4.7%)	0 (0.0%)	1 (0.3%)	10 (2.9%)	8 (2.4%)
	Total	264 (77.6%)	21 (6.2%)	17 (5.0%)	79 (23.2%)	158 (46.5%)
Main Sources of income	Formal Employment	40 (11.8%)	4 (1.2%)	3 (0.9%)	10 (2.9%)	25 (7.4%)
	Business	71 (20.9%)	10 (2.9%)	5 (1.5%)	24 (7.1%)	46 (13.5%)
	Remittances from kin	4 (1.2%)	0 (0.0%)	1 (0.3%)	2 (0.6%)	8 (2.4%)
	Farming	113 (33.2%)	8 (2.4%)	8 (2.4%)	30 (8.8%)	61 (17.9%)
	Others	40 (11.8%)	0 (0.0%)	1 (0.3%)	16 (4.7%)	19 (5.6%)
	Total	268 (78.8%)	22 (6.5%)	18 (5.3%)	82 (24.1%)	159 (46.8%)

3.5 Knowledge of the importance of Partner HIV Testing

Most PLHIVs (92.0%, n=338) knew that it was important for partners of PLHIVs to take the HIV test. Of these, the majority were able to identify benefits of HIV testing for partners, with (92.9%, n=311) noting common knowledge of HIV status within the couple if the test is taken by

the couple and 66.2% (n=311) noting better planning for the future. Most PLHIVs (90.6%, n=331) knew of the possibility of HIV discordance, with 74.0% (n=291) personally knowing at least one HIV discordant couple.

3.6 Sources of HIV information to PLHIVs

This study noted that most PLHIVs used media (79%), health workers (47%) and HIV campaigns (24%) to get HIV information. Other key sources of HIV information to PLHIVs include peers (6%) and posters (5%). Most respondents (70%) noted media as their main source of HIV information. This is shown in Table 2.

This study sought to determine association between information sources and age, sex, education, marital status, religion, parity and sources of income. Association was found between information sources and sex with males more likely to have peers as sources of information ($\chi^2(1, N = 340) = 4.37, p = 0.037$) compared to females, and females more likely to use media as a source of HIV information as compared to males ($\chi^2(1, N = 340) = 4.49, p = 0.034$). No association was found with age, education, marital status, religion, parity and sources of income.

4 DISCUSSIONS

The Kenyan HIV policy frameworks prioritize HIV awareness and knowledge as key pillars of both prevention and treatment of the virus. A clear understanding of how the HIV virus transmission can be avoided or limited is key in fostering individual sexual and vertical risk reduction, albeit knowledge alone is often insufficient to prevent transmission or acquisition of the virus [12]. Although PLHIVs have very high knowledge levels on classical prevention methods - condom use, abstinence and faithfulness to a partner - this study noted low levels of knowledge among PLHIVs on emerging behavioural and biomedical interventions that have been associated with lowered transmission risk among positives, including ART for prevention and prompt STi treatment. This study found similar results as Kahn *et al* (2013) who observed low levels of knowledge among positives as regards ART's role in reducing HIV transmission risk to sexual partners [17]. Good knowledge and understanding of treatment as prevention among PLHIVs could foster good onset and adherence behaviours, thus beneficial to both individual PLHIVs as well as their partners, especially in discordant relationships. There was also low realization that disclosure of status to sexual partners, family testing and psychological support could lower HIV transmission risk. Over the years, the main factors accounting for low levels of condom use in Kenya have been demand-side barriers including knowledge and low levels of felt need, thus a higher level of knowledge on condom use could strengthen use among PLHIVs [18].

Various studies have shown association between source of income, occupation and HIV knowledge, although the specific type of work done that predisposes populations to lower HIV knowledge or higher infections vary from place to place [19]. A persons source of income determines to a great extent where they spent most of their time, as well as whom they interact with, thus this could be a great determinant or modify the level of exposure and acceptance to HIV programs. This study notes various associations between main source of income and HIV knowledge among PLHIVs. For instance, we noted that PLHIVs whose main source of income was remittances from kin were least likely to have knowledge that being faithful to a partner is a preventive option available to PLHIVs. Persons who depend of remittances from kin are likely to have reduced interaction with wider communities because of the removal from other economic

activities, a factor that could reduce their interaction with HIV programs and information, thus limit their opportunity to get the much needed knowledge. It is thus important for HIV programmers to ensure that programs delivered are tailor made to suit various occupations, especially looking at when and how services are delivered. Key informants indicated that HIV programs had used varying methodologies to target a wide range of population groups with knowledge on condom use and abstinence, resulting in high levels of knowledge in all these groups; thus explaining the no statistical difference finding among demographic groups as regards knowledge on condom use and abstinence.

In addition to knowledge about effective ways to avoid contracting or transmitting HIV, it is key for individuals to correctly identify incorrect beliefs and misconceptions about HIV and AIDS. Common misconceptions about AIDS include the belief that the virus can be transmitted through a mosquito or other insect bites, by kissing others as well as through witchcraft or other supernatural means addressable by traditional healers [11]. We found minimal misconceptions about the HIV disease among PLHIVs. For instance, only 0.3% approved the misconception that mosquito bites could transmit HIV, much lower than the 23.5% seen in the Kenyan adult population. Misconceptions relating to HIV transmission could lead to missed prevention opportunity [11, 17]. Lower levels of misconceptions in our study population could be attributed to enhanced engagement of PLHIVs with HIV care and treatment programs, including regular interactions and discussions with health service providers and peers.

