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Determinants of Fertility Desires and Intentions among HIV Infected and Uninfected Women and Contraceptive use among HIV-infected women in the study at Six hospitals in two regions of Kenya

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Abstract

HIV epidemic in Kenya is geographically diverse ranging from a prevalence of 26 percent and 0.4 percent. Evidence indicates that a higher proportion of HIV infected women are more likely to be associated with unintended pregnancies.Despite this evidence, little is known about determinants of fertility desires and intentions of HIV-infectedand HIV-uninfected women in Kenya. 437 HIV-infected and 365 HIV-uninfected women were enrolled in the study. Using a cross-sectional mixed method, the study sought to investigate determinants of fertility desires and intentions among HIV-infected and uninfected women, and further determined factors associated with desire and intention to use contraceptives among HIV-infected women. Focus group discussions and key informant interviews were conducted with HIV-infected and uninfected women and Health providers respectively. Sampling was proportionate to the size based on client volumes at each study hospital. Similar factors including; age, region of residence, place of residence, level of education, employment and marital status were found to significantly influence desire and intention to have children among HIV-infected and uninfected women. Older women were more likely to desire or intend to have more children P<0.001), marital status was the only factor that influenced desire and intention to utilize contraceptives among HIV-infected women. Myths and misconception and poor provider -client interactions on family planning methods were some of the demand and supply system gaps that hinder utilization of family planning methods Innovative approaches are required to promote use of contraceptives among HIV infected women to reduce maternal morbidity, mortality and vertical transmission of HIV.

Key Words: Fertility desires, fertility intentions, factors influencing contraceptive use, HIV-infected, HIV-uninfected.

Introduction

Global efforts to strengthen HIV prevention and treatment programs are reducing the transmission of HIV; however the pace of decline in new infection is far too slow to reach the Fast-Track target by 2020 calling for a concerted effort among all players [1]. Most people living with HIV/AIDS in sub-Saharan Africa are in their prime child bearing and rearing years, many are already parents and live in a context where a high premium is placed on parenthood [2].

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In Kenya HIV prevalencewas estimated at 5.9 percent in 2015 with more women (6.5 percent) compared to men (4.7 percent) living with HIV -. Women are more vulnerable to HIV infection compared to men as AIDS-related illnesses remain the leading cause of death for women of reproductive age [1]. The epidemic is geographically diverse, ranging from a high prevalence of 26 percent in Homabay County in Nyanza region in Western Kenya to a low of approximately 0.4% in Wajir in the North Eastern region. The high burden of HIV and AIDS in Kenya account for an estimated 29 percent of annual adult deaths, 20 percent of maternal mortality and 15 percent of deaths in children under age five [5]. HIV prevalence among women is 16% and 6.2% in Nyanza and Central regions respectively [6].

Nyanza and Central are contrast regions: Nyanza has the highest HIV burden in the country, high fertility rate, high unmet need of family planning while Central has slightly lower HIV burden than the national average, while fertility rate is the second lowest after Nairobi at 2.8. In Nyanza the fertility rate is 4.3 with mean number of children ever born to women aged 40-49 years at 5.8, while mean number of children ever born to women aged 40-49 in Central is 3.7 [6].Total unmet need of family planning is eight point eight percent in Central while Nyanza is at 23.4 percent [6]. The desires and intentions of HIV-infected women to have children is a topic of interest because HIV infection and fertility pose serious challenges in the prevention of mother-to-child transmission and among heterosexual couples. Although Kenya's MTCT rate has dropped from 15.7 percent in 2013 to eight point three percent, it is higher than the global target of <5% [7]. Mother-to-child transmission accounts for almost all new infections in children [5]. Without uptake of effective interventions, HIV-infected mothers will continue to infect their children [8, 9, 10].A study from Kenya indicates that a higher proportion of HIV infected women are more likely to be associated with unintended (both mistimed and unwanted) pregnancies and a desire not to have more children [11].

Several studies from Nigeria, Kenya, Sub-Saharan Africa and United States have shown that HIV-infected female and male desired to have more children, driven by individual and couple preference as well as societal, religious, cultural expectations such as a desire for sons to carry family name and parenthood as a central life goal [12, 13, 14, 15]. Similarly, women on ART in Kenya with HIV status notwithstanding, demonstrated determination to become mothers [16].Studies from Ghana, Ethiopia and US have indicated that reducing unmet need for family planning is a key strategy for minimizing HIV infection rates especially via mother-to-child transmission (17, 18, 19). Although Kenya's currently married women have 18 percent of unmet need of family planningwith nine percent in need of spacing and eight percent in need of limiting, there may be a greater unmet need of family planning services among HIV-infected women [6, 20]. Studies in Nigeria, Ethiopia, Uganda and Kenya have shown higher proportion of HIV-positive women being more likely to be associated with unintended (both mistimed and unwanted) pregnancies and a desire not to have more children while modern contraceptive utilization is suboptimal [11,18, 19, 20, 21, 22, 23].

