Contraceptive method preferences and use among Kenyan women living with HIV

Leah Hardenbergh

A thesis

submitted in partial fulfillment of the

requirements for the degree of

Master of Public Health

University of Washington

2024

Committee:

Alison Drake

Daniel Enquobahrie

Program Authorized to Offer Degree:

Epidemiology

University of Washington

Abstract

Contraceptive method preferences and use among Kenyan women living with HIV

Leah Hardenbergh

Chair of the Supervisory Committee:

Alison Drake

Department of Global Health

Background: Women living with HIV (WLWH) face unique challenges relating to contraception, and understanding how preferences influence method selection can improve contraceptive counseling. Data are lacking on how contraceptive attribute preferences relate to attributes of methods used. We determined relationships between contraceptive attribute preferences and attributes of methods used, identified correlates of contraceptive satisfaction, and identified preference clusters.

Methods: We used baseline data from 2479 Kenyan WLWH enrolled in a cluster randomized control trial of a reproductive health counseling intervention. Participants for the current study included women who used contraception based on baseline assessment. We used self-administered electronic survey data to measure relationships between contraceptive attribute preferences (including long-acting and effectiveness) and attributes of methods used. We examined correlates of contraceptive satisfaction using Poisson regression. Principal components analysis (PCA) was used to identify dimensions of contraceptive preferences.

Results: Median age was 33 years (interquartile range: 28-38). Most (66%) of women were married/cohabitating. The most common contraceptive methods used were implants (36%), injectables (35%), and condoms (34%), followed by oral contraceptive pills (OCPs) (8%), intrauterine devices (4%), and tubal ligation (2%). Most participants preferred methods that avoid intermittent bleeding (85%), are effective (73%), and avoid daily dosing (71%). Women who preferred methods that were long-acting (Prevalence Ratio [PR] 1.36, 95% Confidence Interval [CI]: 1.20-1.55), avoid daily dosing (PR 1.10, 95% CI: 1.00-1.21), permit self-discontinuation (PR 1.34, 95% CI: 1.22-1.48), avoid intermittent bleeding (PR 1.43, 95% CI: 1.20-1.74), and are non-hormonal (PR 1.19, 95% CI: 1.05-1.36) were significantly more likely to use methods with these attributes compared to women who did not hold these preferences. Relationships remained significant in adjusted models. Participants with agreement between preference and use of methods that are long-acting or avoid intermittent bleeding were more likely to have high contraceptive method satisfaction. In PCA, preferences for attributes were found to cluster on three dimensions: (1) avoid heavy bleeding, weight changes, libido changes, and non-hormonal; (2) long-acting, avoid daily dosing, permit self-discontinuation, and avoid intermittent bleeding; and (3) concealable without an effectiveness preference. Immediate return to fertility was independent and found to not cluster with other variables, and was therefore modeled separately. The first and second dimensions were correlated with condom use. The second dimension was correlated with having a tubal ligation but inversely correlated with OCP use while the third was correlated with injectable use, and preferences for immediate return to fertility were correlated with condom use but inversely correlated with having a tubal ligation.
Discussion: Preferences for contraceptive methods that are long-acting and avoid intermittent bleeding may be drivers in method selection and satisfaction.

Implications: Preferences for some attributes, such as ability to have regular periods and longer duration of coverage, may be more important than other preferences in selecting a method of contraception. Health care providers may consider the strength of these preferences in providing patient-centered counseling to select contraceptive methods.

INTRODUCTION

Reproductive life counseling, including contraceptive counseling, can help women and girls prevent unintended pregnancy and meet their reproductive goals. In sub-Saharan Africa, nearly one quarter of women have unmet for contraception, and women living with HIV (WLWH) face additional challenges. (1) While WLWH share many needs for reproductive life counseling with all women, they also have unique needs, including needs to evaluate potential interactions between antiretroviral therapy (ART) and contraception, and plan for safe conception. Effective counseling can improve uptake of contraception and reduce contraceptive discontinuation. (2–4) Quality of counseling may vary based on whether women's contraceptive values and preferences are incorporated into counseling sessions. These values and preferences may also be impacted by their HIV status.

Contraceptive method attributes, such as method effectiveness, side effect profiles, concealability, convenience, time to return to fertility, and duration of coverage, are typically discussed during counseling sessions; yet, there is substantial variability in the attributes providers and women prioritize to discuss. It is challenging for providers to offer high quality contraceptive counseling, as preferences for contraception are highly individual and complex, warranting tailored counseling. (5) In addition, women may find it difficult to articulate the relative importance of different contraceptive attributes, making it challenging for providers to deliver patient-centered counseling that accurately reflects patients' desires. HIV care providers tasked with providing integrated HIV and reproductive health care may face additional challenges with counseling, with limited time to provide comprehensive care and inadequate training to offer these services. Preferences for multiple attributes may also make it difficult to select a method, as some attribute combinations may not align with any methods that exist. While contraceptive preferences and desires can be used to help guide patient-centered

counseling, (6) the degree to which they impact ultimate contraceptive method selection is unknown. For WLWH, contraceptive decision making is further complicated by considerations of medical eligibility criteria and prevention of vertical and horizontal HIV transmission.

Some have found that preferences for some method attributes align with using methods with these same attributes, while others have not. (6–8) Preferences for methods that are non-hormonal or provide protection against sexually transmitted infections (STIs) were associated with using methods with these attributes while preferences for highly effective contraception were not associated with use of highly effective methods in one study conducted in the U.S. (7) Another study in the U.S. found preferences for highly effective contraception were associated with selecting hormonal IUDs (versus oral contraception pills (OCPs)), while preferences for user independent, long-acting methods were associated with using methods other than OCPs. (6) Using contraceptive methods with attributes that differ from those that are desired is common, as women may not have access to all methods or need to weigh which attributes are most important when methods are not capable of meeting all their preferences. For example, women may select and accept methods with a lower efficacy than desired if preferences for other attributes, such as ability to self-discontinue, are relatively more important. (8) However, the number and range of previously studied attributes (preferred and used) has been limited, and some attributes, including tolerability of side effects and concealability, have not been well-characterized. Furthermore, these relationships between method attribute preferences and attributes of methods used have not been explored among women in sub-Saharan Africa or among WLWH.

