

Research

*Corresponding author

Monica A. Magadi, PhD

Professor

School of Social Sciences

University of Hull

Hull, HU6 7RX, UK

Tel. +44(0)1482 462032

E-mail: m.magadi@hull.ac.uk

Volume 3 : Issue 1

Article Ref. #: 1000HARTO32119

Article History

Received: March 25th, 2016

Accepted: April 14th, 2016

Published: April 18th, 2016

Citation

Magadi MA. HIV/AIDS and contraceptive method choice: Demographic and socio-economic correlates of contraceptive method choice among HIV-positive women practising family planning in Kenya. *HIV/AIDS Res Treat Open J.* 2016; 3(1): 1-12. doi: [10.17140/HARTOJ-3-119](https://doi.org/10.17140/HARTOJ-3-119)

Copyright

©2016 Magadi MA. This is an open access article distributed under the Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

HIV/AIDS and Contraceptive Method Choice: Demographic and Socio-Economic Correlates of Contraceptive Method Choice Among HIV-Positive Women Practising Family Planning in Kenya

Monica A. Magadi, PhD*

School of Social Sciences, University of Hull, Hull, HU6 7RX, UK

ABSTRACT

Introduction: As the generalized HIV epidemic in specific settings of sub-Saharan Africa continues to evolve, there is need for evidence-based response to address emerging challenges, which include enabling the large number of women living with HIV make informed choices to achieve their reproductive goals.

Objectives: This paper seeks to (i) examine the effect of HIV/AIDS on contraceptive method choice among women using contraceptives in Kenya; and (ii) identify correlates of contraceptive method choice among HIV-positive women practising family planning.

Material and Methods: We apply multinomial Logistic regression models to a sample of 3190 sexually-active women of reproductive age using contraceptives from the 2003 and 2008 Kenya Demographic and Health Surveys to examine the effect of HIV/AIDS on contraceptive method choice. The analysis of correlates of method choice among HIV-positive women is based on a sample of 255 HIV-positive women using contraceptives and involves bivariate cross-tabulations with Chi-Square tests.

Result: Overall association between HIV status and contraceptive method choice is consistent with expected patterns, with women who are HIV-positive being more than twice as likely to use condoms rather than hormonal contraceptives, compared to their counterparts of similar characteristics who are HIV-negative ($p < 0.05$). Among women infected with HIV, those who were previously tested for HIV were more likely to use condoms and less likely to use hormonal methods ($p < 0.05$) than those who had never been tested. The higher use of condoms by HIV-positive women is only evident among those who had previously been tested for HIV. Significant correlates of contraceptive method choice among HIV-positive women include parity, marital status, age group, education and ethnicity. Overall trends suggest a notable shift from use of hormonal methods to condoms by HIV-positive women, but predominant use of hormonal methods (60%) and low use of condoms (23%) by HIV-positive young women aged 15-24 practising family planning is of potential concern.

Conclusion: The findings have important implications for family planning policies/programs targeting young women living with HIV and underscore the need to intensify efforts towards improved HIV testing coverage to enable HIV-positive women make informed reproductive choices.

KEYWORDS: HIV-positive women; Contraceptive method choice; Demographic and socio-economic correlates; Multinomial regression analysis; Demographic and health survey; Kenya.

INTRODUCTION

Kenya has a generalized HIV epidemic, driven primarily by hetero sexual transmission. According to recent estimates, national HIV prevalence among adults aged 15-64 years was 5.6% in 2012, translating to an estimated 1.2 million adults living with HIV.¹ Women are

disproportionately affected (prevalence of 6.9% for females *versus* 4.4% for males in 2012) and wide regional variations exist in the country. Despite a recent overall national decline in HIV prevalence among adults aged 15-64 in Kenya from 7.2% in 2007 to 5.6% in 2012, the prevalence in the worst affected region of Nyanza Province remained unchanged at about 15% during the same period.¹ Prevailing trends for women of reproductive age (aged 15-49 years) mirror these national patterns-the prevalence declined from around 9% in 2003 to 7% in 2012, but remained unchanged at about 18% in the highest prevalence region of Nyanza province. An earlier study revealed unique reproductive experiences of women in the highest HIV prevalence setting of Nyanza province,² suggesting an intricate link between HIV and reproductive behaviour. Notwithstanding impressive strides in HIV testing and treatment coverage in the country during recent years,³ the number of people living with HIV has remained high. It has been noted that as Kenya's HIV epidemic continues to evolve, there is need for continued evidence-based action to respond to emerging challenges,⁴ which include addressing the reproductive needs of the large number of women living with HIV.

HIV-positive women have special family planning needs. Of particular concern is the apparent greater risk of unintended pregnancy among HIV-positive than HIV-negative women^{5,6} which may be attributable to overall lower uptake of contraceptives⁷ or use of less effective methods⁵ by HIV-positive women. These patterns have implications for overall maternal and child health in settings of high HIV prevalence such as sub-Saharan Africa (SSA), including vertical transmission of HIV from mother to child. Furthermore, the apparent link of some hormonal contraceptives, especially injectables, to increased HIV transmission^{8,9} has important implications for contraceptive method choice in high HIV prevalence SSA settings with wide spread use and rising popularity of injectables.

It is important to improve understanding of the extent to which HIV-positive women are using suitable family planning (FP) methods, consistent with their reproductive goals and desires. It has been noted that the risks of unprotected sex, sexually transmitted infections, infertility and unintended pregnancy are inextricably linked,¹⁰ making the issue of using appropriate methods of protection a critical one. Condom use has been recognized as the mainstay of dual protection of HIV infection and unintended pregnancy,¹¹ but acceptability remains low in most settings of sub-Saharan Africa (SSA), especially in long-term relationships.¹² Furthermore, inconsistent condom use has been noted as a major cause of concern, leading to unplanned pregnancies among women living with HIV.⁵

Although all the available reversible methods of contraception can generally be used by women at risk of HIV infection and by HIV infected women, hormonal contraception, especially injectables, have been linked to increased risk of HIV infection and transmission.^{8,9,13} Therefore, the increasing popularity and dominance of injectable contraceptives in most SSA

countries¹⁴⁻¹⁶ have far-reaching repercussions for contraceptive method choice in settings of high HIV risk. Integrated services have been linked to increased use of condoms and reduced use of other modern contraceptives.¹⁷ A better understanding of the link between HIV/AIDS and contraceptive method choice in settings adversely affected by HIV/AIDS will help inform effective integration of HIV/AIDS and FP services.