This study focuses on two objectives: a) determinants of fertility desires and intentions among HIV-infected and uninfected and b) contraceptive use among HIV-infected women in Nyanza and Central regions of Kenya. A study in Kenya found that family planning use was high among HIV positive women attending care but so were unplanned pregnancies which were at 40%,majority 56% who reported becoming pregnant "while on Family planning" were using condoms or short term methods [20]. Understanding determinants of fertility desire and intention among HIV positive women can improve education interventions to reduce unmet need for family planning.

The choice of contraception in people living with HIV is constrained by the need to prevent both sexual transmission of HIV and unwanted pregnancies [26]. Many women are at risk for unintended pregnancy and HIV infection at the same time [27]. Dual function contraceptives that simultaneously prevent HIV transmission as well as unwanted pregnancies might be the most appropriate contraceptive method for women living with HIV and AIDS [28]. Family planning is cost-effective for preventing HIV transmission, unwanted pregnancies and maternal mortality and result in fewer orphans [29].Family planning has greater impact on improving the overall health of a woman as well as that of her children by delaying pregnancies, reducing the total number of children born to a woman, and preventing unintended pregnancies. Nearly one-third of maternal deaths could be prevented by meeting unmet need for family planning [30, 31]. Preventing unwanted pregnancy among HIV-positive women must be seriously considered if universal Prevention of Mother to Child Transmission (PMTCT) of HIV is to be achieved.

Numerous behavioural and contextual factors interact in a complex way to determine intended and unintended reproductive outcomes among women living with HIV. Limited information exists on desire and intention to have children and contraceptive use among HIV infected women of reproductive age in Kenya. Fertility desires, intentions and contraception needs of this sub group of women have implications for preventing vertical and heterosexual transmission. The current study will contribute to this body of knowledge.

Materials and Methods

Theoretical Framework

The study used the theory of planned behaviour (TPB) as an analytical framework. This theory proposes that intentions are predictors of human behavior [32]. Further, that these intentions are affected by three

blocks of determinants: Firstly,attitudes which are affected by behavioral beliefs and the evaluation of behavioral outcomes. Secondly by the normative components; the beliefs about what others value, expect or accept as affected by gender, cultural norms, education, religious beliefs or socio-economic factors and lastly the degree to control the behavior or the perception of it [33]. The three factors affecting intention are each caused by a set of beliefs, which are determined by factors in the individual's background [33]. Intention connotes commitment to a course which usually leads to instrumental behaviors such as contraceptive use. Desires are, however, wishes, which may be based more on emotions than on reality. A study examining the predictive value of fertility preferences among Ghanaian women indicated that intention to have additional children have shown moderate to strong predictive power [34].

Ethics

Ethical clearance and approval for this study was obtained from the Scientific Steering Committee and the Ethical Review Committee of Kenya Medical Research Institute (KEMRI).

Study Population and Inclusion Criteria

The study was carried out in Nyanza and Central regions of Kenya, six hospitals where the Kenya Mentor Mother Program (KMMP), a peer education and psychosocial support program for PMTCT was being implemented participated in the study. 10 hospitals (nine public and one faithbased) in Nyanza and five hospitals (three public and two faithbased) in Central regions were implementing KMMP at the time of the study. KMMP implementation was initially started at high volume hospitals, this means these hospitals were high volume.The hospitals, Jaramogi Oginga Odinga Teaching and Referral Hospital and Ahero sub-district hospital were randomly selected while Kendu Adventist hospital was purposively selected being the only faithbased hospital among the 10 hospitals implementing KMMP at the time in Nyanza region. In Central Nyeri General Hospital, Kiambu District Hospital and Nazareth Mission Hospital were randomly selected to participate in the study. The participants were HIV-infected and uninfected women 15-49 years of age with a known HIV test result. A total of eight health workers from four hospitals, two from each region also participated in the study as Key Informant Interviewees.

Informed Consent

The study objectives were explained to the eligible respondents, the right to withdraw at any point of the interview was explained and a written consent was signed. The interviews were carried out with strict confidentiality.

The Study Design

A cross-sectional mixed method study was conducted in October 2011. Quantitative data was collected from HIV-infected and HIV-uninfected women of reproductive age using questionnaires translated into local languages. Qualitative data was collected by focus group discussions (FGDs) with HIV-infected and uninfected women of reproductive age and key informant interviews (KIIs) with health workers (clinic nurses/clinical officers) stationed at the comprehensive Care (HIV) clinics and PMTCT clinics at 4 hospitals. Two FGDs were conducted at 2 hospitals in each region, with HIV-infected women (37) and HIV uninfected women (42).

Sampling Techniques

The sample size for the quantitative part of the study was calculated by estimating the difference within 95% confidence interval within 5% of difference. With an estimated 39% of married women using modern contraception in Kenya in 2011 [35], the formula [36] to arrive at the minimal sample size was:

$n=z^2pq/\ \alpha^{\ 2}$ (where z = 1.96, p = proportion of users, q = 1 - p, α = allowable error (5%)

$n=(1.96)^2 * (0.39) * (0.61)/(0.05)^2$

n=365 women - applied to for both HIV-infected and HIV uninfected.

10% of the total sample n=365 was added to both samples (HIV-infected and HIV uninfected) to allow for attrition or refusal during the interview.