We conducted a cross-sectional analysis to examine relationships between reported contraceptive method attribute preferences and attributes of contraceptive methods used among Kenyan WLWH. We also explored correlates of method satisfaction and examined

clusters of contraceptive method preferences. Understanding key contraceptive preference attributes that may drive contraceptive method selection, and identifying factors related to contraceptive satisfaction, could help improve counseling experiences and increase satisfaction while reducing method switch and discontinuation.

METHODS

Study design, study setting, and study population

In this cross-sectional analysis, we used baseline survey data from WLWH enrolled in a cluster randomized controlled trial (cRCT) evaluating a digital reproductive health counseling intervention between December 2022 and April 2024. This study protocol has been previously described. (9) Briefly, participants were recruited from 10 HIV clinics, five in rural or peri-urban sites in Western Kenya (Bondo sub-County, Lumumba sub-Country, Rachuonyo District, Siaya District, and Kisumu District General Hospitals) and five in urban or peri-urban sites in Nairobi (Mathare North Health Center, Riruta Health Center, Kenyatta National Hospital, Kangemi Health Centre, and Kibera South Health Center).

A total of 3143 women of the target (n=3300, 330 per site) are currently enrolled in the trial at the time of analysis. To be eligible for the cRCT, women must have been diagnosed with HIV; received HIV care at a participating clinic; aged 18-45 (14-17 if an emancipated minor); had daily access to a mobile phone with a Safaricom SIM; planned to receive HIV care at their enrollment facility for 2 years; spoken English, Kiswahili, or Luo; and been able to read text messages or been comfortable with someone else reading study-related texts. Women who were pregnant or enrolled in a different study with an intervention were excluded from the cRCT. Additionally, to be included in the current analysis, participants must have reported using a contraceptive method in the month prior to enrollment. We excluded women who used a

traditional method of contraception, (10) vaginal rings, lactational amenorrhea method, or emergency contraception as there was insufficient power to characterize method use among these women (n< 20 for all methods). The final analytic population for the current analysis comprised of 2,479 women.

Ethical approval for this study was granted by the University of Washington's Human Subjects Division (STUDY00000438) and the ethical review committee at Kenyatta National Hospital (KNH).

Data collection

WLWH receiving care at a study site were invited to participate in the cRCT. Those who were interested were screened for eligibility and asked to provide written consent to enroll and were administered an electronic survey to collect demographics and reproductive health history. Participants completed enrollment at their next scheduled visit, which was between one week and six months based on delivery of differentiated HIV services in Kenya. During this visit, participants at both intervention and control sites completed additional tablet-based self-administered surveys on family planning preferences and concerns on a tablet. Participants in the intervention arm also received reproductive life planning counseling on the tablet, were enrolled in the Mobile WACh SMS system intervention for follow-up counseling based on their reproductive health needs and shared a report from the summary screen from the counseling tool with HIV care providers. Sociodemographic data including age, income and marital status collected at screening and additional data collected at enrollment were used in this cross-sectional analysis.

Contraceptive method attributes, preferences, and satisfaction definitions

A total of eleven contraceptive method attribute preferences were collected from self-administered surveys. Nine attribute preferences were derived from questions with yes/no

responses: four related to avoiding side effects (intermittent bleeding, heavy bleeding, weight changes, libido changes), three related to dosing and duration (long-acting, avoiding daily dosing, and permitting self-discontinuation), one related to immediate return to fertility, and one related to non-hormonal methods. Preferences for effective methods were determined based on whether participants' self-selected effectiveness as one of the three most important attributes in a contraceptive method. Preferences for concealability were based on the response to a yes/no question and/or selecting concealability as one of the three most important contraceptive method attributes.

IUDs, implants and sterilization were classified as highly effective methods; oral contraceptives and injectables were classified as effective methods; and male condoms were classified as less effective. (Table 1) (10) Women were classified as being satisfied with their contraceptive method based on a "very happy" response to a 5-point Likert scale assessing satisfaction with their current method. For the correlates of method satisfaction analysis, women who had a preference for a contraceptive method attribute but did not use a method with that attribute were classified as having preference-use disagreement. Women who either preferred a contraceptive attribute and used a method with this attribute or who had no preference for that attribute were classified as having preference-use agreement.

Data analysis

We constructed separate Poisson generalized linear models with a log-link function and robust standard errors to measure the relationship between each contraceptive attribute preference and use of a method with that attribute. This approach can be used to estimate prevalence ratios (PRs) and related 95% confidence intervals (CIs) and is appropriate when the outcome is not rare. (11) We examined sociodemographic variables and duration of contraceptive use as potential covariates for each attribute model; additional potential

covariates were included in each model based on the hypothesized relationship between attribute preferences and use. Covariates were individually evaluated in a crude model for each attribute, and those with $p<0.1$ were included in a multivariate model. Potential effect modification by partner's HIV status was also examined in the attribute models through interaction terms.

Correlates of method satisfaction were also measured through Poisson generalized linear models, and included sociodemographics, history of contraception use, time since HIV diagnosis, and method attribute preference-use agreement as potential covariates. We evaluated covariates in crude models and included those with $p<0.1$ in the multivariate model. The Benjamini-Hochberg adjustment was used with a false discovery rate of 0.25 to limit false discoveries from multiple comparisons.