This paper focuses on the association between HIV/AIDS factors and contraceptive method choice among women currently using contraceptives in Kenya. An earlier qualitative study in a low contraceptive prevalence setting in Kenya had noted that for some HIV-positive women, their HIV status dictated their contraceptive decisions.¹⁸ Besides HIV status, other HIV/AIDS-related factors, including: HIV risk perception, HIV/AIDS stigma, HIV/AIDS awareness and previous HIV testing are considered of interest as they may also influence individual's contraceptive choice. For instance, it is possible that in settings where most individuals do not know their HIV status, perceived HIV risk may be a more important determinant of contraceptive behaviour than actual HIV status. The specific objectives are to:

- (i) examine the effect of HIV/AIDS on contraceptive method choice among women in Kenya; and
- (ii) identify demographic and socio-economic correlates of contraceptive method choice among HIV-positive women using family planning.

MATERIAL AND METHODS

The Data

This study is based on secondary analysis of data from the Kenya Demographic and Health Surveys (KDHS) conducted in 2003 and 2008.^{16,19} These two surveys included HIV testing for nationally-representative samples, providing a unique opportunity to anonymously link HIV test results to the full survey record at individual level. From an overall sample of 16,639 women of reproductive age (aged 15-49 years) included in the two surveys (8195 in 2003 and 8444 in 2008), a total of 9132 women (i.e survey respondents residing in every other household) were eligible for HIV testing. The protocol for HIV testing in the two KDHS surveys was as follows:

'... all eligible women and men who were interviewed were asked to voluntarily provide some drops of blood for HIV testing. ...tested with a Vironostika Anti-HIV-1/2 Plus enzyme-linked immunosorbent assay (ELISA) test kit (DADE Behring HIV-1/2) for verification purposes. All positive samples and 5 percent of negative samples were then tested with a Murex HIV-1/2 Micro ELISA System. For quality assurance, all positive samples and a 10 percent random sample of the negative samples were retested at the KEMRI HIV laboratory using the same testing algorithm of both Vironostika and Murex Micro ELISA systems. Finally, 30 discrepant samples were tested by polymerase chain reaction (PCR) DNA at KEMRI laboratory'.¹⁶(pp. 9-10)

Our study sample included all women tested for HIV who were using contraceptive methods at the time of the survey (27% in 2003 and 39% in 2008), making a total of 3190 respondents (for Objective i analysis). About eight percent of this sample was HIV-positive, representing a sample of 255 HIV-positive women (for Objective ii analysis). The comparative nature of DHS data allows for pooling of data across surveys to achieve sufficient samples and monitor trends. Pooling data across the two surveys is deemed necessary due to the limited size of HIV-positive sample of women using contraceptives in each of the two surveys.

Contraceptive method choice is the outcome variable of interest while HIV/AIDS-related factors (i.e. whether previously tested for HIV, HIV/AIDS awareness, HIV/AIDS stigma, HIV risk perception and sero-status) constitute the key explanatory variables. The study takes into consideration a number of other key explanatory variables, recognizing that the association between HIV/AIDS and contraceptive method choice is likely to be influenced by a range of background demographic and socio-economic moderating factors or confounders associated with both HIV/AIDS and contraceptive method choice. A summary description of study variables is presented in Table 1.

METHODS OF ANALYSIS

The analysis involved both descriptive bivariate analysis and multivariate modelling. Chi-Square tests were used to assess significance of bivariate associations in cross-tabulations, while multivariate analysis was based on multinomial logistic regression analysis of factors associated with contraceptive method choice. The response (dependent) variable in our analysis-contraceptive method choice – was classified into four mutually exclusive categories: hormonal method (pills and injectables), condoms, periodic abstinence, and other methods (mainly sterilization and other long-term methods). Although dual use of condoms with other contraceptives was considered of particular interest, this was not used as a distinct category because of very small numbers. Dual contraceptive methods, combining condoms with other methods were classified as ‘condoms’, since use of condoms was of particular interest.

Preliminary analysis assessed potential clustering of contraceptive method choice within communities or clusters, but there was no evidence of significant intra-cluster correlations. Hence, the analysis was based on single-level rather than multi-level models. The general equation for the multinomial logistic

VARIABLE	Description
Dependent variable	
Contraceptive method choice	Current contraceptive method used, classified as: hormonal (pill/injectable); condom; abstinence; and other. 'Other' comprised mainly sterilization and long-term methods.
HIV/AIDS-related factors	
HIV status	Binary variable, coded as 1=if respondent is HIV-positive; 0=negative.
Previously tested for HIV	Binary variable, coded as 1 if responded was previously tested for HIV; 0=has never been tested
Knows someone with or died of HIV/AIDS	Binary variable, coded as 1 if respondent knows someone with or who died of HIV/AIDS; and 0=otherwise.
HIV/AIDS comprehensive knowledge	A composite awareness index derived from a series of questions on misconceptions about HIV/AIDS, knowledge of how HIV is transmitted and ways to avoid infection. The resulting score classified into quintiles (1-4), with lowest awareness coded as 1.
HIV/AIDS Stigma	A composite index derived from a set of four DHS questions on HIV/AIDS stigma. The resulting score is classified as 0 for 'low' stigma or 1 for 'high' stigma.
Perceived risk of HIV/AIDS	Classified as: 0= no/low risk; or 1= moderate/high perceived risk
Demographic and background socio-economic factors	
Respondent's age	Three age-group categories: 15-24, 25-34 and 35+.
Respondent's parity	The total number of children ever born, classified into four categories: 0, 1-2, 3-4 and 5+
Respondent's marital status	Marital or union status at time of survey, classified as: never married, currently married (monogamous/polygamous), widowed, divorced/separated
Fertility intention	Future fertility intention, coded as 1 if respondent wants no more children; 0=otherwise
Recent sexual activity	Period since last sex, classified as: within one week, 1-4 weeks, 1-6 months; and more than 6 months
Respondent's education	Highest educational attainment classified into: no formal education; primary level, and secondary and above.
Household wealth index	DHS composite wealth index ²⁰ based on household possessions and amenities, classified into quintiles: poorest, poorer, middle; richer and richest
Respondent's religion	Religious affiliation, classified into: Catholic, Protestant/other Christian, and Muslim and other
Respondent's ethnicity	Classified into four categories: Kikuyu, Luo, Luhya and other
Region of residence	Seven provinces: Central, Coast, Eastern/North Eastern, Nairobi, Nyanza, Rift Valley and Western
Urban/rural residence	Binary variable, coded as 1=urban or; 0=rural residence.