Sampling Techniques

Systematic random sampling was used to select HIV-infected women of reproductive age attending comprehensive care clinic. The number of HIV infected women of reproductive age attending comprehensive care clinic in a given month was used to estimate the population universe from which the desired sample was drawn. The month of October 2011 was randomly selected to form sampling frame (total number of active clients at comprehensive care clinic in the month of October 2011 from the six hospitals). From a sampling frame of 6741, (total HIV-infected

women of reproductive age attending comprehensive care clinic at the six hospitals) the sampling interval was determined by dividing the sampling frame by the sample number (6741/402) leading to a sampling interval of 17. From the second HIV-infected client attending clinic and every 17th client were recruited for the study on a daily basis until the desired sample was reached. All participants who took part in the interview on the same day of recruitment were given transport reimbursement of Ksh. 100 (equivalent to USD 1.12 in 2011). HIV-infected clients who agreed to participate in the study but could not be interviewed the same day due to commitment were given appointment to come for the interview on a different date and a transport reimbursement of Ksh. 200 (USD 2.24) was given. Since there was no register for HIV-uninfected women bringing their children at the child welfare clinic, the second and every 17th HIV-uninfected client who came to the clinic was approached to participate in the study. An option of making appointment date or taking the interview the same day was offered. Similarly, a transport reimbursement of Ksh.100 and 200 was given to clients interviewed the same day and those who had appointments respectively. HIV-infected women and HIV uninfected women who had not participated in quantitative study arm were requested to participate in focused group discussion. Health workers for the key informant interviews were purposively selected from the PMTCT clinics and comprehensive care clinics (HIV clinics). Forty five minutes' FGDs were conducted jointly by an experienced nurse trained in qualitative methods and research ethics and the principle investigator in Nyanza region. In Central, FGDs were conducted by two experienced nurses trained in qualitative methods and research ethics. The FGDs were audio-taped, transcribed into local languages and then translated into English. Key informant interviews were conducted for 30 minutes in English. Written informed consent was obtained from each participant prior to individual interview and FGDs.

Statistical Analysis

Stata version 13 [37] was used to analyze quantitative data. Chi square and Fishers exact tests were conducted. Statistical tests were evaluated to test significance of associations between dependent and each independent variable at 95% level of confidence ($P<0.05$). The univariable (unadjusted) and multivariable (adjusted) Odds Ratios, 95% confidence intervals and respective *p* values were reported. Qualitative data was thematically analyzed. Transcriptions and field notes were analyzed through open coding and grouping codes to categories. From the categories, themes that express content of each group were identified. Finally sifting data, sorting quotes and making comparisons within and between themes were done before data was interpreted.

3. **Results**

The total sample size was 810, out of which 802 (99 per cent) had indicated their HIV status. 437 (54.5 per cent) were HIV- infected while 365 (45.5 per cent) were HIV- uninfected. The minimum required sample size was 365, which was sufficiently met. Statistical power is based on the minimum required sample and it does not affect the analysis by having more observations in one group. The assumption of difference in variance between larger and smaller group does not arise because they are independent samples, each with its own group variability.

Seventy seven point one percent of the respondents were aged below 35 years old. Christian religious affiliation was almost homogenous as shown in Table 1.

Table 1: Socio demographic characteristics of study women by HIV status

Background characteristic	Category	HIV-infected %	N	HIV-uninfected%	n	p values
Age of respondents(years)	15-19	3.6	434	11.1	362	<0.001
	20-24	13.6		30.1		
	25-29	29.5		29.6		
	30-34	24.7		13.8		
	35-39	18		7.5		
	40-44	7.8		4.7		
	45-49	3		3.3		
Region of residence	Central	47.8	437	48.2	365	0.912
	Nyanza	52.2		51.8		
Place of residence	Urban	43.6	420	41.3	361	0.517
	Rural	56.4		58.7		
Ethnic group	Kikuyu	39.7	436	36.3	361	0.082
	Luhya	5.1		9.4		
	Luo	48.2		44		
	Others	7.0		10.2		
Religion	Christian	97.3	433	97.5	361	0.804
	Others	3.7		2.5		
Highest level of education	No formal education	1.9	433	0.9	352	<0.001
	Primary	52.4		35.8		
	Secondary	34.4		43.2		
	Post-secondary	11.3		20.2		
Employment status	Formally employed	15.4	415	20.6	330	<0.001
	Self employed	59.5		44.6		
	Housewife	25.1		34.9		
Marital status	Married	68	437	74.1	363	0.057
	Not married	32		25.9		

P <0.05 is statistically significant at 95% level of confidence

Factors associated with fertility desires among women in the study

At both bivariate and multivariate analysis, a woman's desire to have more children was dependent on several factors including; a woman's age, region of residence, place of residence, level of education, employment status and marital status.

Older women were significantly more likely to desire more children than younger women. Women aged between 25-29 years were 4.9 times more likely to desire to have more children than those aged between 15-19 years. Women between 35 – 39 years were 19.88 times more likely to desire more children (P < 0.001) than the younger women while those aged between40-44 years were 32.15times more likely to desire more children (P<0.001).