Assessing the level of knowledge regards how and when mother to child HIV transmission can occur remains key in reducing the vertical HIV transmission risk. This study noted similar PMTCT knowledge levels as those observed by the AIDS indicator Survey in 2014 among adult Kenyans where 57% of women and 49% of men knew that HIV could be transmitted from mother to child during pregnancy, 78% women and 75% men were aware that HIV could be transmitted from mother-to-child during delivery and 87% of women and 86% of men knew that HIV could be transmitted from mother to child during breastfeeding [20]. These observations were also similar trends to various regional studies. Maputle and Jali (2008) found low level of knowledge about MTCT through breast feeding among women attending an urban teaching hospital in Natal, South Africa. Falnes *et al* (2010) in a Tanzanian study found most mothers not aware of the possibility of MTCT during labor and delivery, with 60% aware it could occur during pregnancy [9, 21]. Here, mothers thought that babies were fully protected from HIV and other infections while in the uterus. Most of these studies have however been done among pregnant mothers attending ANC, who could have taken special interest in such messages because they were pregnant. The fact that a sizable proportion of people do not know the specific phases where mother to child transmission can occur presents a missed opportunity for HIV prevention from mother to child since people may fail or delay to take up available interventions because of that lack of knowledge.

This study also noted that males exhibited lower PMTCT knowledge as compared to females. In Kenya, females of reproductive age are more likely to interact with a health worker as compared to their male counterparts, as they seek various services for themselves and their babies. These services include family planning, antenatal care visits, delivery, post-natal care for both the mother and baby, immunizations for the baby as well as taking children to health facilities when they are sick. Antenatal, delivery and post-natal services specifically targets pregnant women to

ensure they are informed of various PMTCT options. This could explain the higher knowledge levels among females on MTCT. The high knowledge levels among females could be facilitative in ensuring uptake of PMTCT interventions, however the low levels among males could constitute a barrier especially given that male involvement is a key contributor to mothers enrolling to and adhering to PMTCT interventions. Although there is need for further research as regards the exact impact of male engagement interventions on women's uptake of PMTCT services, some studies have observed up to 40% better outcomes in MTCT with enhanced male involvement [22,23]. Our study also found PLHIVs attending lower level facilities with higher MTCT knowledge as compared to those in higher level facilities, perhaps due to the fact that tier 4 facilities have poor patient to clinician ratio in the comprehensive care clinic. We noted that health workers remain a major source of HIV information to PLHIVs.

Sexually transmitted infections (STIs) increase the risk of HIV acquisition and transmission, but despite this important role played by STIs in public health, the HIV epidemic has overshadowed initiatives aimed at addressing STIs [20]. Individualized knowledge of signs and symptoms of STIs as well as knowledge of a place to seek treatment are key ingredients to prompt STI treatment for both adults and adolescents, albeit there are other factors that also contribute to STI treatment seeking behaviours. Although most PLHIVs knew of a place where they could seek STI treatment, there was low knowledge on STI symptoms both among males and females. This low knowledge could result in delay in seeking treatment for those infected [24, 25].

There are several intricate issues that still lack conclusive scientific explanations in the AIDS field today; among these are specific aspects regarding HIV discordance. On one hand, it is globally agreed that negative partners in discordant relationships are at high risk of HIV acquisition, and can reduce these chances through employing already known biomedical and behavioral interventions. On the other hand, there are still discussions and exploratory studies attempting to analyze and explain possible reasons for the existence of HIV discordance between different individuals and couples [26]. Our study observed higher knowledge level as regards the fact that HIV discordance exists when compared to national level surveys done among the general populations. For instance, the 2012 Kenya AIDS Indicator Survey observed 43.7% of women and 49.8% of men did not know about HIV discordance [20]. These high knowledge levels on discordance among PLHIVs could be attributed to the fact that they have more direct contact with positive clients in discordant couples during clinic visits and psychosocial support groups as indicated with the high proportion personally knowing at least one discordant couple. High knowledge levels on HIV discordance have been associated with reduced risk of infection among couples, especially those in discordant relationships.

Information sharing to various PLHIV audiences remains a critical component of HIV prevention as well as care and treatment. As such, it is important to understand PLHIVs sources of HIV information, both broadly as well as by sub population, in order to appropriately educate PLHIVs [27]. We noted that media, health workers and HIV campaigns remain the most important communication channels for PLHIVs as regards HIV knowledge. It is however key to note that various media sources reach various groups better. For instance, we found that peers as sources of information better reaches males as compared to females, while media better reached females. HIV programmers could therefore explore more use of peer models in changing behaviours of male PLHIVs for better health outcomes. HIV programs in Kenya have notably

indicated challenges as regards targeting and involving males in prevention, care and treatment activities as compared to females. In exploring media as an information source, this study focused on traditional media including print and audio, but did not include social media. Future studies could explore the role of Social Media in HIV prevention and treatment information against various groups, including the youth.

5 CONCLUSION

Our observations highlight the need to enhance PLHIVs knowledge on available preventive biomedical and behavioral measures that they can use to reduce transmission to sexual partners beyond condoms, being faithful to one partner and abstinence, embracing combination prevention as currently advocated for by the World Health Organization. Specific focus should also be directed at knowledge on phases in which MTCT occurs – pregnancy, delivery and breast feeding; as well as STi symptoms. In enhancing this knowledge, attention should be paid on people with various income sources, males and females, as well as those attending higher level facilities. This study also notes that media, health workers and HIV campaigns are important communication channels for most PLHIVs on HIV information, and Peer models are key in communicating to males.

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