Table 1: A summary description of variables included in the study.

regression used in the analysis takes the form:

$$\text{Log} [\pi^{(s)}/\pi^{(r)}] = b^{(s)}_0 + b^{(s)}_1 X^{(s)}_1 + b^{(s)}_2 X^{(s)}_2 + \dots + b^{(s)}_k X^{(s)}_k;$$

S=2, 3, 4.

Where:

$\pi^{(s)}$ is the probability of using a particular contraceptive method (s);

$\pi^{(r)}$ is the probability of using reference-category contraceptive method - r=hormonal (1);

$b^{(s)}_0$ is the regression intercept/constant for contraceptive method (s);

$X^{(s)}_{1-k}$ are covariates for k explanatory variables for contraceptive method (s); and

$b^{(s)}_{1-k}$ are the associated usual regression parameter estimates.

The second part of the analysis focused on HIV-positive women (Objective ii) and examined factors associated with contraceptive method choice among HIV-positive women. Due to sample size limitations, this part of the analysis was confined to bivariate associations. It was necessary to merge some of the

categories of explanatory variables with relatively few HIV-positive women using contraceptives at the time of the survey to achieve sufficient samples for valid Chi-Square tests.

RESULTS

Associations between HIV/AIDS and Contraceptive Method Choice

The bivariate associations between HIV/AIDS-related factors and contraceptive method choice among current users are resented in Table 2.

Condom use is higher among HIV-positive women (30%) than those who were negative (20%), but hormonal contraceptives (pill and injectables) is the predominant method among both HIV-infected (42%) and uninfected (49%) women currently using contraceptives. Current users who were previously tested for HIV, had personal acquaintance with HIV/AIDS victims or had higher HIV/AIDS awareness are generally more likely to use hormonal contraceptives, but less likely to use pe-

HIV/AIDS factor	Method currently used (percent)				Cases
	Hormonal	condoms	abstain	other	
HIV sero status**					
- Negative	48.9	20.0	14.5	16.7	2935
- Positive	41.5	29.5	14.1	14.9	255
Previously tested for HIV***					
- No	44.6	19.4	18.2	17.8	1543
- Yes	51.7	22.0	10.9	15.4	1637
Knows someone who has or died of HIV/AIDS**					
- No	47.8	22.8	17.9	11.5	430
- Yes	48.5	20.4	13.8	17.3	2746
HIV/AIDS awareness***					
- Lowest	42.2	23.3	19.5	14.9	463
- Lower	47.9	18.7	16.4	16.9	877
- Higher	50.2	20.0	14.2	15.7	948
- Highest	50.1	22.0	10.1	17.9	902
HIV/AIDS Stigma*					
- Low	46.3	21.4	15.9	15.9	1519
- high	50.1	20.0	13.1	16.8	1671
Perceived HIV/AIDS risk***					
- Mod-high or has AIDS	46.4	24.8	13.6	15.1	1902
- No-low risk	51.3	14.1	15.7	18.9	1288
All	48.3	20.7	14.4	16.6	3190

*Chi-Square p<0.05; **p<0.01; ***p<0.001

Table 2: Contraceptive method choice among current users by HIV/AIDS-related factors.

riodic abstinence compared to counterparts who never tested, knew no one living with or died of HIV/AIDS, or had lower HIV/AIDS awareness. Those who perceive themselves to be at a moderate or high risk of HIV infection are more likely to use condoms (25%) than those who perceive themselves to be at no or low risk (14%).

Multivariate results based on multinomial regression analysis (Table 3) reveals independent associations between HIV/AIDS-related factors and contraceptive method choice, once background socio-economic and demographic factors are controlled for. The parameter estimates from multinomial Logistic regression are presented in the form of relative risk (RR)

factors, with 95% confidence intervals, to ease interpretation. A relative risk factor greater than 1.00 implies that the factor is associated with higher use of a particular contraceptive method than the reference category (i.e. hormonal method), while a value less than 1.00 implies lower use.

The results suggest that HIV status is a significant determinant of method choice, with HIV-positive women being more likely to use condoms or periodic abstinence rather than hormonal contraceptives (pills or injectables). Women who are HIV-positive are more than twice as likely to use condoms rather than hormonal contraceptives compared to their counterparts of similar characteristics who are HIV-negative (RR=2.41). There

