Uptake and correlates of contraception among postpartum women in Kenya: results from a national cross-sectional survey

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Abstract

Objectives—To characterize uptake and correlates of effective contraceptive use postpartum.

Study Design—We analyzed data from a national, cross-sectional evaluation of prevention of mother-to-child HIV transmission programs that enrolled women attending 6-week or 9-month infant immunization visits at 120 Kenyan maternal and child health clinics. We classified women

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who resumed sexual activity postpartum and did not desire a child within 2 years as having a need for family planning (FP).

Results—We included 955 (94%) of 1012 women 8–10 months postpartum in the analysis. Mean age was 25.8 years and 36% were primigravidas. By 9-months postpartum 62% of all women used contraception and 59% used effective contraception (injectables, implants, intrauterine devices [IUDs], oral contraceptives [OCs], and tubal ligations). Most contraceptive users (61%) used injectables, followed by implants (10%), OCs (6%), IUDs (4%), and condoms alone (2%). The majority (n=733, 77%) had a need for FP and 67% of 733 women with FP need used effective contraception. Among women with a need for FP, effective contraception use was higher among those who discussed FP in postnatal care (PNC) than who did not discuss FP in PNC (Prevalence Ratio (PR) for PNC alone: 1.35 (95% Confidence Interval [CI]:1.16-1.58; PR for PNC and antenatal care [ANC]:1.42, 95% CI: 1.21-1.67; p=0.001 for both).

Conclusions—Two-thirds of postpartum women with a need for FP used effective contraception at 9-months postpartum, and use was associated with discussing FP during PNC.

Implications—Integrating FP counseling in ANC/PNC could be an effective strategy to increase effective contraception use.

Keywords

postpartum; contraception; Kenya; maternal health; child health

1.0 INTRODUCTION

Reducing unmet need for family planning (FP) is a global public health priority, and a critical component of the post-2015 sustainable development goals (SDGs) and FP2020 initiative.[1, 2] Postpartum women benefit from FP as a strategy to plan and space their births. Short interpregnancy intervals are associated with higher risk of infant mortality, preterm birth, low birthweight, and small-for-gestational-age.[3, 4] Using effective FP methods helps extend the interpregnancy interval to reduce these maternal and child health (MCH) risks. Yet, unmet need for FP during the postpartum period remains high. Data from women 2 years postpartum participating in Demographic and Health Surveys (DHS) in low- and bottom- income countries (LMIC) suggest unmet need exceeds 60% using a prospective definition of unmet need.[5] In Kenya, unmet need has declined among the general population between 2008 and 2014; however, more recent data on unmet need during the postpartum period are lacking.[6] In addition, method mix in Kenya has shifted during this same time period with higher use of implants, but temporal changes and correlates of specific FP methods have not been well characterized among postpartum Kenyan women.

Since over one-third of women in LMICs introduce complementary infant feeds before 6 months postpartum, effectiveness of the lactational amenorrhea method (LAM) for pregnancy prevention is diminished.[7] Thus, it is essential for postpartum women to receive FP services and effective methods early to achieve healthy birth spacing and prevent unintended pregnancies. Previous studies report that women who attend more antenatal care (ANC) visits, deliver with a skilled birth attendant, or attend postnatal care (PNC) are more

likely to use postpartum contraception.[8–12] However, other factors may also impact use of FP during the postpartum period.

We characterized uptake and correlates of effective contraception, and specific types of FP, using data from a survey of postpartum women sampled from 120 facilities across Kenya.

2.0 MATERIAL AND METHODS

2.1 Study design and sampling

In 2013, we conducted a cross-sectional study in MCH clinics providing ANC and PNC throughout Kenya to assess coverage and uptake of prevention of mother-to-child HIV transmission (PMTCT) services as previously described.[13] Briefly, we used probability proportionate to size sampling to select 121 MCH clinics in seven of the eight geographical regions in Kenya from which all mother-infant pairs were sampled to participate during a 5-day period per clinic. We classified facility size based on annual number of ANC clinic visits in 2011 and excluded "small" (<500 visits) and/or North Eastern Province facilities due to logistical constraints. (Figure 1).