A woman living in Nyanza region was 10.1 times more likely to desire to have more children than a woman who lived in Central region. Women who lived in urban areas of Kenya were more likely to desire to have fewer children than their counterparts in rural areas, odds ratio 0.41, p = 0.012. Conversely, the higher the level of education of a woman, the lower the chances of desiring to have more children;a woman with secondary education was 0.13 times less likely to desire more children than her counterpart who had no

formal education (p=0.021). A self-employed woman was 3.7 times more likely to desire to have more children than one who was in formal employment (p= 0.010).Further assessment with the likelihood ratio (LR) test (P<0.05) also indicated that; age, residence, place of residence, education and employment have a significant difference in assessing the desire for children(Table 2).

Qualitative datagives an understanding that women living with HIV must have children in order to gain social respect in the societyregardless of HIV status. Women and families living with HIV will go out of their way to get child/children. In response to a discussion question, why do women desire to have children?

"Mothers without children are not respected. Sometimes you may feel left out, you pretend to be happy but within, you feel there is something missing, continuation of generation" (HIV infected FGD participant, Nazareth Hospital)

"*Children are a gift from God right from Abraham's time. Children are a blessing, they bind parents/foster unity in marriage. Help foster respect to parents" (HIV uninfected FGD participant Kendu Adventist hospital)*

In response to a discussion question on health care providers' opinions on how fertility desires and intentions among women of reproductive age are influenced:

"We (health workers) influence fertility intentions- we encourage the mothers to come up with partners, we give them FP. We also give them education especially after delivery"(KII, HIV clinic Nurse Nyeri).

Table 2: Factors associated with fertility desire among women in the study

Background Characteristics	crude OR(95%CI)	crude P	adj. OR(95%CI)	P(Wald's test)	P(LR-test)
Age Category: ref.=15-19 years					**< 0.001**
20-24	1.54 (0.32,7.41)	0.587	1.65 (0.32,8.58)	0.55	
25-29	3.81 (0.88,16.56)	0.074	4.9 (1.02,23.55)	0.047	
30-34	4.35 (0.98,19.31)	0.053	5.92 (1.15,30.38)	0.033	
35-39	6.84 (1.54,30.44)	0.012	19.88 (3.69,106.95)	< 0.001	
40-44	8.62 (1.81,41.18)	0.007	32.15 (5.41,191.03)	< 0.001	
45-49	4.6 (0.7,30.19)	0.112	12.4 (1.34,114.59)	0.026	
Residence: Nyanza vs Central (ref.)	5.14 (2.94,9)	< 0.001	10.12 (4.99,20.54)	< 0.001	< 0.001
Place: Urban vs Rural(ref.)	0.41 (0.25,0.66)	< 0.001	0.48 (0.27,0.85)	0.012	0.01
Level of Education: ref.=No Education					< 0.001
Primary	0.72 (0.18,2.85)	0.638	0.53 (0.1,2.81)	0.453	
Secondary	0.15 (0.04,0.64)	0.01	0.13 (0.02,0.73)	0.021	
Post-Secondary	0.15 (0.03,0.71)	0.017	0.24 (0.04,1.61)	0.143	
Employment Status: ref.=Formally employed					0.011
Self employed	4.32 (1.82,10.24)	< 0.001	3.87 (1.38,10.89)	0.01	
House wife	3.07 (1.23,7.66)	0.016	2.31 (0.76,6.98)	0.138	
Marital Status: ref.=Married					0.362
Single	0.31 (0.14,0.7)	0.004	0.47 (0.2,1.11)	0.086	
Divorced	1.9 (0.2,18.56)	0.579	1.2 (0.03,47.23)	0.922	
Separated	1.22 (0.34,4.37)	0.755	1.09 (0.24,5.04)	0.911	
Widowed	3.2 (1.59,6.44)	0.001	1.43 (0.6,3.41)	0.424	
HIV Status: Negative vs Positive (ref.)	0.62 (0.4,0.97)	0.038	1.36 (0.78,2.4)	0.279	0.279

P <0.05 - Statistically significant at 95% level of confidence

Factors associated with fertility intentions among women in the study

Bivariate and multivariate analysis indicate that a woman who live din rural area was 0.32 times more likely to have higher fertility intentions than a woman who lived in urban centre (p = 0.001). Fertility intentions were also lower among women living in Central region such that a woman in Nyanza was 3.3 times more likely to intend to have more children than her counterpart in Central region (P = 0.001).