Parameter (reference categories in brackets)	Condom		Periodic abstinence		Sterilization/other	
	RR (95% CI of RR)		RR (95% CI of RR)		RR (95% CI of RR)	
2008 survey (2003)	3.45 (2.29, 5.21)	*	0.91 (0.68, 1.21)		0.75 (0.58, 0.96)	*
HIV positive (negative)	2.41 (1.58, 3.67)	*	1.58 (1.02, 2.46)		1.17 (0.78, 1.77)	
Previously tested (no)	1.12 (0.84, 1.49)		0.71 (0.55, 0.91)		1.07 (0.85, 1.35)	*
HIV awareness (lowest)						
- lower	0.88 (0.58, 1.34)		0.78 (0.55, 1.11)		0.97 (0.68, 1.38)	
- higher	1.01 (0.66, 1.52)		0.87 (0.61, 1.24)		1.05 (0.73, 1.50)	
- highest	0.76 (0.50, 1.15)		0.60 (0.42, 0.87)		1.02 (0.72, 1.46)	*
Perceived HIV /AIDS mod-high risk (no-low)	1.02 (0.76, 1.35)		0.98 (0.77, 1.26)		0.96 (0.76, 1.20)	
Age group (15-24)						
- 25-34	1.23 (0.85, 1.77)		1.19 (0.83, 1.72)		2.22 (1.41, 3.48)	*
- 35+	2.58 (1.61, 4.16)	*	2.59 (1.66, 4.03)	*	5.30 (3.23, 8.69)	*
Parity (0)						
- 1-2	0.06 (0.03, 0.10)	*	0.13 (0.07, 0.24)	*	0.24 (0.10, 0.55)	*
- 3-4	0.02 (0.01, 0.05)	*	0.10 (0.05, 0.20)	*	0.23 (0.10, 0.56)	*
- 5+	0.02 (0.01, 0.04)	*	0.17 (0.08, 0.35)	*	0.34 (0.14, 0.85)	*
Education (none)						
- Primary	1.16 (0.51, 2.63)		1.44 (0.75, 2.76)		0.70 (0.41, 1.20)	
- Sec+	1.31 (0.56, 3.06)		1.64 (0.83, 3.23)		0.97 (0.55, 1.70)	
Wealth index (poorest)						
- Poorer	0.93 (0.54, 1.59)		0.91 (0.57, 1.45)		0.77 (0.48, 1.22)	
- Middle	0.68 (0.39, 1.18)		0.77 (0.48, 1.23)		0.66 (0.42, 1.05)	
- Richer	0.90 (0.52, 1.54)		0.77 (0.48, 1.22)		1.06 (0.68, 1.67)	
- Richest	0.72 (0.39, 1.34)		0.65 (0.37, 1.12)		0.99 (0.59, 1.66)	
Religion (Catholic)						
- Protestant	0.83 (0.62, 1.13)		0.83 (0.63, 1.08)		1.20 (0.93, 1.54)	
- Muslim/ Other	1.66 (0.97, 2.85)		1.52 (0.93, 2.50)		1.78 (1.07, 2.96)	*
Ethnic group (Kikuyu)						
- Luhya	2.23 (1.21, 4.45)	*	1.16 (0.65, 2.09)		0.49 (0.29, 0.83)	*
- Luo	4.42 (2.46, 8.30)	*	1.64 (0.91, 2.97)		0.60 (0.36, 1.02)	
- Other	2.19 (1.33, 3.60)	*	1.57 (1.03, 2.40)		0.74 (0.52, 1.07)	

Region (Central)					
- Nairobi	1.58 (0.83, 3.04)		1.10 (0.61, 1.98)	1.38 (0.85, 2.25)	
- Coast	1.26 (0.63, 2.50)		0.87 (0.48, 1.58)	0.92 (0.54, 1.55)	
- Eastern/North Eastern	0.92 (0.46, 1.83)		0.66 (0.38, 1.16)	0.61 (0.37, 1.00)	*
- Nyanza	1.27 (0.64, 2.54)		0.67 (0.37, 1.24)	1.58 (0.95, 2.62)	
- R.Valley	1.82 (0.97, 3.42)		1.99 (1.22, 3.27)	* 1.18 (0.76, 1.82)	
- Western	2.02 (0.93, 4.39)		0.72 (0.35, 1.45)	1.79 (0.98, 3.25)	
Urban residence (rural)	1.08 (0.70, 1.66)		1.12 (0.75, 1.67)	0.88 (0.62, 1.25)	
Want another child (no)	0.86 (0.64, 1.17)		1.64 (1.24, 2.16)	* 0.61 (0.46, 0.81)	*
Marital status					
- married-monogamous	0.15 (0.09, 0.26)	*	0.82 (0.46, 1.44)	1.98 (0.89, 4.42)	
- married-polygamous	0.21 (0.11, 0.42)	*	0.54 (0.27, 1.09)	2.35 (1.00, 5.55)	
- div./sep./widowed	0.54 (0.30, 0.95)	*	0.45 (0.22, 0.92)	* 1.45 (0.62, 3.43)	
Last sexual activity (within one week)					
- within one month	1.21 (0.87, 1.70)		1.32 (0.98, 1.78)	1.37 (1.05, 1.78)	*
- 1-6 months	1.33 (0.87, 2.04)		1.67 (1.10, 2.52)	1.20 (0.79, 1.83)	
- > 6 month	0.52 (0.28, 0.95)	*	1.52 (0.85, 2.72)	* 1.58 (0.92, 2.73)	

* - sig at 5% level ($p < 0.05$)

Table 3: HIV/AIDS and other determinants of contraceptive method choice.

is little evidence that the other HIV/AIDS factors relating to HIV/AIDS awareness, previous testing for HIV or HIV/AIDS risk perception have a significant association with choice of condoms or other contraceptive methods (i.e. sterilization and other) *versus* hormonal contraceptives. However, those with higher HIV/AIDS awareness (RR=0.60) or previously tested for HIV (RR=0.71) are less likely to use periodic abstinence *versus* hormonal methods, compared to their counterparts of similar characteristics who have lower HIV/AIDS awareness or never been previously tested for HIV.

The results show little evidence of significant variations in contraceptive method choice by background socio-economic factors controlled for in the analysis such as urban/rural residence, educational attainment or household wealth, once the effects of other important factors are controlled for. However, there is some evidence of method choice being affected by ethnicity, religion and region of residence. Women of all ethnic groups are significantly more likely to use condoms rather than hormonal contraceptives, compared to Kikuyu women of similar characteristics.

Although age and parity are expected to be positively correlated, they show opposite patterns on method choice. Higher parity is associated with lower use of condoms, periodic abstinence and sterilization/other methods *versus* hormonal contraceptives, while the opposite is the case for older age. Those who want more children in future are more likely to use periodic abstinence (RR=1.64) and less likely to use sterilization/other (RR=0.61) *versus* hormonal contraceptives. Those who are cur-

rently married are less likely to use condoms *versus* hormonal than never married women of similar characteristics (RR=0.15 for monogamous married; RR=0.21 for polygamous married). Also, the previously married (i.e. divorced/separated and widowed) are less likely to use condoms (RR=0.54) or abstinence (RR=0.45) than the never married counterparts of similar characteristics.