We conducted a principal components analysis (PCA) to identify patterns of contraceptive attribute preferences and facilitate understanding of factors that influence method selection. This technique reduces correlated data into fewer variables that capture as much information from initial variables as possible. (12) Method preferences were included in the initial PCA, and preferences with a uniqueness score >60%, which suggests weak correlation with other preferences, were dropped and modeled separately. Remaining preferences underwent subsequent PCA to generate components, which were retained if the eigenvalue was ≥1 (Kaiser's criterion). (13) Retained components were transformed using varimax rotation, which aids in interpretation of factor loadings. (12) Component loadings with an absolute value greater than 0.5 hold the most weight and were used to determine the label for each component. We conducted Poisson regression to determine relationships between principal components and method use, first in crude models and then in multivariate models that included covariates with $p<0.1$.

Analyses were conducted using the statistical package R version 4.2.1.

RESULTS

Among 3143 women enrolled, 2479 (79%) were included in our analysis (Figure 1). The median age of participants was 33 years (interquartile range [IQR] 28-38) (Table 2). Most (67%) were married or cohabitating, 58% had three or more living children, and nearly half (46%) completed secondary education. Median time since HIV diagnosis was 8 years (IQR 4-12). Most (77%) women had a regular partner, over half (56%) with seroconcordant partners and 11% with partners with an unknown HIV status. The most common contraceptive methods used by participants (alone or in combination with another method) were implants (36%), condoms (35%) and injectables (34%), followed by OCPs (8%), IUDs (4%), and tubal ligation (2%).

Contraceptive method attribute preferences

Overall, the prevalence of contraceptive method attribute preferences ranged from 14% for concealability to 85% for avoiding intermittent bleeding (Figure 2). The majority of women preferred methods that are effective (73%), long-acting (60%), non-hormonal (52%), avoid daily dosing (71%), avoid heavy bleeding (63%), and permit self-discontinuation (51%). There were more women who held preferences for methods that are long-acting, avoid intermittent bleeding, are non-hormonal, and are highly effective than there were women using methods with these attributes.

In the crude model, 67% of women who had a preference for long-acting methods used a long-acting method, compared to 54% of women who did not indicate this preference (PR 1.36, 95% CI: 1.20-1.55) (Table 3). In the multivariate model, preferences for long-acting methods remained significantly associated with long-acting method use (PR 1.36, 95% CI 1.17-

1.58) after adjusting for age, income, education, marital status, duration of contraception use, and number of children.

Preferences for methods that avoid daily dosing were more common among women who used a method that did not require daily dosing (73%) compared to women using OCPs (38%) (PR 1.10, 95% CI: 1.00-1.21).

Preferences for a method that permits self-discontinuation were more commonly reported among women who used a method that could be self-discontinued (59%) than among women using a user independent method that required a provider to discontinue (37%) (PR 1.34, 95% CI: 1.22-1.48). The relationship between preference for a method permitting self-discontinuation and use of a method with this attribute held in the multivariate model adjusting for income and duration of contraceptive use (PR 1.33, 95% CI: 1.20-1.47).

Overall, 89% of women using a method that avoids intermittent bleeding had a preference to avoid intermittent bleeding, compared to 81% among those using methods that could have caused spotting or amenorrhea (PR 1.43, 95% CI: 1.20-1.74). This association remained significant after adjusting for age, income, and duration of contraceptive use in the multivariate model (PR 1.34, 95% CI: 1.08-1.68).

Preference for a non-hormonal method was significantly higher among those using non-hormonal methods (56%) than those using hormonal methods (49%) (PR 1.19, 95% CI: 1.05-1.36). The relationship between preference for and use of a non-hormonal method held in the multivariate model (PR 1.19, 95% CI: 1.05-1.36), after adjusting for age, income, marital status, and duration of contraceptive use

There was no relationship between preferences for methods based on their effectiveness, concealability, immediate return to fertility; as well as ability to avoid daily dosing, heavy bleeding, weight changes, or libido changes and using methods with these corresponding

attributes. There was also no evidence of effect modification by partner HIV status for any of the relationships between contraceptive method attribute preferences and attributes of methods used evaluated (results not shown).

Method satisfaction

Overall, 1661 (67%) of women self-reported high satisfaction with their current method (Table 4), and there was no difference in satisfaction across method types. Women with household income ≥ 10,00 KSH/month were 12% more likely to have high contraceptive method satisfaction (PR 1.12, 95% CI 1.02-1.24) compared to those with income <10,000, while women who used ≥ two contraceptive methods in their lifetime were 22% less likely to be satisfied with their method compared to women who had only used one method (PR 0.78, 95% CI: 0.71-0.87). Satisfaction was higher among women who had preference-use agreement for a long-acting method (PR 1.25, 95% CI 1.12-1.39), a method permitting self-discontinuation (PR 1.19, 95% CI: 1.02-1.41), a method that avoids intermittent bleeding (PR 1.21, 95% CI 1.10-1.34), and a non-hormonal method (PR 1.24, 95% CI: 1.11-1.38), compared to those with preference-use disagreement. Women who discussed contraception with someone other than their healthcare provider and who discussed contraception with their partner in the prior year were less likely to be satisfied with their method (PR 0.88, 95% CI: 0.80-0.98 and PR 0.82, 95% CI: 0.71-0,94, respectively). We did not detect relationships between age, education, marital status, number of children, duration of contraception use, method switch or discontinuation in the prior year, or time since HIV diagnosis and method satisfaction. In the multivariate model, higher household income (≥ 10,00 KSH/month) (PR 1.12, 95% CI: 1.02-1.24), lifetime use of 2 or more methods (PR 0.78, 95% CI: 0.70-0.87), discussing contraception with a partner in the prior year (PR 0.84, 95% CI: 0.71-0.99), and preference-use agreement for methods that were long-acting (PR 1.31,

95% CI: 1.17-1.47), and avoid intermittent bleeding (PR 1.15, 95% CI: 1.02-1.31) remained significantly associated with method satisfaction.