A self-employed woman was 3.03 times more likely to intend to bear more children than a woman in formal employment (P=0.072). An unemployed woman was 3.52 times more likely to have higher fertility intentions than the one in formal employment (P= 0.056)

Further assessment with likelihood ratio (LR) test indicated that, woman's age, residence, place of residence, education, and marital status had significant effect in assessing the women's fertility intentions (P<0.05). (Table 3)

In response to a discussion question –How does HIV infection status affect desire and intention of women to have children? The following were the responses from FGDs

"*If you get a partner who loves you, you can decide to have a baby. If you test positive you are seen as a prostitute because of mode of transmission" (FGD HIV uninfected participants, Nazareth Hospital)*

"*If you are positive and you can't breast feed, the people around you will think that you are positive-so you will not want to have a child. If a mother is HIV infected she can't give birth, she will be afraid as she will be laughed at. Women will have low self-esteem and do not want to accept status. If you get a baby and the baby is negative you can die anytime and leave the baby with problems*"*(HIV uninfected FGD participants Nyeri Hospital).*

Table 3:Factors associated withfertility intentions among women in the study

Background Characteristics	crude OR(95%CI)	crude P value	adj. OR(95%CI)	P(Wald's test)	P(LR-test)
Age Category: ref.=20-24 years					**< 0.001**
15-19 [no data]	-	-	-	-	
25-29	3.78 (1.26,11.3)	0.017	4.43 (1.41,13.86)	0.011	
30-34	3.19 (0.99,10.26)	0.052	4.13 (1.18,14.49)	0.027	
35-39	9.27 (3.06,28.11)	< 0.001	18.65 (5.22,66.61)	< 0.001	
40-44	18.62 (5.75,60.3)	< 0.001	63.56 (15.78,256.06)	< 0.001	
45-49	4.34 (0.74,25.62)	0.105	8.65 (1.18,63.66)	0.034	
Residence: Nyanza vs Central(ref.)	2.02 (1.19,3.42)	0.009	3.3 (1.6,6.78)	0.001	< 0.001
Place: Urban vs Rural(ref.)	0.29 (0.16,0.52)	< 0.001	0.32 (0.16,0.63)	0.001	< 0.001
Level of Education: ref.=No Education					< 0.001
Primary	1.82 (0.22,14.82)	0.577	2.6 (0.24,28.65)	0.434	
Secondary	0.42 (0.05,3.61)	0.429	0.66 (0.06,7.6)	0.736	
Post-Secondary	0.08 (0,1.39)	0.083	0.22 (0.01,5)	0.343	
Employment: ref.=Formally employed					0.108
Self employed	4.55 (1.6,12.9)	0.004	3.03 (0.91,10.11)	0.072	
House wife	3.54 (1.19,10.57)	0.024	3.52 (0.97,12.78)	0.056	
Marital Status: ref.=Married					0.038

Single	0.31 (0.12,0.79)	0.014	0.41 (0.14,1.16)	0.093	
Divorced	2.63 (0.27,25.73)	0.406	1.62 (0.01,420.83)	0.866	
Widowed	3.21 (1.51,6.84)	0.002	1.55 (0.62,3.88)	0.344	
HIVStatus: Negative vs Positive (ref.)	0.59 (0.35,0.99)	0.044	1.39 (0.73,2.65)	0.312	0.313

P <0.05 - Statistically significant at 95% level of confidence

Contraceptive use among HIV-infected women by demographic characteristics

Thirty one point five percent of all HIV-infected women aged 15-49 years were not using any contraceptive. 61.5 percent of HIV–infected women aged 15-19 and those aged 45-49 were not using any family planning method. (Table 4)

Table 0. Contraceptive use among HIV-infected women by background characteristics

Background characteristics		Use FP	Don't use FP	No. of women	P value
Age in years	15-19	38.5	61.5	13	0.001
	20-24	75.0	25.0	52	
	25-29	71.2	28.8	118	
	30-34	74.0	26.0	100	
	35-39	60.3	39.7	73	
	40-44	74.2	25.8	31	
	45-49	38.5	61.5	13	
	Total	**68.5**	**31.5**	**400**	
Region of residence	Central	63.7	36.3	164	0.918
	Nyanza	64.1	35.9	206	
	Total	**68.7**	**31.3**	**403**	
Place of residence	Urban	64.5	35.5	169	0.309
	Rural	72.0	28.0	218	
	Total	68.7	31.3	387	
Ethnic group	Kikuyu	65.8	34.2	158	0.691
	Luhya	62.5	37.5	16	
	Luo	70.0	30.0	200	
	Kamba	77.8	22.2	9	
	Meru	80.0	20.0	10	
	Kisii	75.0	25.0	4	
	Others	80.0	20.0	5	
	Total	**68.7**	**31.3**	**402**	
Religion	Catholic	69.4	30.6	147	0.378
	Protestant	67.4	32.6	236	
	Muslim	77.8	22.2	9	
	Traditional Religion	85.7	14.3	7	
	Total	**68.7**	**31.3**	**399**	
Highest level of education	No formal education	57.1	42.9	7	0.785
	Primary	68.2	31.8	211	
	Secondary	68.8	31.2	138	
	Post-secondary	72.1	27.9	43	
	Total	**68.7**	**31.3**	**399**	
Employment status	Formally employed	64.4	35.6	59	0.016
	Self employed	73.2	26.8	231	
	Housewife	64.9	35.1	94	

	Total	**69.8**	**30.2**	**384**	
Marital status	Married	76.8	23.2	276	<0.001
	Not married	51.2	48.8	127	
	Total	**68.7**	**31.3**	**403**	

P <0.05 - Statistically significant at 95% level of confidence

Factors associated with desire to use contraceptives among HIV Infected women

According to the results from likelihood ratio test (Table 5), marital status was the one factor that influenced desire to utilize contraception. Married HIV- infected women were more likely to desire to use contraceptives than single, divorced and widowed HIV-infected women(p<0.001).