2.2 Study procedures

Study nurses enrolled women attending routine 6-week or 9-month immunization visits and administered a survey on demographic and clinical characteristics, reproductive and medical history, and partner characteristics. We asked women whether they were trying to become pregnant or prevent pregnancy when they became pregnant, about their future fertility intentions, and about their current FP use. Women were also asked about whether anyone has talked to them about FP, and if yes, the timing and setting of the discussion (ANC, PNC, non-ANC/PNC, non-health care setting, family/community, or other setting). The Hurt/Insult/Threaten/Scream (HITS) scale was used to determine history of intimate partner violence (IPV).[14]

Ethical review committees at the Kenya Medical Research Institute and the University of Washington, and the Associate Director for Science at the U.S. Centers for Disease Control and Prevention, approved all study procedures.

2.3 Contraceptive definitions and statistical analysis

Modern contraception included condoms, injectables, implants, intrauterine devices (IUDs), oral contraceptives (OCs), and tubal ligations (TL). Long-acting, reversible contraception (LARC) included IUDs and implants. Effective contraception included all modern contraceptives except condoms alone. [15–17]. Dual method use consisted of condoms plus another effective contraceptive method. We defined women with a need for FP as those who resumed sexual activity after delivery and did not desire a child within the next two years; women with an unmet need for FP were women with a need for FP who were not using modern contraception. We identified correlates of effective contraceptive use among women who had a need for FP using Chi-squared tests for proportions and T-tests for continuous measures and univariate Poisson generalized linear models with a log-link function, an approach used when the outcome prevalence is high.[18, 19] We applied survey weights and

clinic-level clustering adjustments to account for the sampling design and ensure representativeness; reported percentages are weighted. Variables significant at p<0.10 were included in a multivariate Poisson generalized linear model. We included the variable with the least amount of data missing in multivariate models if variables were collinear. Variables with p>0.05 were removed from the final multivariate model. We used Stata 13.1/MP *svy commands* (Stata Corporation, College Station, TX) to perform statistical analyses.

3.0 RESULTS

In total, 955 (94%) of 1012 women 8–10 months postpartum attending 9-month infant immunization visits were included in the analysis (Figure 2). Mean age was 25.8 years (standard deviation [SD] 5.8) and mean years of completed education was 9.0 (SD 3.7) (Table 1). Most (88%) women were married, with mean relationship duration of 5.7 years (SD 4.9) among women with current partners. Overall, HIV prevalence was 7%. Over one-third (36%) of women were primigravidas and the mean number of living children was 2.4 (SD 1.7). Only half of women had attended 4 ANC clinic visits and 69% delivered in a facility (Table 1).

Among all 955 postpartum women, most (94%) reported no desire for children within the next two years and 80% resumed sexual activity by 9-months postpartum. Overall, 59% of all postpartum women (n=955) reported using modern contraception; the most common method was injectable (38%) (Figure 3). LARC was used by 12% of postpartum women. Less than 1% of women used TL, non-modern methods, or dual methods. Over half (56%) of postpartum women used effective contraception; among these women 61% used injectables, followed by implants (17%), OCs (11%), and IUDs (7%). Uptake of effective contraception varied regionally: Central (71%), Nairobi (65%), Eastern (62%), Western (59%), Nyanza (57%), Coast (55%), and Rift Valley (52%). Overall, 77% (n=733) of postpartum women had a need for FP. Among postpartum women with a need for FP, 30% were not currently using modern contraception.

Uptake of modern contraception and effective contraception was slightly lower among all postpartum women (62% and 59%, respectively) than the subset in women with a need for FP (70% and 67%, respectively) (Figures 4a and b). Injectable and LARC use were both similar among all women and women a need for FP, respectively. Prevalence of effective contraceptive use was also similar among HIV-infected and HIV-uninfected women (Figure 4a) (52% vs 60%, respectively; p=0.16).

3.1 FP discussion

Less than half (44%) of all postpartum women reported discussing FP with a provider during ANC or PNC. Among these women, 11% discussed FP in ANC alone, 17% in PNC alone, and 16% in both ANC and PNC. Women who used effective contraception were more likely than women who did not use effective contraception to have discussed FP with a provider in PNC alone (21% vs. 12%, respectively) or in both ANC and PNC (21% vs. 9%, respectfully) (p<0.001 for both).