Method preference clustering

In total, 100 participants were excluded from the PCA due to incomplete preference data. In the initial PCA, a preference for immediate return to fertility had a uniqueness score of 0.66 and was excluded from subsequent PCAs and modeled as an individual factor. In the PCA analysis, three principal components with eigenvalues >1 were identified, explaining 59% of total variance. Factor loadings with an absolute value of at least 0.5 for each dimension included: 1) preferences to avoid heavy bleeding, weight changes, libido changes, and for non-hormonal methods [side-effect related preferences]; 2) preferences for methods that are long-acting, avoid daily dosing, permit self-discontinuation, and avoid intermittent bleeding [dosing, duration, and regular period preferences]; and 3) preferences for concealability but not effectiveness [concealability but not effectiveness preferences] (Table 5).

In the Poisson model, there were significant relationships between the side-effect preferences domain (PR 1.15, 95% CI: 1.07-1.23), the dosing, duration, and regular period related preference domain (PR 1.10, 95% CI: 1.03-1.19), and a preference for a method with immediate return to fertility (PR 1.17, 95% CI: 1.01-1.35) and condom use. Women with dosing, duration, and regular period related preferences were also more likely to use tubal ligation (PR 1.51, 95% CI: 1.09-2.16) but less likely to use OCPs (PR 0.74, 95% CI: 0.64-0.85), whereas the women with the concealability but not effectiveness dimension were more likely to use injectables (PR 1.11, 95% CI: 1.04-1.18). Women who preferred a method with immediate return to fertility were less likely to use tubal ligation (PR 0.34, 95% CI: 0.13-0.75).

DISCUSSION

In this cohort of WLWH using modern contraception in Kenya, most women had preferences for contraceptive methods that are effective, long-acting, avoid daily dosing, and avoid side effects, with at least 60% of women desiring each of these method attributes. Women with preferences for methods that are long-acting, avoid daily dosing, permit self-discontinuation, avoid intermittent bleeding, or are non-hormonal were more likely to use methods with each of these attributes.

We found relationships between preferences and use of methods that are long-acting, non-hormonal, and avoid intermittent bleeding; these results concur with those from previous studies. (6,7) While nearly three-quarters of women in our study indicated a preference for effectiveness, only 42% of women used a highly effective method. Women may desire methods to be more effective but choose methods that have effectiveness levels lower than desired because other method attributes are deemed to be more important. Alternatively, Marshall et al. suggest there may be a disconnect between women's perceptions of effectiveness and clinical standards. (7) Not using one's method of choice is common; a study of contraceptive users and non-users in Malawi found over 60% of women were not using their preferred method (including no method). (14) Lack of access to their preferred method may also explain these results.

In our study, convenience preferences (relating to dosing, duration of use, or need to see a provider) were widely held and important for method selection. A systematic review on contraceptive preferences among those living with HIV similarly found that convenience considerations were common. Male condoms were identified as a preferred method in several studies due to their accessibility and convenience, (15) while a study on WLWH in Ethiopia found that preference for OCPs was low due to the burden of remembering a daily pill, and only 5% of the sample was using OCPs (similar to our findings of 8%) compared to 26% prior to HIV

diagnosis. (16) WLWH are already navigating antiretroviral therapy (ART) regimens and treatment, so convenience may be a higher priority than in other populations.

Our results suggest there may be implications of using a method with attributes that differ from those that are preferred, depending on the attribute. Using methods that aligned with preferences for long-acting methods or methods that avoid intermittent bleeding were influential on satisfaction, whereas using methods that avoid daily dosing when this attribute was preferred was not related to method satisfaction. While contraceptive methods were not associated with method satisfaction, women who used fewer methods and did not discuss contraception with their partner reported higher method satisfaction, which may indicate that women discuss methods with partners if they have a problem with the method. Partner dynamics have previously been cited as impacting satisfaction. A study in Nairobi found that many women reported power imbalances in their relationship with male partners, and anticipated their partner would oppose their contraceptive method of choice, which could lead to lower method satisfaction if women value their partner's support to use their method of choice. (17)

We found preferences clustered into three domains: side-effect related preferences; dosing, duration, and regular period preferences; and concealability but not effectiveness preferences; while a preference for immediate return to fertility held as its own separate domain. Women who held preferences related to side-effects were more likely to use condoms, which are the only non-permanent contraceptive method with minimal potential side effects in our study. Women with preferences related to convenience were also more likely to use either condoms or tubal ligation, but less likely to use OCPs. These results may be explained by preferences for methods that do not have burdensome and inconvenient qualities, such as remembering to take a daily pill for OCPs.

Our study had several strengths. We assessed a diverse array of preferences, permitting a more complex analysis of the strength of the relationship between contraceptive attribute preferences and use of methods with these attributes. Furthermore, we were able to examine how agreement between contraceptive attribute preferences and use of methods with these attributes relates to method satisfaction, using the same dataset. Finally, we were able to identify how attribute preferences cluster together by using principal component analysis, a robust analytical approach.

Our study is also subject to some limitations. We were unable to assess the temporal relationship between contraceptive method preferences and methods used due to the cross-sectional study design. In addition, our results may not be generalizable to WLWH from other regions. We did not examine preferences for those with potential unmet need for contraception, which could lead to selection bias. Contraceptive attribute preferences were captured in multiple ways and bias could be introduced by capturing preferences with different types of survey questions. Finally, we did not collect data on potentially important preferences, including the ability to protect against HIV/STI transmission, or the relative ranking/strength of preferences for specific attributes; therefore, we could not examine these attributes or variables.

In conclusion, WLWH hold complex contraceptive preferences that may not be captured by a single method. Our research highlights the importance of preferences for methods that are long-acting and avoid intermittent bleeding in method selection and satisfaction. Future research to better understand the relative importance of contraceptive method attributes and how WLWH perceive these to be similar or different than their HIV-negative counterparts can aid in guiding contraceptive counseling and selection of methods that are optimally suited to their unique values and preferences. This work could contribute to improving appropriateness of initial

method selection, reduce contraceptive discontinuation and switch, and prevent unintended pregnancies.