Table 5: Factors associated with desire to use contraceptive among HIV infected women

Background Characteristics	**crude OR(95%CI)**	**crude P value**	**adj. OR(95%CI)**	**P(Wald's test)**	**P(LR-test)**
Age Category: ref.=15-19 years					0.221
20-24	4.46 (1.25,15.92)	0.021	2.96 (0.77,11.31)	0.113	
25-29	4.05 (1.23,13.31)	0.021	2.5 (0.69,9.04)	0.163	
30-34	4.61 (1.38,15.4)	0.013	2.94 (0.78,11.14)	0.113	
35-39	2.61 (0.77,8.79)	0.122	1.69 (0.43,6.68)	0.452	
40-44	4.8 (1.21,18.97)	0.025	3.56 (0.77,16.52)	0.104	
45-49	1.14 (0.23,5.67)	0.87	0.96 (0.16,5.8)	0.967	
Marital Status: ref.=Married					< 0.001
Single	0.33 (0.19,0.56)	< 0.001	0.35 (0.2,0.62)	< 0.001	
Divorced	0.3 (0.02,4.86)	0.396	0.3 (0.02,5.54)	0.416	
Separated	0.52 (0.15,1.85)	0.315	0.46 (0.13,1.67)	0.238	
Widowed	0.27 (0.13,0.55)	< 0.001	0.31 (0.14,0.68)	0.003	
Residence: Nyanza vs Central(ref.)	0.99 (0.65,1.53)	0.985	0.98 (0.57,1.69)	0.944	0.944
Employment Status: ref.=Formally employed					0.386
Self employed	1.48 (0.81,2.68)	0.201	1.35 (0.72,2.55)	0.35	
House wife	1.01 (0.52,1.98)	0.972	0.95 (0.43,2.07)	0.891	

P <0.05 - Statistically significant at 95% level of confidence

Factors associated with intention to use contraceptives among HIV -infected women

Results of multivariate regression analysis (table 6), show that age, region of residence, employment status and marital status of HIV-infected participants were some ofthe factors that influenced intention to utilize contraception. Older women are less likely to intend to use contraceptives compared to younger women. However an assessment of the likelihood ratio (LR) test showed that all age groups in the study were more likely to have intention to use contraceptives than 15-19 years old women in the study (p<0.001).

Similarly HIV infected women who were, single, separated, divorced were generally less likely to have the intention to use contraceptive methods compared to married women. House wives are 3.6 times likely to intend to use contraception.

Table 6. Factors associated with intention to use contraceptive among HIV infected women

Background Characteristics	**crude OR(95%CI)**	**crude P value**	**adj. OR(95%CI)**	P(Wald's test)	P(LR-test)
Age Category: ref.=15-19 years					< 0.001
20-24	2 (0.11,37.83)	0.644	3.29 (0.14,75.99)	0.457	

25-29	0.42 (0.04,4.03)	0.45	0.53 (0.04,7.59)	0.644	
30-34	0.18 (0.02,1.8)	0.145	0.23 (0.02,3.25)	0.276	
35-39	0.09 (0.01,0.94)	0.045	0.11 (0.01,1.89)	0.128	
40-44[no data]	-	-	-	-	
45-49	0.03 (0,0.55)	0.019	0.03 (0,1.02)	0.051	
Marital Status: ref.=Married					0.44
Single	0.62 (0.24,1.57)	0.309	0.35 (0.1,1.28)	0.112	
Separated	0.17 (0.02,1.72)	0.133	0.57 (0.03,12.08)	0.717	
Widowed	0.21 (0.06,0.69)	0.01	0.95 (0.19,4.7)	0.951	
Residence : Nyanza vs Central	3.42 (1.48,7.87)	0.004	1.00 (0.27,3.74)	0.996	0.996
Employment Status: ref.=Formally employed					0.197
Self employed	1.19 (0.41,3.41)	0.752	1.00 (0.23,4.42)	0.998	
House wife	6.32 (1.68,23.88)	0.007	3.64 (0.48,27.39)	0.21	

P <0.05 - Statistically significant at 95% level of confidence

Qualitative data identified myths, misconception and lack of knowledge on family planning methods as some of the reasons why women are not using contraceptive methods as indicated in the quotes below;

My husband complained that contraceptives reduce urge for sex (HIV-Uninfected FGD participant)

Men say Family planning gives women so much liberty and freedom to move around with other men knowing that they won't get pregnant easily (HIV-infected FGD participant)

I developed fear due to what I heard from my friend; they say family planning brings diseases. People also fear contraceptives may cause permanent barrenness (HIV-infected FGD participant).