3.2 Correlates of effective contraceptive use

Among women with a need for FP, uptake of effective contraception was associated with higher education (Prevalence Ratio [PR] 1.06/year average increase, 95% Confidence Interval [CI] 1.03-1.08), household income 10,000 KSH/month (PR 1.21, 95% CI 1.08-1.37), and having two living parents (PR 1.22, 95% CI 1.06-1.40) (Table 2). Women 19 years were more likely to use effective contraception than older women. Effective contraceptive use was more common among women who delivered in a facility (PR 1.39, 95% CI: 1.18-1.64), and discussed FP in a healthcare setting compared to women who did not have any discussion about FP or discussed FP outside of a healthcare setting. While discussing FP in ANC alone was not associated with effective contraceptive use, discussing FP in PNC alone (PR 1.35, 95% CI 1.16-1.58) or in combination with ANC (PR 1.42, 95% CI: 1.21-1.67) were both correlates of use. Effective contraception was not significantly associated with the number of current or lifetime sexual partners, history of IPV, breastfeeding duration, HIV status, or partner's HIV status (p>0.10). Several factors remained significantly associated with effective contraceptive use in a multivariate model that included education, age category, both parents being alive, facility delivery, 2 living children, 4 ANC visits, and discussed FP with provider in ANC and/or PNC (Table 2). Effective contraception was associated with higher education (Adjusted Prevalence Ratio [APR] 1.04/year increase, 95% CI 1.02-1.06, p<0.001). Delivering in a facility (APR 1.23, 95% CI 1.04-1.45, p=0.01) and discussing FP during PNC alone (APR 1.29, 95% CI 1.20-1.51, p=0.002) or during both ANC and PNC (APR=1.40, 95% CI 1.21-1.63, p<0.001) were also associated with effective contraceptive use. We conducted exploratory analyses among all postpartum women (with and without a need for FP) to determine whether uptake of postpartum contraception varied by FP method type or HIV status, and whether correlates of injectable use (vs. no effective contraception) differed from overall effective contraceptive use. Correlates of effective contraceptive use were similar to the primary analysis, with the exception that male partner ANC attendance (APR=1.17, 95% CI 1.02-1.34, p=0.02), having both parents alive (APR=1.16, 95% CI 1.02-1.33, p=0.03), and age 20–34 years (APR compared to age 35 1.44, 95% CI 1.04-2.00, p=0.03) were also significant in the adjusted model. Similarly, results from the injectable specific analysis and analysis stratified by HIV status were similar to the primary findings (data not shown).

4.0 DISCUSSION

In this national survey of postpartum Kenyan women, we found that 56% were using effective contraception by 9-months postpartum, the majority (61%) of whom used injectable methods, and <1% used dual methods. The contraceptive prevalence rate (CPR) at 9-months postpartum in our study was similar to other recent studies of Kenyan women; however, use of LARC and permanent methods was lower and injectable use was higher in our study.[6, 9] Overall, 34% of postpartum women had an unmet need for FP.

We found that women who discussed FP during PNC, alone or in combination with FP discussion in ANC, were more likely to use effective contraception. A recent review of interventions to improve postpartum contraception found that interventions delivered after, rather than before, delivery are generally more successful but results are mixed.[20]

Similarly, another observational study found no association between FP counseling in ANC and postpartum FP uptake.[21] Women in LMICs may be more receptive to FP discussions following delivery when there is a current or perceived future need for FP than during ANC. [20, 22] In our study, more than half of women reported never discussing FP within a healthcare setting, despite routinely attending ANC and PNC visits. Current Kenyan national guidelines include providing FP counseling throughout the continuum of care in ANC, intrapartum, and at each PNC visit; and as integrated service provision within HIV care.[23] Since infant immunization coverage is high in sub-Saharan Africa, with frequent provider interactions during these visits, strategies to promote FP counseling in the early postpartum period during infant immunization visits could be a useful strategy to reduce unmet need during this period.