Correlates of Contraceptive Method Choice among HIV-Positive Women

An examination of contraceptive method choice among HIV positive women by HIV/AIDS related factors (Table 4) provides no evidence of significant variations by HIV/AIDS knowledge or knowing someone who has died of or living with HIV. However, HIV risk perception in marginally significant ($p < 0.1$), suggesting that those who perceived themselves to be at moderate or high risk of HIV infection were more likely to use condoms and less likely to use hormonal contraceptives than those who perceived themselves to be at no or low risk. More conclusive patterns were observed with respect to previous HIV testing, with HIV-positive women who were previously tested for HIV being more likely to use condoms and less likely to use hormonal contraceptives than those who have never been tested ($p < 0.05$). The importance of previous HIV testing is further highlighted in Figure 1, comparing contraceptive method choice of HIV-positive and HIV-negative women by previous HIV testing.

Figure 1 reveals that there is no difference in method

HIV/AIDS factor	Method currently used (percent)				Cases
	Hormonal	condoms	abstain	other	
Previously tested for HIV*					
- No	46.0	19.0	16.0	19.0	107
- Yes	37.9	37.1	12.9	12.1	148
Knows someone who has or died of HIV/AIDS (ns)					
- No	45.9	27.0	16.2	10.8	37
- Yes	41.2	30.7	12.1	16.1	216
HIV/AIDS awareness(ns)					
- Lowest	30.6	36.1	22.2	11.1	35
- Lower	49.0	27.5	7.8	15.7	55
- Higher	40.3	30.6	15.3	13.9	76
- Highest	43.2	27.2	12.3	17.3	89
Perceived HIV/AIDS risk (†)					
- Mod-high or has AIDS	37.2	34.6	14.7	13.5	157
- No-low risk	49.4	20.0	12.9	17.6	98
All	41.5	29.5	14.1	14.9	255

*Chi-Square $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; † $p < 0.10$.

Table 4: Method choice among HIV-positive current users by HIV/AIDS-related factors.

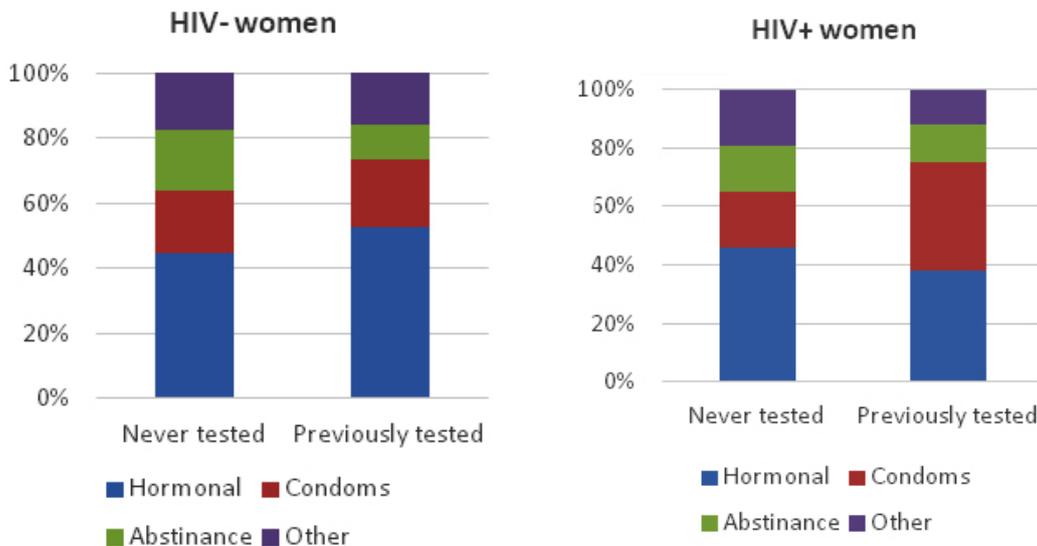


Figure 1: Comparing contraceptive method choice of HIV-positive and HIV-negative women by previous HIV testing.

choice between HIV-positive and HIV-negative women who never previously tested for HIV, but notably higher use of condoms (37% vs 19%) accompanied with lower use of hormonal methods (38% vs 46%) among HIV-positive than HIV-negative women previously tested for HIV. These patterns suggest that the observed higher use of condoms rather than hormonal contraceptives by HIV-positive compared to HIV-negative women (Tables 2 and 3) only applies to those previously tested for HIV. A further examination of contraceptive method choice among HIV-positive women by background characteristics (Table 5) reveal important patterns by a number of factors. Highly significant associations ($p < 0.001$) are observed with respect to parity, marital status and year of survey, with condom use being notably higher than use of hormonal methods among those of parity

zero (90.5% condoms vs 9.5% hormonal), never married women (66.7% vs 23.3%) and in 2008 (40.9% vs 29.9%). Observed trends suggest a notable shift from use of hormonal methods to condoms by HIV-positive women. In 2003, a large majority of HIV-positive women using contraceptives were using hormonal methods (61%), with only a small minority (9%) using condoms. By 2008, these patterns had reversed, with condom use increasing from 9% to 41%, while use of hormonal methods declined from 61% to 30%.

Evidence of significant associations ($p < 0.05$) are also observed with respect to age group, educational attainment and ethnic group. Higher use of condoms than hormonal methods is observed among women with at least secondary education (con-

Background characteristic	Contraceptive method currently used (%)				Unweighted Cases
	Hormonal	Condoms	Abstinence	Other	
Survey year ***					
- 2003	61.1	9.3	12.8	16.3	84
- 2008	29.9	40.9	14.9	14.3	171
Age group *					
- 15-24	60.0	22.5	15.0	2.5	41
- 25-34	41.2	33.3	9.6	15.8	118
- 35+	33.3	27.6	19.5	19.5	96
Parity ***					
- 0	9.5	90.5	0.0	0.0	22
- 1-2	48.1	28.6	11.7	11.7	80
- 3-4	52.0	22.7	12.0	13.3	83
- 5+	33.3	19.7	22.7	24.2	70
Education *					
- none / Primary	45.6	24.4	16.8	13.4	160
- Sec+	34.4	38.8	10.0	16.7	95
Wealth index (ns)					
- poorest / Poorer	32.6	30.2	14.0	23.3	47
- Middle	37.1	25.7	17.1	20.3	37
- Richer	41.7	31.7	13.3	13.3	60
- Richest	46.6	29.1	13.6	10.7	111
Religious affiliation (ns)					
- Catholic	41.5	33.8	7.7	16.9	72
- Protestant/Muslim/ Other	41.5	27.8	16.5	14.2	183
Ethnic group **					
- Kikuyu	40.0	22.5	10.0	27.5	46
- Luhya	25.0	28.1	21.9	25.0	38
- Luo	37.9	39.8	13.6	8.7	100
- Other	56.2	18.8	14.1	10.9	71
Region of residence (ns)					
- Nairobi	43.9	29.3	9.8	17.1	43
- Central	42.9	21.4	10.7	25.0	30
- Coast/ Eastern/N. Eastern	50.0	23.3	16.7	10.0	38
- Nyanza	36.7	40.5	12.7	10.1	84
- R.Valley	41.0	23.1	25.6	10.3	27
- Western	39.1	21.7	13.0	26.1	33
Residence					
- rural	36.6	31.4	16.3	15.7	143
- urban	50.0	26.1	10.2	13.6	112
Want another child †					
- no /later	39.6	31.5	10.7	18.1	159
- yes	44.6	26.1	19.6	9.8	96