Some are scared to use implant due to expenses involved during fixing and removal, also lack of support, fear of cancer of the womb, discouragement by others (HIV-uninfected FGD participant)

Heath workers rarely give information out of what took you to the hospital (HIV-uninfected FGD participants

Discussion

This study provides mixed method evidence on fertility desires and intentions, and contraceptive use among HIV-infected and uninfected women. Most women were aged 35 years and below, a prime child bearing and rearing years, many were already parents living in the context where a high premium is placed on parenthood (38). Results show that HIV is not a major factor in determining fertility desire or intention among women of reproductive age. This has implication for service delivery as health care providers may assume that HIV- infected women understand their vulnerability as a result of the HIV infection and may not desire or intend to have children and this perception may limit the extensive exploration on fertility intention during client education and counseling by health care providers.A study from sub Saharan Africa indicates that fertility increases after approximately the first year on ART [39].Some studies have also shown that the use of ART was a significant predictor in fertility intentions.Fertility intention has been shown to provide a fairly accurate forecast of fertility behaviour in Malaysia [40, 41]. Fertility intentions are considered an important determinant of behaviour and according to Theory of Planned Behaviour (TPB); intention is a strong predictor of behaviour[42]. Though fertility intention may be influenced by factors including, individual attitudes,social pressure, lack of control of the action in question and perceived power [43], in this study fertility desires and intentionsof HIV-infected and uninfected women in the study were influenced by age, region of residence (Nyanza versus Central), place of residence (urban versus rural) and level of education of the women, while stigma and discrimination were part of other factors that influenced desire and intention.

Older HIV-infected and uninfected women 35-39 years were 18.6 times more likely to desire more

children while women aged 40-44 were 32.1 times more likely to desire more children than younger women. This is unexpected finding as women at 40 years and above are considered older enough to have completed child bearing, however it may be due to the need to replace if they have had HIV–infected children or lost children due to HIV. The introduction of more efficacious ART to prevent mother-to-child transmission of HIV has improved maternal and neonatal health outcomes which may appeal to an HIV-infected mother who would want to have (a)another child but in this study,paticipants were both HIV-infected and uninfected women. Further research is needed to explore what may be the reasons for this.Furthermore this study found that the same older women were less likely to intend to use contraceptives compared to younger women, this supports findings by Kloba, that women using contraceptive means are 2.5 times less likely to express an intention of childbearing [44]. It is usually presumed that the older a woman is, the less likely her desire or intention to have more children however fertility is a more complicated issue than may appear at a glance, and is indicated by the fact that, even in developed countries, a large number of pregnancies are unintended and result in abortions or unwanted deliveries [45].

Fertility desire and intention was higher in Nyanza than in Central region. The predominant ethnic groups for this study were Luo from Nyanza and Kikuyu from Central. The former was found to have higher fertility desires and intentions this is consistent with a study in Kenya by Iyer & Weeks found that ethnic controls were significant among Kalenjins, Luhya, Mijikenda-Swahili and Luo [46]. Similarly a previous study in Kenya indicated that the Kikuyu and Kamba show least preference for large families because they had earlier access to colonial education [47]. These findings are consistent with other studies on fertility in sub-Saharan Africa and Kenya showing that cultural norms and ethnic controls may encourage or discourage high fertility while the influence of early education and colonization indicate least preference for large families [47, 48, 49]. It is possible that due to socio-cultural norms, Nyanza women are influenced to have more children however; it could also be due to various factors such as under five deaths due to malaria or HIV infection. Under five mortality rates is highest in Nyanza at 82 deaths per 1000 live births but lowest in Central at 42 deaths per 1000 live births [6].

Although it is generally known that social context of urban areas accelerates adoption of new reproductive behaviour, the study indicated that a woman (HIV infected and HIV-uninfected) living in urban area was 0.3 times more likely to intend to have more children than one in rural area contrary to findings from latest KDHS, 2014 where total fertility rate in urban is lower than rural at 3.1 and 4.5 respectively. However, another study in sub-Saharan Africa has shown that modern contraceptive use has increased more among rural than urban women in both Ghana and Kenya, although in terms of demographic factors, poor, uneducated and rural Kenyan women have high TFRs, low contraceptive use and high unmet need for contraceptives, in comparison with other groups in both countries [6, 47, 50]. While a study on urban and rural fertility transitions in developing world indicated that national definitions of rural and urban may change over time, as the boundaries tend to move out into formerly rural areas as urban populations sprawl but also since urban/rural status of the previous residence is self-reported, and thus subject to even larger biases [51], it is not clear if this unexpected finding could have been as a result of any of the factors mentioned. A further study to explore this finding is necessary.

Qualitative results from this study indicated that despite HIV status, women desire and intend to have children as a matter of priority. In response to a question why women desire children?Participants concluded that "*Mothers without children are not respected. Sometimes you may feel left out. You can pretend to be happy but within you there is something missing. It is continuation of generation."(HIV-infected FGD participant).* These findings are similar to studies from Kenya, and Ethiopia which have reported that HIV does not negatively modify women's subsequent fertility intentions. On the contrary studies done in Kenya and Ethiopia indicate that use of ART significantly predict fertility intention as having children is considered a prerequisite for a happy and fulfilled life [16, 41]. However other studies from South Africa and Mozambique have shown that HIV-infected pregnant women are more likely than HIV-uninfected women to have maternal morbidity, poor pregnancy and neonatal outcomes [52, 53].It is therefore important that HIV-infected women get adequate health education and counselling support on fertility and sexual and reproductive health to empower them to make informed choices. Fertility and sexual and reproductive health counselling and education should include men and couples attending clinics should be educated together. A study from Uganda has reported that men play an important role in decision-making in the home in many African contexts, and male fertility desires and participation in child-bearing decisions can have crucial impact on the woman [23].