In our study, higher maternal education and utilization of MCH services (4 ANC visits and facility delivery) were significantly associated with contraceptive use, consistent with other studies.[8–12, 24] Postpartum FP use in LMICs has also been associated with urban residence,[8] being married,[12] greater wealth and education,[10–12] achievement of desired family size and current fertility desire.[24] In contrast to our study, a study conducted in five LMICs found that younger postpartum women (<20 years old) were 24% more likely than women 30 years to have an unmet need for FP.[9] Together, these factors may be markers of empowerment and access to information that facilitate uptake of postpartum FP.

Over one-third of postpartum women in our study used injectables, and use was similar by HIV status. In response to findings from some, but not all, studies showing an association between depot medroxyprogesterone acetate (DMPA) and increased risk of HIV acquisition, [25–27] WHO recommended expanding the contraceptive method mix to include the full range of contraceptive methods (particularly implants and IUDs). Due to injectable widespread use in many regions with high HIV incidence, it is important to weigh potential HIV-related risks with potential benefits to avert maternal deaths via injectables.[28] Increasing implant use among postpartum women may help alleviate these HIV-related risks, and maintain MCH benefits. Implants have many characteristics that make them particularly well-suited for postpartum women, including the ability to be inserted immediately postpartum, breastfeeding compatibility, longer-term coverage, high effectiveness, and no need for re-dosing.[29] However, LARC use has previously been reported to be low (<4%) among postpartum women in sub-Saharan Africa.[9] Our data suggest implants are increasingly an acceptable FP method for postpartum women, with 10% using selecting this method, similar to the general population.[6] Thus, implants may increasing represent a larger proportion of the method mix to postpartum women who are offered them.

Our study had several strengths. We included adolescents (age 14-17) and unmarried postpartum women sampled nationally, restricted most analyses to women with a need for FP, and excluded FP methods with high failure rates. The study also had some limitations. One province was not included; however, it is sparsely populated and the sampling frame excluded small facilities; we did not measure contraceptive discontinuations or switching, and results may not be generalizable to women who do not attend PNC. Finally, we had limited power to assess correlates of contraceptive use among HIV-infected women.

Promoting FP during the postpartum period is a high-impact and cost-effective approach to improve MCH.[30] Strategies that better integrate patient-centered FP counseling and education within ANC and PNC as part of the routine package of MCH services, and provide comprehensive counseling to include methods with longer-term coverage could be effective approaches to meet postpartum FP needs. Further research to provide critical insights to enhance FP counseling approaches for postpartum women who are already accessible in the healthcare system, such as concerns about side effects and compatibility with breastfeeding, and data on method satisfaction and continuation rates among postpartum women, may help improve care.