Marital status ***					
- never married	23.3	66.7	6.7	3.3	34
- married	43.6	20.1	18.8	17.4	162
- div./sep./widowed	45.9	34.4	4.9	14.8	59
Last sexual activity					
- within one week	47.0	26.6	14.5	12.0	130
- within one month	37.1	30.6	16.1	16.1	60
- 1-12 months	34.4	34.4	11.5	19.7	65
Total	41.5	29.5	14.1	14.9	255

*Chi-Square $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; † $p < 0.10$.

Table 5: Contraceptive method choice among HIV-positive women by background characteristics.

doms -38%; hormonal -34%) and among the Luo ethnic group (condoms -40%; hormonal -38%). With respect to age group, contraceptive method choice among the youth is potentially of concern. A large majority of HIV-positive young women aged 15-24 using contraceptives are using hormonal methods (60%) while only 23% are using condoms.

DISCUSSION AND CONCLUSIONS

The main objectives of the research reported in this paper were to: (i) examine the effect of HIV/AIDS on contraceptive method choice in Kenya; and (ii) Identify correlates of contraceptive method choice among HIV-positive women using contraceptives. The analysis of contraceptive method choice among current contraceptive users mainly aimed at ascertaining the extent to which HIV-positive women are using appropriate methods, commensurate with their reproductive goals and needs. Although dual use of condoms and other contraceptive methods would be of primary interest, inclusion of this classification was not possible, given the very small numbers using dual methods. Overall patterns of method choice are consistent with expected patterns, with women who are HIV-positive being more than twice as likely to use condoms rather than hormonal contraceptives compared to their counterparts who are HIV-negative. The observed higher use of condoms by HIV-positive women, especially those who know their HIV status, is consistent with findings elsewhere in Africa.^{17,21} For example, Lopez et al¹⁷ observed that HIV-positive women were more likely to discontinue their hormonal contraceptives, and more likely to use condoms.

Important demographic and socio-economic correlates of contraceptive method choice among HIV-positive women include parity, marital status, age group, education and ethnicity. Condom use is notably higher than use of hormonal methods among those of parity zero (condoms -90.5% vs hormonal -9.5%), never married women (66.7% vs 23.3%), those with at least secondary education (38% vs 34%) and among the Luo ethnic group (40% vs 38%). Overall prevailing trends in contraceptive method choice among HIV-positive women in Kenya which suggest a notable shift from use of hormonal methods to condoms, and the observed lower use of hormonal methods by HIV-positive compared to HIV-negative women are encouraging,

especially given the possible link of hormonal contraception to increased risk of HIV infection in previous research^{8,9,13} and increasing popularity and dominance of injectable contraceptives in most SSA countries, including Kenya.¹⁴⁻¹⁶ Recent research evidence has been inconclusive, calling for further research to establish safety of hormonal contraceptives for HIV-positive women.^{22,23}

However, observed patterns also identify some sub-groups of HIV-positive women in Kenya for whom contraceptive method choice is potentially of concern. First, the fact that a large majority (60%) of HIV-positive young women aged 15-24 using contraceptives are using hormonal methods and only 23% using condoms suggests that contraceptive method choice among HIV-positive youth is potentially of concern. It raises an issue on the extent to which HIV-positive youth in Kenya are able to access suitable contraceptive methods, commensurate with their reproductive needs and desires. Although Condom use is recognized as one of the main strategies for combating the spread of HIV, promoting condom use among the youth in Kenya can be controversial, especially as some believe it encourages early sexual experimentation.¹⁶ Nevertheless, our findings provide credence to an earlier recommendation on the need for particular attention to reproductive health information and services for HIV-positive adolescents.²⁴ Second, the relatively low condom use among sub-groups that are known to have particularly high HIV prevalence such as previously married women²⁵ is also of concern and warrants attention.

It is important to recognize that although use of condoms is recommended for HIV-positive individuals for prevention of HIV transmission, it is one of the least effective contraceptive methods. In a study in South Africa, Schwartz et al²⁶ observed that women who reported condom use were just as likely to have an unplanned pregnancy as women who reported using no contraception at all. Use of dual methods, combining condoms with other contraceptive methods, is preferred to improve contraceptive effectiveness.²⁷ However, dual method use in most sub-Saharan settings is low.^{21,28} A recent study in Namibia, Kenya and Tanzania observed low dual method use and low use of highly effective contraception among people living with HIV for whom contraceptive protection was predominantly

through condom-only use.²⁸ Dual contraceptive use in Kenya is very low as some couples believe it is unnecessary.²⁹ Ralph et al⁹ highlighted the need for future priorities to include expanding contraceptive choice and identifying effective ways of promoting use of dual methods. Besides condoms, use of other contraceptive methods, especially long-term methods, have been promoted for women living with HIV. For instance, Kimani et al⁶ recommended greater use of long-term reversible contraceptives to reduce the risk of both vertical transmission of HIV as well as unintended pregnancy, while Siveregi et al⁷ recommended promoting long-term permanent methods in family planning counselling for both HIV-positive and HIV-negative women to improve overall contraceptive uptake and reduce unintended pregnancies. Kimani et al⁶ underscored the need to strengthen family planning services for women living with HIV to improve access to wide-ranging appropriate family planning services.