Acknowledgements and funding

We would like to acknowledge the contributions from study participants and staff. This study was made possible through funding and support from NIH/NICHD R01HD104551, the University of Washington/Fred Hutch Center for AIDS Research (CFAR) (NIH/NIAID P30 AI027757), and the University of Washingtons' Global Center for Integrated Health of Women, Adolescents, and Children (Global WACh).

Table 1: Contraceptive Method Attributes by Method Type

Method attribute	Variable type	Tubal ligation	Oral contraception	Injectable	IUD	Implant	Condoms
Effectiveness, fertility and concealability preferences							
Effectiveness (perfect use)	Categorical*	HE	E	E	HE	HE	LE
Concealable from partner or others	Binary	X		X	X	X	
Immediate return to fertility	Binary		X		X	X	X
Convenience preferences							
Long-acting	Binary	X			X	X	
Avoid daily dosing	Binary	X		X	X	X	X
Permit self-discontinuation	Binary		X	X			X
Side effect preferences							
Avoid intermittent bleeding (including spotting or amenorrhea but excluding heavy bleeding)	Binary	X	X		X		X
Avoid heavy bleeding	Binary	X	X			X	X
Avoid weight changes	Binary	X	X		X	X	X
Avoid libido changes	Binary	X		X	X	X	X
Non-hormonal	Binary	X			X		X

IUD: Intrauterine device
*Highly effective (HE) (>99%); effective (E) (80-99%), less effective (LE) (<80%)

Table 2: Characteristics of WLWH using contraception and receiving HIV care in Kenya

Characteristic	Total N = 2479	Overall n (%) or median (IQR)
Sociodemographic		
Age (years)	2479	33 (28-38)
Age category	2479	
<25		267 (11)
25-34		1123 (45)
>34		1089 (44)
Completed at least secondary education	2479	1147 (46)
Household income ≥10,000 KSH/month	2479	1068 (43)
Employed	2478	1097 (44)
Married/cohabitating	2479	1640 (66)
Time to clinic (minutes)	2479	30 (30-50)
Clinical characteristics		
Time since HIV diagnosis (years)	2474	8 (4-12)
Parity	2402	3 (2-4)
Number of living children	2402	3 (2-4)
Currently breastfeeding	2401	554 (23)
ART use	2479	2461 (99)
Efavirenz	2453	33 (1)
Dolutegravir	2459	2194 (89)
Other	2447	229 (9)
Partner characteristics		
Has regular partner	2469	1910 (77)
Partner HIV status	1910	
Positive		1060 (55)
Negative		639 (33)
Don’t know		211 (11)
Partner on ART	1055	981 (92)
Partner on PrEP	730	264 (36)
Disclosed HIV status to partner	1869	1771 (95)
Contraception use and history		
Methods used in prior month	2479	
Injectable		858 (35)
Implant		894 (36)
IUD		89 (4)
OCP		191 (8)
Condoms		846 (34)
Female sterilization		49 (2)
Duration of current method use ≥1 year	2422	1510 (62)
Obtained preferred method at most recent visit	2477	2341 (95)
Method switch (past year)	2479	174 (7)
Discussion of FP with social network in past year	2468	1049 (42)
Number of methods used in lifetime	2479	2 (1-3)

WLWH: Women living with HIV; IQR: Interquartile range; IUD: Intrauterine device; OCP: Oral contraceptive pills

Table 3: Models of concordance between contraceptive method preferences and method use

Method attribute preferences	Method without corresponding attribute used		Method with corresponding attribute used		Poisson generalized linear models			
	N	(%)	N	(%)	Crude PR (95% CI)	p	Adjusted PR (95% CI)	p
Model 1: High effectiveness	1046	(72)	754	(73)	1.03 (0.90, 1.18)	0.71	1.05 (0.91, 1.21)	0.49
Model 2: Effectiveness	312	(77)	148	(72)	0.96 (0.87, 1.05)	0.38	0.98 (0.89, 1.08)	0.64
Model 3: Concealability	65	(11)	284	(15)	1.08 (0.95, 1.22)	0.23	1.08 (0.95, 1.22)	0.24
Model 4: Immediate return to fertility	216	(30)	517	(32)	1.03 (0.93, 1.14)	0.56	1.02 (0.92, 1.13)	0.70
Model 5: Long-acting	788	(54)	688	(67)	1.36 (1.20, 1.55)	**<0.001**	1.36 (1.17, 1.58)	**<0.001**
Model 6: Avoid daily dosing	51	(38)	1686	(73)	1.10 (1.00, 1.21)	**0.04**	1.10 (1.00, 1.21)	**0.04**
Model 7: Permits self-discontinuation	294	(37)	965	(59)	1.34 (1.22, 1.48)	**<0.001**	1.33 (1.20, 1.47)	**<0.001**
Model 8: Avoid intermittent bleeding								
Model 9: Avoid heavy bleeding	1121	(81)	972	(89)	1.43 (1.20, 1.74)	**<0.001**	1.34 (1.08, 1.68)	**0.009**
Model 10: Avoid weight changes	462	(63)	1108	(64)	1.01 (0.92, 1.12)	0.82	1.00 (0.90, 1.10)	0.96
Model 11: Avoid libido changes	302	(45)	909	(50)	1.06 (0.97, 1.16)	0.22	1.04 (0.94, 1.14)	0.44
Model 12: Non-hormonal	44	(33)	973	(42)	1.02 (0.94, 1.11)	0.64	1.02 (0.94, 1.11)	0.64
	737	(49)	532	(56)	1.19 (1.05, 1.36)	**0.007**	1.19 (1.05, 1.36)	**0.009**

Adjusted models:
Model 1 is adjusted for age category, income, education, marital status, contraception use duration, and number of children
Model 2 is adjusted for income, marital status, and contraception use duration
Model 3 is adjusted for income and marital status
Model 4 is adjusted for education
Model 5 is adjusted for age category, income, education, marital status, contraception use duration, and number of children
Model 6 is not adjusted for any covariates