Acknowledgments

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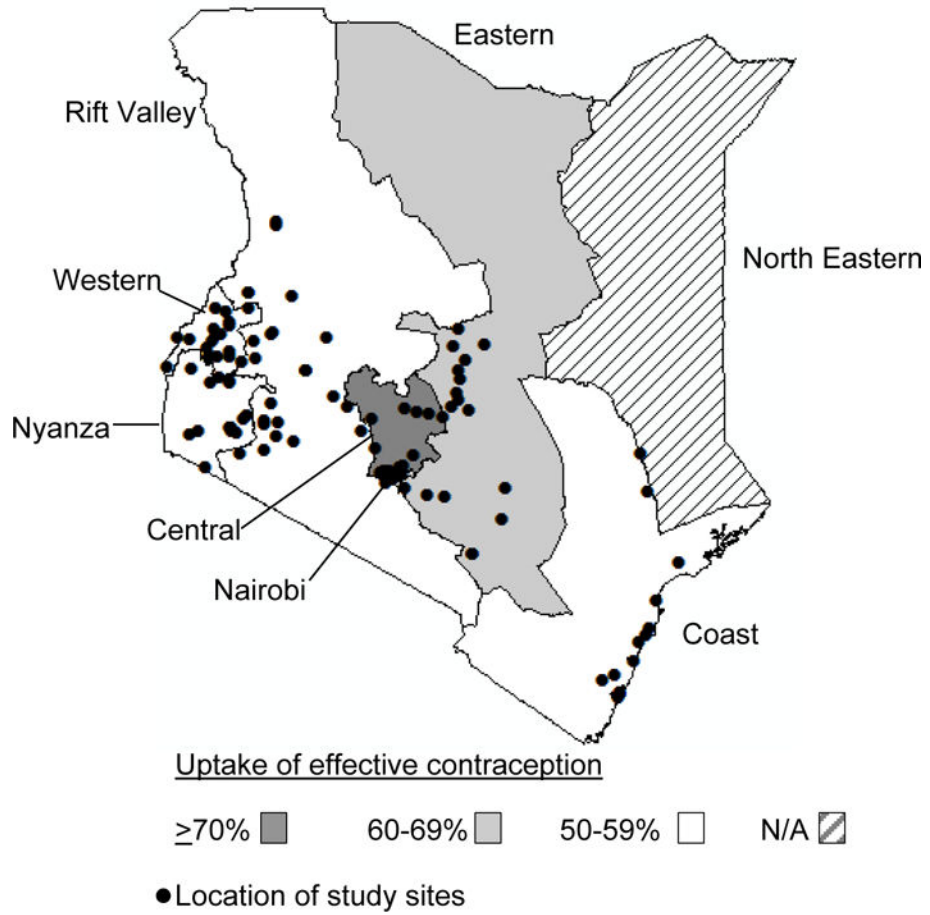
Figure 1. Study locations (n=120) and regional uptake of effective contraceptive methods among Kenyan postpartum women attending maternal and child health clinics, 2013

Percentages are weighted
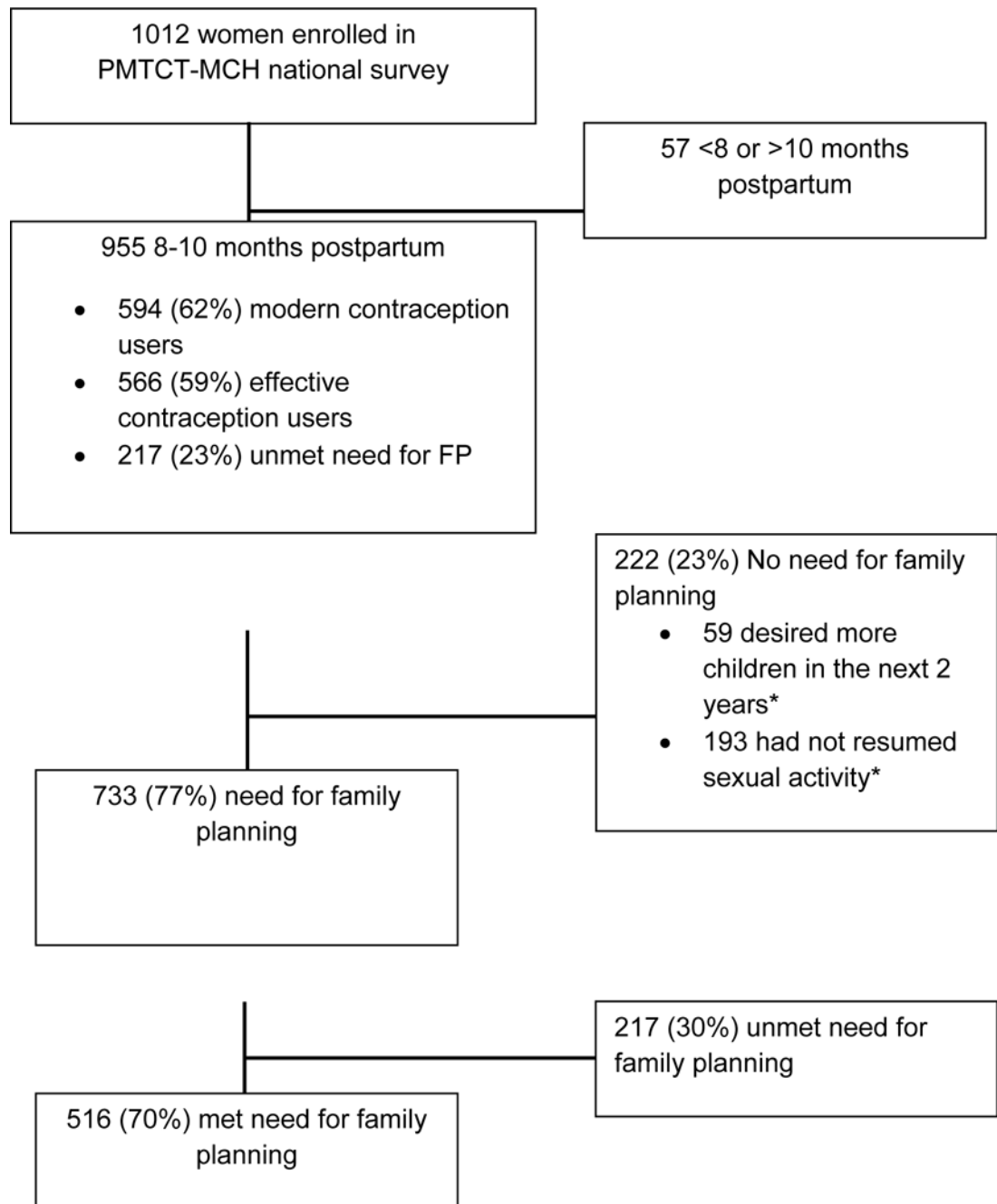
Figure 2. Study flowchart for Kenyan postpartum women attending maternal and child health clinics, 2013
*Not mutually exclusive. PMTCT=prevention of mother-to-child HIV transmission; MCH=maternal and child health Modern contraception included condoms, injectables, implants, intrauterine devices, oral contraceptives, and tubal ligations; effective contraception included all modern contraception except condoms. Women with unmet need reported resuming sexual activity after delivery and not desiring children within the next two years. Percentages are weighted.