The observed patterns with respect to previous HIV testing underscore the importance of HIV testing in enabling HIV-positive women choose suitable contraceptive methods. The higher use of condoms and lower use of hormonal methods among HIV-positive than HIV-negative women previously tested for HIV, while there is no difference in method choice between HIV-positive and HIV-negative women who never previously tested for HIV, suggests that the observed higher use of condoms rather than hormonal contraceptives by HIV-positive women is only applicable to those previously tested for HIV. This is consistent with finding from a recent study of the effects of the HIV treatment on contraceptive choice in South Africa, where an increase in contraceptive use (especially condoms) across the cascade, from lowest level among HIV-positive women who did not know their status to highest levels among women who had been on HIV treatment for a long period of time was observed.²⁷ Similar findings have been observed in Malawi where women's knowledge of their HIV-positive status was found to be a significant predictor of their family planning practice.³⁰ Knowledge of HIV status is a prerequisite for appropriate action to address HIV-positive status. Despite a rising trend in HIV testing in Kenya and almost everyone previously tested having received their test results,¹⁶ a significant proportion of women of reproductive age (e.g. more than 40% in 2008) has never been tested for HIV, highlighting the need to intensify efforts to improve coverage in HIV counselling and testing in the country to enable women make informed choices to achieve their reproductive needs and desires.

Finally, some key data limitations which may have potential implications on our interpretation of some of the study findings are worth noting. First, the KDHS data used in this study are based on a cross-sectional design which limits our ability to establish temporal ordering of events of interest. We recognize that HIV/AIDS factors and contraceptive behaviour are intrinsically linked and while in this paper our focus is on the role of HIV/AIDS-related factors in influencing contraceptive method choice, we recognize that contraceptive behaviour (especially condom use) may indeed influence the risk of HIV infection.

Therefore, we are unable to infer precise causal relationships from the patterns observed. It is important to recognize that the relationships observed provide evidence of simple associations rather than causal relationships. A second limitation relates to inadequate sample size which limits our statistical power to detect some important patterns in contraceptive method choice, especially among HIV-positive women. Even after pooling data across the two surveys, the sample of 255 HIV-positive women using contraceptives at the time of surveys is limited for meaningful multivariate analysis that would simultaneously take into consideration the effects of potential confounding factors in the relationships observed. Nevertheless, the bivariate associations provide useful patterns to enable identification of specific sub-groups that should be targeted by specific family planning and HIV/AIDS policies and programmes in Kenya and similar settings in SSA.

REFERENCES

1. National AIDS and STI Control Programme (NASCOP), Ministry of Health. Kenya AIDS Indicator Survey 2012: Final Report. Nairobi, NASCOP. 2014. Web site. <http://www.nacc.or.ke/images/documents/KAIS-2012.pdf>. Accessed March 24, 2016.
2. Magadi MA, Agwanda A. Investigating the association between HIV/AIDS and recent fertility patterns in Kenya. *Soc Sci Med*. 2010; 71(2): 335-344. doi: [10.1016/j.socscimed.2010.03.040](https://doi.org/10.1016/j.socscimed.2010.03.040)
3. Maina WK, Kim AA, Rutherford GW, et al. Kenya AIDS Indicator surveys 2007 and 2012: Implications for public health policies for HIV prevention and treatment. *J Acquir Immune Defic Syndr*. 2014; 66(Suppl 1): S130-S137. doi: [10.1097/QAI.000000000000123](https://doi.org/10.1097/QAI.000000000000123)
4. National AIDS Control Council (NACC) and National AIDS and STI Control Programme (NASCOP). *The Kenya AIDS Epidemic Update 2011*. Nairobi, Kenya. 2012. Web site. http://www.unaids.org/sites/default/files/en/dataanalysis/knowyourresponse/countryprogressreports/2012countries/ce_KE_Narrative_Report.pdf. Accessed March 24, 2016.
5. Schaan MM, Taylor M, Marlink R. Reproductive behaviour among women on antiretroviral therapy in Botswana: mismatched pregnancy plans and contraceptive use. *Afr J AIDS Res*. 2014; 13(3): 305-11. doi: [10.2989/16085906.2014.952654](https://doi.org/10.2989/16085906.2014.952654)
6. Kimani J, Warren C, Abuya T, Mutemwa R, Mayhew S, Askew I. Family planning use and fertility desires among women living with HIV in Kenya Global health. *BMC Public Health*. 2015; 15(1): 909. doi: [10.1186/s12889-015-2218-z](https://doi.org/10.1186/s12889-015-2218-z)
7. Siveregi A, Dudley L, Makumucha C, Dlamini P, Moyo S, Bhembe S. Does counselling improve uptake of long-term and permanent contraceptive methods in a high HIV-prevalence setting? *Afr J Prim Health Care Fam Med*. 2015; 7(1): E1-E9. doi:

10.4102/phcfm.v7i1.779

8. Hefron R, Donnell D, Rees H, et al. Use of hormonal contraceptives and risk of HIV-1 transmission: a prospective cohort study. *Lancet Infect Dis*. 2012; 12(1): 19-26. doi: [10.1026/s1473-3099\(11\)70247-x](https://doi.org/10.1026/s1473-3099(11)70247-x)

9. Ralph LJ, Gollub EL, Jones HE. Hormonal contraceptive use and women's risk of HIV acquisition: Priorities emerging from recent data. *Curr Opin Obstet Gynecol*. 2015; 27(6): 487-495. doi: [10.1097/GCO.0000000000000228](https://doi.org/10.1097/GCO.0000000000000228)

10. Brady M. Preventing sexually transmitted infections and unintended pregnancy, and safeguarding fertility: Triple protection needs of young women. *Reprod Health Matters*. 2003; 11(22): 134-141. doi: [10.1016/S0968-8080\(03\)02289-4](https://doi.org/10.1016/S0968-8080(03)02289-4)

11. Berer M. Dual protection: more needed than practised or understood. *Reprod Health Matters*. 2006; 14(28): 162-170. doi: [10.1016/S0968-8080\(06\)28262-4](https://doi.org/10.1016/S0968-8080(06)28262-4)

12. Williamson NJ, Liku K, Loughlin Mc, Nyamongo I, Nakayima F. A qualitative study of condom use among married couples in Kampala, Uganda. *Reprod Health Matters*. 2006; 14(28): 89-98. doi: [10.1016/S0968-8080\(06\)28268-5](https://doi.org/10.1016/S0968-8080(06)28268-5)