In relation to education this study established that, the higher the level of education attainment of a woman, the lower the chances of desiring to bear more children. This is in contrast to findings of KDHS 2014 where women in Nyanza had the highest level of secondary education but had higher fertility desires in this study. It is noteworthy that Central region because of its proximity to the capital city of Kenya and good climate for agriculture; is the key producer of coffee, one of Kenya's key exports and much of Kenya's dairy industry is also based in this province(https://en.wikipedia.org/wiki/Central_Province_(Kenya)). Centralis richer than Nyanza and more parents can afford to take their children to school. Contraceptive uptake is also higher in Central and fewer girls drop out of school due to pregnancies. In contrast, Nyanza has the highest rate of teenage pregnancies at 22.2 per cent, associated with lack of education, as well as partner violence among teenage girls may lead to lack of adherence to medication[6]. Study conducted in Swaziland found that children, adolescents and those with advanced disease were most likely tohave high viral load and least likely to achieve viral suppression [10].

HIV infected older women were less likely to intend to use contraceptives compared to younger women, similar to findings from studies conducted in Ehtiopia [54, 55].Sixty one point five per cent of women aged 15-19 and 45-49 were not using any method although, LR test indicated that all age groups in the study were more likely to have intention to use contraceptive than 15-19 years. Teenage pregnancy has potential adverse impact on the health of the mother and the child, poor social and economic outcomes in general and more consequences particularly for HIV –infected teenage girls. Further statistics on adolescent also reveal that teen pregnancy and motherhood rate stands at 18 per cent in Kenya [6]. This is likely to lead to unplanned pregnancies which may pose a high risk for vertical transmission of HIV during pregnancy, birth and breast feeding. There are several myths and misconception at individual and community level that affect the utilization of contraceptives. In this study qualitative findings from FGD indicated that, partners/husbands complain about reduced sexual urge, fear that contraceptives bring diseases such as cancers of the womb and may cause barrenness were some of the main myths and misconception as in the following quotes; "*My husband complained that contraceptive reduce sex urge" (HIV negative FGD participant), I developed fear due to what I heard from my friend, they say FP brings diseases, people also fear contraceptives may cause permanent barrenness (HIV-infected FGD participant).*A Similar multi country study conducted in Kenya, Nigeria and Senegal found that the most prevalent myth at individual and community level were that people who use contraceptives end up with health problems [56].At the sametime poor Provider-Client interraction on available methods was reported as system related gap [57], qualitative findings from the study indicated that health workers do not give information out of what took client to the hospital as in this quote; *Health workers rarely give information out of what took you to hospital (HIV-uninfected FGD participant).*Myths and misconception may be hindering the use of contraceptives. Health care providers need to improve on family planning counselling and education by addressing the myths and misconception.

Single, seperated and divorced HIV-infected women were less likely to desire or intend to use contraceptives,this behaviourmay have been influenced by myths and misconception as women may not see the need of exposing themselves to contraceptives if they do not have regular sex.This is similar to studies conducted in developing counties which indicate that among sexually active never-married women wanting to avoid pregnancy, the most common reason cited for not using contraception is infrequent sex (49%), followed by not being married (29%) and concerns about contraceptive side effects (19%) [58].However this indicate lack of knowledge about the various contraceptive methods avalable. Since sex is infrequent among this group there is a high chance of getting unplanned pregnancy. There is a higher unmet need of family planning among sexually active unmarried women 26.4 per cent compared to 18 per cent among currently married women [6]. Every effort should be directed towards giving facts about contraceptives to improve knowledge among currently married and unmarried women about different methods available for use. Where there is shortage of health care providers, there is need to engage trained lay health workers like Mentor Mothers/Peer Educators (HIV positive women) who are themselves using contraceptives to educate women and act as role models of various family planning methods.

Conclusion

Similar factors influence fertility desire and intentions of HIV-infected and uninfected women of reproductive age. In order to ensure quality services for women of reproductive age, programs should focus on better linkage and integration of family planning, reproductive health and HIV services to enable women

realize their fertility desire and intention without risk of vertical or horizontal transmission of HIV. Information, education and counseling to help women learn more about contraceptive methods available to them and how to address side effects must be part of the service integration. Where there is health provider shortage use of trained Mentor Mothers/peer educators should be considered. It is important to be aware that even mature women of 40 years and above may still have desire and intention to have children and health care providers should ensure that all women attending routine HIV clinic regardless of their education and age should have an opportunity to information on fertility and SRH through education tailored to their needs and unique circumstances.Safer conception approaches to ensure viral suppression of HIV infected partners through antiretroviral therapy (ART) and use of behavioral measures to reduce unprotected vaginal sex.

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