a. **All women**
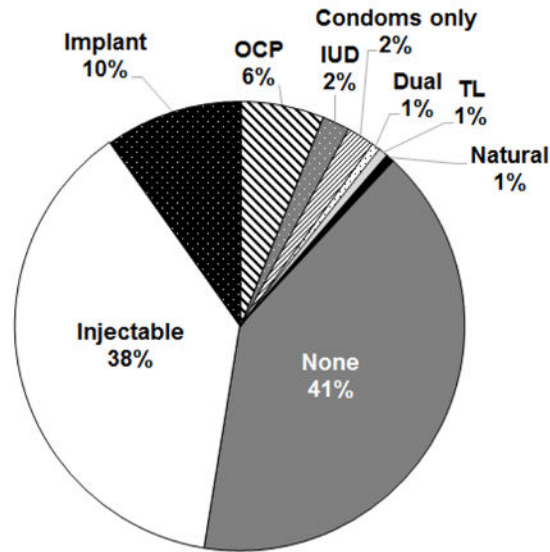
b. **Women with a need for family planning**
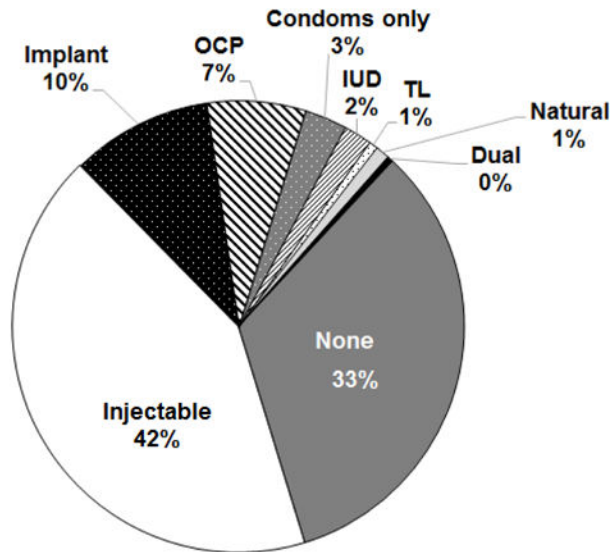
Figure 3. Contraceptive methods used among Kenyan postpartum women attending maternal and child health clinics, 2013