13. Heikinheimo O, Lahteenmaki P. Contraception and HIV infection in women. *Hum Reprod Update*. 2009; 15(2): 165-176. doi: [10.1093/humupd/dmn049](https://doi.org/10.1093/humupd/dmn049)

14. Magadi MA, Curtis S. Trends and determinants of contraceptive method choice in Kenya. *Stud Fam Plann*. 2003; 34(3): 149-159. doi: [10.1111/j.1728-4465.2003.00149.x](https://doi.org/10.1111/j.1728-4465.2003.00149.x)

15. Seiber EE, Bertrand JT, Sullivan TM. Changes in contraceptive method mix in developing countries. *Int Fam Plan Perspect*. 2007; 33(3): 117-123. Web site: <https://www.guttmacher.org/about/journals/ipsrh/2007/09/changes-contraceptive-method-mix-developing-countries>. Accessed March 24, 2016

16. Kenya National Bureau of Statistics (KNBS) and ICF Macro. *Kenya Demographic and Health Survey 2008-09*. Calverton, Maryland: KNBS and ICF Macro. 2010. Web site: <http://dhsprogram.com/pubs/pdf/fr229/fr229.pdf>. Accessed March 24, 2016.

17. Lopez LM, Hilgenberg D, Chen M, Denison J, Stuart G. Behavioral interventions for improving contraceptive use among women living with HIV. *Cochrane Database Syst Rev*. 2013; 1: CD010243. doi: [10.1002/14651858.CD010243.pub2](https://doi.org/10.1002/14651858.CD010243.pub2)

18. Imbuki K, Todd CS, Stibich MA, Shaffer DN, Sinei SK. Factors influencing contraceptive choice and discontinuation among HIV-positive women in Kericho, Kenya. *Afr J Reprod Health*. 2010; 14(4): 98-109. Web site: <http://www.bioline.org.br/pdf?rh10070>. Accessed March 24, 2016.

19. Central Bureau of Statistics (CBS) [Kenya], Ministry of Health (MOH) [Kenya], and ORC Macro. *Kenya Demographic and Health Survey 2003*, Calverton, Maryland. 2004. Web site: <http://www.dhsprogram.com/pubs/pdf/FR151/FR151.pdf>. Accessed March 24, 2016.

20. Rutstein, SO, Johnston K. The DHS Wealth Index. *DHS Comparative Reports. No.6*. ORC Macro, Calverton, Maryland USA. 2004. Web site: [http://www.childinfo.org/files/DHS_Wealth_Index_\(DHS_Comparative_Reports\).pdf](http://www.childinfo.org/files/DHS_Wealth_Index_(DHS_Comparative_Reports).pdf). Accessed March 24, 2016.

21. Church K, Wringe A, Fakudze P, et al. Reliance on condoms for contraceptive protection among HIV care and treatment clients: A mixed methods study on contraceptive choice and motivation within a generalised epidemic. *Sex Transm Infect*. 2014; 90(5): 394-400. doi: [10.1136/sextrans-2013-051339](https://doi.org/10.1136/sextrans-2013-051339)

22. Phillips SJ, Polis CB, Curtis KM. The safety of hormonal contraceptives for women living with HIV and their sexual partners. *Contraception*. 2016; 93(1): 11-16. doi: [10.1016/j.contraception.2015.10.002](https://doi.org/10.1016/j.contraception.2015.10.002)

23. Balkus JE, Brown ER, Hillier SL, et al. Oral and injectable contraceptive use and HIV acquisition risk among women in four African countries: A secondary analysis of data from a microbicide trial. *Contraception*. 2016; 93(1): 25-31. doi: [10.1016/j.contraception.2015](https://doi.org/10.1016/j.contraception.2015)

24. Obare F, van der Kwaak A, Birungi H. Factors associated with unintended pregnancy, poor birth outcomes and post-partum contraceptive use among HIV-positive female adolescents in Kenya. *BMC Women's Health*. 2012; 12: 34. doi: [10.1186/1472-6874-12-34](https://doi.org/10.1186/1472-6874-12-34)

25. Magadi MA, Desta M. A multilevel analysis of the determinants and cross-national variations of HIV seropositivity in sub-Saharan Africa: evidence from the DHS. *Health Place*. 2011; 17(5): 1067-1083. doi: [10.1016/j.healthplace.2011.06.004](https://doi.org/10.1016/j.healthplace.2011.06.004)

26. Schwartz SR, Rees H, Mehta S, Venter WDF, Taha TE, Black V. High incidence of unplanned pregnancy after antiretroviral therapy initiation: Findings from a prospective cohort study in South Africa. *PLoS ONE*. 2012; 7(4): e36039. doi: [10.1371/journal.pone.0036039](https://doi.org/10.1371/journal.pone.0036039)

27. Raifman J, Chetty T, Tanser F, et al. Preventing unintended pregnancy and HIV transmission: Effects of the HIV treatment cascade on contraceptive use and choice in rural Kwa Zulu-Natal. *J Acquir Immune Defic Syndr*. 2014; 67(4): S218-S227. doi: [10.1097/QAI.0000000000000373](https://doi.org/10.1097/QAI.0000000000000373)

28. Antelman G, Medley A, Mbatia R, et al. Pregnancy desire and dual method contraceptive use among people living with HIV attending clinical care in Kenya, Namibia and Tanzania. *J Fam Plann Reprod Health Care*. 2015; 41(1): e1. doi: [10.1136/](https://doi.org/10.1136/)

[jfprhc-2013-100784](#)

29. Roxby AC, Ben-Youssef L, Marx G, et al. Dual contraceptive method use in HIV-serodiscordant Kenyan couples. *J Fam Plann Reprod Health Care*. 2016 pii: jfprhc-2015-101233. doi: [10.1136/jfprhc-2015-101233](https://doi.org/10.1136/jfprhc-2015-101233)

30. Habte D, Namasasu J. Family planning use among women living with HIV: knowing HIV positive status helps - results from a national survey. *Reprod Health*. 2015; 12: 41. doi: [10.1186/s12978-015-0035-6](https://doi.org/10.1186/s12978-015-0035-6)