Model 7 is adjusted for income and contraception use duration
Model 8 is adjusted for age category, income, and contraception use duration
Model 9 is adjusted for contraception use duration
Model 10 is adjusted for contraception use duration
Model 11 is not adjusted for any covariates
Model 12 is adjusted for age category, income, marital status, and contraception use duration

Table 4: Correlates of high contraceptive method satisfaction among WLWH in Kenya

Method attribute preferences	Method without corresponding attribute used		Method with corresponding attribute used		Poisson generalized linear models			
	N	(%)	N	(%)	Crude PR (95% CI)	p	Adjusted PR (95% CI)	p
Age	33.3	(6.3)	32.5	(6.2)	1.01 (1.00, 1.01)	0.09	1.01 (1.00, 1.02)	0.09
Age category (years) <25	173	(10)	94	(12)	Ref.	Ref.		
25-34	741	(45)	382	(47)	1.02 (0.87, 1.21)	0.83		
>34	747	(45)	341	(42)	1.06 (0.90, 1.25)	0.49		
Income ≥10,000 KSH/month	764	(46)	304	(37)	1.12 (1.02, 1.24)	**0.02**	1.12 (1.02, 1.24)	**0.02**
Secondary education or more	774	(47)	373	(46)	1.01 (0.92, 1.11)	0.80		
Married/cohabitating	1111	(67)	529	(65)	1.03 (0.93, 1.14)	0.54		
3 or more children*	931	(57)	473	(60)	0.97 (0.88, 1.07)	0.50		
Contraception use duration ≥ 1 year*	991	(61)	519	(64)	0.96 (0.87, 1.06)	0.39		
Obtained preferred method at most recent visit	1584	(95)	756	(93)	1.23 (0.98, 1.56)	0.08	1.15 (0.91, 1.48)	0.25
Use of 2+ methods in lifetime	1092	(66)	668	(82)	0.78 (0.71, 0.87)	**<0.001**	0.78 (0.70, 0.87)	**<0.001**
Method switch/discontinuation in prior year	171	(10)	85	(10)	1.00 (0.85, 1.16)	0.96		
Long-acting preference-use agreement	1193	(73)	476	(58)	1.25 (1.12, 1.39)	**<0.001**	1.31 (1.17, 1.47)	**<0.001**
Avoid daily dosing preference-use agreement*	1611	(98)	791	(98)	1.07 (0.77, 1.55)	0.71		
Permits self-discontinuation preference-use agreement*	1470	(90)	683	(84)	1.19 (1.02, 1.41)	**0.03**	1.16 (0.97, 1.38)	0.10
Avoid intermittent bleeding preference-use agreement	986	(59)	368	(45)	1.21 (1.10, 1.34)	**<0.001**	1.15 (1.02, 1.31)	**0.03**
Non-hormonal preference-use agreement	1223	(74)	498	(61)	1.24 (1.11, 1.38)	**<0.001**	1.09 (0.95, 1.26)	0.22
Discussed contraception with someone other than HCW in prior year	654	(40)	395	(49)	0.88 (0.80, 0.98)	**0.01**	1.00 (0.89, 1.12)	0.97
Discussed contraception with partner in prior year*+	246	(19)	195	(29)	0.82 (0.71, 0.94)	**0.007**	0.84 (0.71, 0.99)	**0.04**
2+ years since HIV diagnosis	1440	(87)	720	(88)	0.97 (0.84, 1.12)	0.65		
Tubal ligation use	38	(2)	11	(1)	1.16 (0.83, 1.58)	0.36		
Oral contraceptive pills use	138	(8)	53	(6)	1.08 (0.91, 1.29)	0.36		
Injectable contraception use	568	(34)	289	(35)	0.98 (0.89, 1.09)	0.74		
IUD use	70	(4)	19	(2)	1.18 (.92, 1.49)	0.17		
Implant use	590	(36)	304	(37)	0.98 (0.88, 1.08)	0.64		
Condoms use	561	(34)	285	(35)	0.98 (0.89, 1.09)	0.75		

*variable has >1% missingness

HCW = health care worker; IUD = Intrauterine device
+among women with partners for N, %, and univariate model; reparameterized in a multivariate model to allow for women without partners to be included in the model

Table 5: Varimax-Rotated Loading Matrix of Contraceptive Attribute Preferences

Method attribute preferences	1	2	3
Effectiveness	0.05	-0.24	**-0.70**
Avoid intermittent bleeding	0.48	**0.52**	0.02
Avoid heavy bleeding	**0.63**	0.39	-0.02
Avoid weight changes	**0.76**	0.12	-0.07
Avoid libido changes	**0.83**	0.02	0.02
Non-hormonal	**0.82**	0.19	0.06
Long-acting	0.08	**0.79**	-0.03
Avoid daily dosing	0.09	**0.75**	0.02
Permits self-discontinuation	0.25	**0.63**	0.06
Concealable	0.04	-0.19	**0.76**