IUD= intrauterine device; OC = oral contraceptives; TL=tubal ligation. Dual methods include condoms and another effective method (injectables, implants, IUDs, OCs, and TL). Percentages are weighted. Percentages rounded up or down to nearest integer if >1%, which results in total exceeding 100%. Women with a need for FP had resumed sexual activity by 9 months postpartum and did not desire more children in the next 2 years.

a. All postpartum women (n=955)
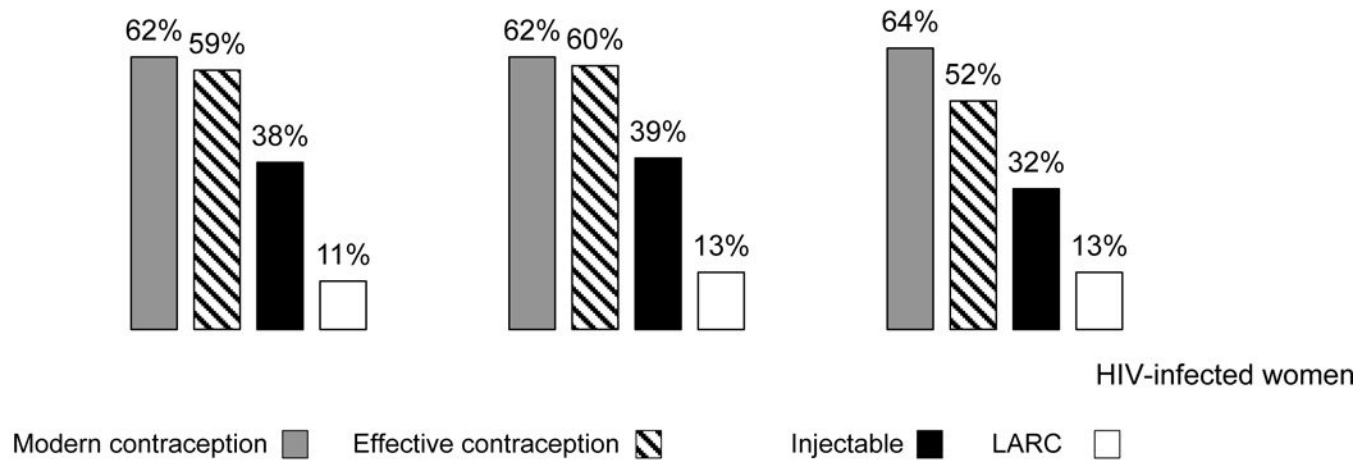
b. Postpartum women with a need for family planning (n=733)

Figure 4. Frequency of contraceptive use, by type and HIV status, among Kenyan postpartum women attending maternal and child health clinics, 2013
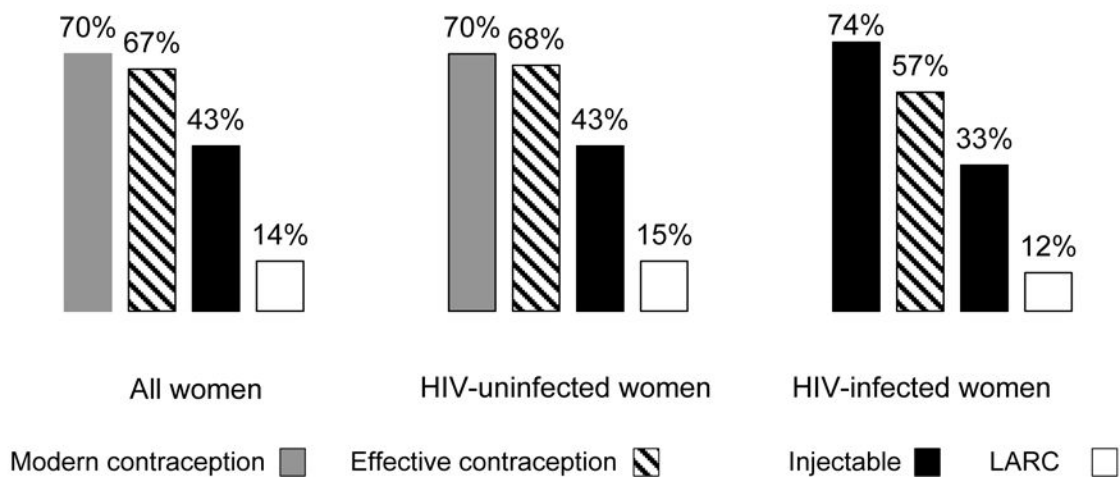Women with unmet need reported resuming sexual activity after delivery and not desiring children within the next two years.