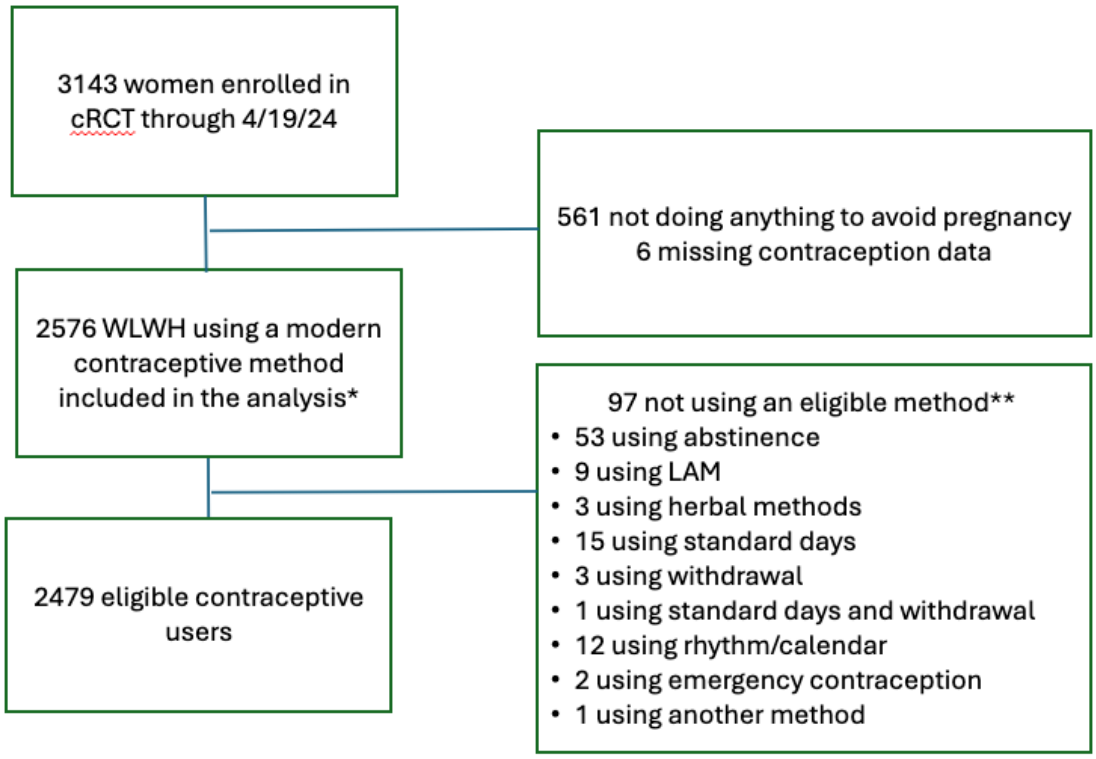
Factor loadings with an absolute value of at least 0.50 are bolded. Eigenvalue for the fourth dimension = 0.92.

Table 6: Correlations between PCA Dimensions and Method Use

PCA Dimension	Poisson generalized linear models			
	Crude PR (95% CI)	p	Adjusted PR (95% CI)	p
Condom use				
Dimension 1	1.15 (1.07, 1.23)	**<0.001**	1.13 (1.05, 1.22)	**<0.001**
Dimension 2	1.10 (1.03, 1.19)	**0.006**	0.97 (0.90, 1.04)	0.36
Dimension 3	0.97 (0.90, 1.04)	0.37	--	--
Immediate RTF preference	1.17 (1.01, 1.35)	**0.03**	1.07 (0.91, 124)	0.42
Implant use				
Dimension 1	0.96 (0.90, 1.03)	0.29	--	--
Dimension 2	0.97 (0.91, 1.04)	0.36	--	--
Dimension 3	0.95 (0.89, 1.02)	0.17	--	--
Immediate RTF preference	1.01 (0.88, 1.17)	0.85	--	--
IUD use				
Dimension 1	0.84 (0.68, 1.04)	0.12	--	--
Dimension 2	1.08 (0.88, 1.35)	0.48	--	--
Dimension 3	1.15 (0.94, 1.38)	0.17	--	--
Immediate RTF preference	0.89 (0.55, 1.40)	0.62	--	--
Injectable use				
Dimension 1	1.03 (0.96, 1.10)	0.44	--	--
Dimension 2	0.98 (0.91, 1.05)	0.51	--	--
Dimension 3	1.11 (1.04, 1.18)	**0.001**	--	--
Immediate RTF preference	1.03 (0.89, 1.19)	0.69	--	--
OCP use				
Dimension 1	0.91 (0.78, 1.05)	0.20	--	--
Dimension 2	0.74 (0.64, 0.85)	**<0.001**	--	--
Dimension 3	0.94 (0.80, 1.09)	0.41	--	--
Immediate RTF preference	0.78 (0.56, 1.08)	0.15	--	--
Tubal ligation use				
Dimension 1	0.79 (0.58, 1.06)	0.12		
Dimension 2	1.51 (1.09, 2.16)	**0.02**	1.55 (1.13, 2.19)	**0.01**
Dimension 3	0.92 (0.66, 1.23)	0.59		
Immediate RTF preference	0.34 (0.13, 0.75)	**0.01**	0.32 (0.12, 0.70)	**0.009**

RTF=return to fertility

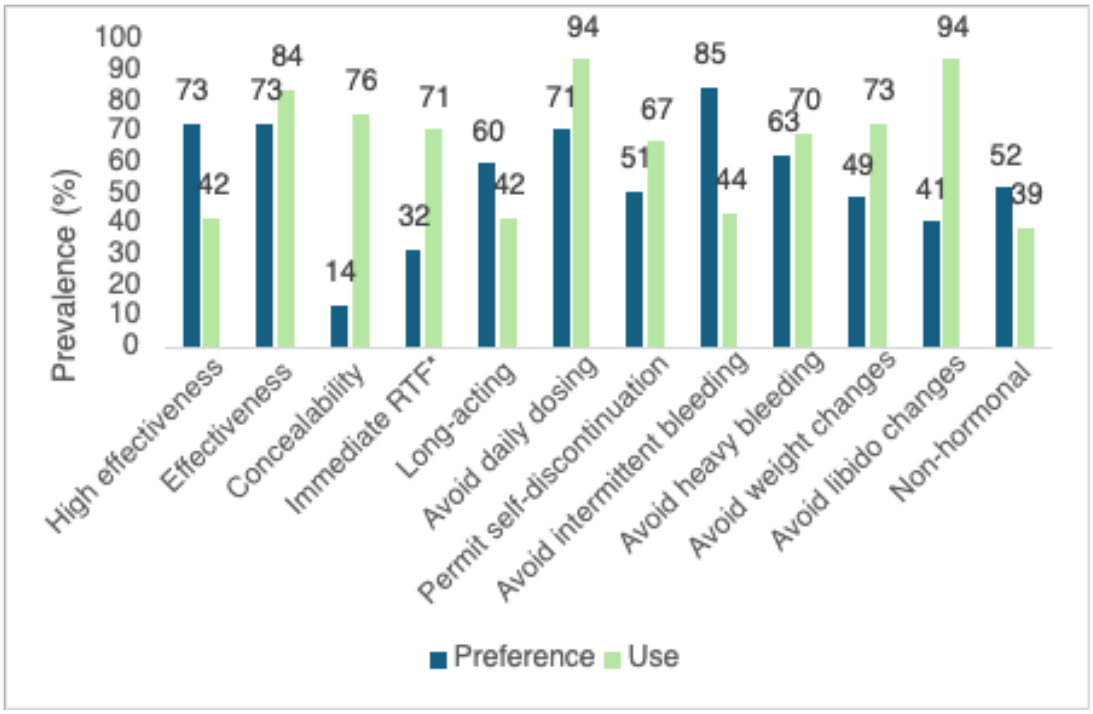
Figure 1: Study flow chart



*Injectable, implant, IUD, OCP, tubal ligation or condom

**Not mutually exclusive - 1 person used standard days and withdrawal

Figure 2: Prevalence for contraceptive method attribute preferences and contraceptive method attributes used (n=2479)



*RTF = return to fertility

Use data is complete. Preference data has the following missingness: High effectiveness/effectiveness: 0; Concealability: 0; Immediate RTF: 7; Long-acting: 21; Avoid daily dosing: 25; Permit self-discontinuation: 31; Avoid intermittent bleeding: 3; Avoid heavy bleeding: 5; Avoid weight changes: 9; Avoid libido changes: 24; Non-hormonal: 20

References

1. Teshale AB. Factors associated with unmet need for family planning in sub-Saharan Africa: A multilevel multinomial logistic regression analysis. PLoS ONE. 2022 Feb 10;17(2):e0263885.

2. Ngure K, Heffron R, Mugo N, Irungu E, Celum C, Baeten J. Successful increase in contraceptive uptake among Kenyan HIV-1 serodiscordant couples enrolled in an HIV-1 prevention trial. AIDS Lond Engl. 2009 Nov;23(Suppl 1):S89–95.

3. Castaño PM, Bynum JY, Andrés R, Lara M, Westhoff C. Effect of Daily Text Messages on Oral Contraceptive Continuation: A Randomized Controlled Trial. Obstet Gynecol. 2012 Jan;119(1):14.

4. Haberlen SA, Narasimhan M, Beres LK, Kennedy CE. Integration of Family Planning Services into HIV Care and Treatment Services: A Systematic Review. Stud Fam Plann. 2017 Jun;48(2):153–77.

5. Lessard LN, Karasek D, Ma S, Darney P, Deardorff J, Lahiff M, et al. Contraceptive Features Preferred by Women At High Risk of Unintended Pregnancy. Perspect Sex Reprod Health. 2012;44(3):194–200.

6. Madden T, Secura GM, Nease R, Politi M, Peipert JF. The Role of Contraceptive Attributes in Women's Contraceptive Decision Making. Am J Obstet Gynecol. 2015 Jul;213(1):46.e1-46.e6.

7. Marshall C, Guendelman S, Mauldon J, Nuru-Jeter A. Young Women's Contraceptive Decision Making: Do Preferences for Contraceptive Attributes Align with Method Choice? Perspect Sex Reprod Health. 2016 Sep;48(3):119–27.

8. He K, Dalton VK, Zochowski MK, Hall KS. Women's Contraceptive Preference-Use Mismatch. J Womens Health 2002. 2017 Jun;26(6):692–701.

9. Ngumbau N, Unger JA, Wandika B, Atieno C, Beima-Sofie K, Dettinger J, et al. Mobile solutions to Empower reproductive life planning for women living with HIV in Kenya (MWACh EMPOWER): Protocol for a cluster randomized controlled trial. PLOS ONE. 2024 Apr 1;19(4):e0300642.

10. Festin MPR, Kiarie J, Solo J, Spieler J, Malarcher S, Van Look PFA, et al. Moving towards the goals of FP2020 — classifying contraceptives. Contraception. 2016 Oct 1;94(4):289–94.

11. Barros AJ, Hirakata VN. Alternatives for logistic regression in cross-sectional studies: an empirical comparison of models that directly estimate the prevalence ratio. BMC Med Res Methodol. 2003 Oct 20;3(1):21.

12. Acal C, Aguilera AM, Escabias M. New Modeling Approaches Based on Varimax Rotation of Functional Principal Components. Mathematics. 2020 Nov;8(11):2085.

13. Ruscio J, Roche B. Determining the number of factors to retain in an exploratory factor analysis using comparison data of known factorial structure. Psychol Assess. 2012 Jun;24(2):282–92.

14. Huber-Krum S, Bornstein M, Garver S, Gipson J, Chapotera G, Norris AH. Are rural Malawian women using their preferred contraceptive method and that of their male partners? Contraception. 2021 Aug;104(2):132–8.

15. Saleem HT, Rosen JG, Quinn C, Duggaraju A, Kennedy CE. Contraception values and preferences of people living with HIV: A systematic review. Contraception. 2022 Jul;111:48–60.

16. Alene KA, Atalell KA. Contraceptive use and method preference among HIV-positive women in Amhara region, Ethiopia. BMC Womens Health. 2018 Dec;18(1):1–9.

17. Zinke-Allmang A, Bhatia A, Gorur K, Hassan R, Shipow A, Ogolla C, et al. The role of partners, parents and friends in shaping young women's reproductive choices in Peri-urban Nairobi: a qualitative study. Reprod Health. 2023 Dec;20(1):1–11.