Table 1

Characteristics of Kenyan postpartum women attending maternal and child health clinics participating in the study, by effective contraceptive use, 2013[1]

| | | Weight Mean (SD) or Unweighted N (Weighted %) | | |
| | | | Effective contraceptive use | |
	N[2]	All women (n=955)	No (n=389)	Yes (n=566)
Sociodemographic				
Age (years)	955	26.1 (5.7)	26.5 (6.2)	25.8 (5.2)
Age category (years)				
≤19	955	83 (8%)	39 (9%)	44 (8%)
20-34	955	776 (82%)	296 (77%)	480 (85%)
35	955	96 (10%)	54 (14%)	42 (7%)
Completed education (years)	955	9.5 (3.8)	8.7 (4.3)	10.0 (3.4)
Both parents alive (vs. one or both deceased)	951	577 (61%)	213 (55%)	364 (65%)
Married	955	827 (87%)	305 (79%)	522 (92%)
Monthly household income 10,000 KSH	606	174 (29%)	52 (24%)	122 (33%)
Relationships and sexual behavior				
Relationship duration (years)[3]	843	5.5 (4.6)	6.0 (5.2)	5.2 (4.2)
Partner age difference (years older)[3]	747	5.6 (5.0)	5.9 (5.5)	5.4 (4.7)
1 current sexual partners	843	36 (4%)	8 (2%)	28 (5%)
Number of lifetime sexual partners	876	1.9 (1.2)	1.8 (1.0)	1.9 (1.2)
Intimate partner violence (within the past year)	918	379 (41%)	144 (39%)	235 (42%)
Partner HIV status known[3]	843	570 (67%)	191 (61%)	379 (71%)
Partner HIV status[3]				
Negative	843	535 (63%)	176 (57%)	359 (68%)
Positive	843	35 (4%)	15 (4%)	20 (4%)
Unknown	843	272 (33%)	122 (39%)	151 (29%)
Resumed sex since delivery	940	772 (82%)	263 (69%)	509 (91%)
Reproductive history				

	N[2]	Weight Mean (SD) or Unweighted N (Weighted %)		
			Effective contraceptive use	
		All women (n=955)	No (n=389)	Yes (n=566)
Gravidity	955	2.4 (1.7)	2.7 (2.1)	2.2 (1.4)
Number of living children	955	2.2 (1.5)	2.5 (1.8)	2.0 (1.3)
Number of ANC visits	885	3.6 (1.6)	3.4 (1.5)	3.7 (1.6)
Partner attended ANC	906	322 (28%)	98 (41%)	224 (36%)
Facility delivery	955	711 (74%)	256 (66%)	455 (80%)
No desire for more children within 2 years	955	906 (95%)	365 (94%)	541 (96%)
Tried to become pregnant (last pregnancy)	952	593 (63%)	225 (59%)	368 (65%)
Duration of breastfeeding (months)	950	8.9 (0.8)	8.8 (0.7)	8.9 (0.9)
Discussed FP with provider[4]				
Never	955	523 (55%)	258 (67%)	265 (47%)
During ANC only	955	106 (11%)	40 (10%)	66 (12%)
During PNC only	955	169 (18%)	51 (13%)	118 (21%)
During ANC and PNC	955	157 (16%)	40 (10%)	117 (20%)
Clinical history				
Ever diagnosed with STI	934	33 (4%)	13 (4%)	20 (4%)
HIV-infected[4]	940	81 (8%)	39 (10%)	42 (7%)
Currently on ART (vs. not on ART)[5]	81	48 (60%)	23 (58%)	25 (62%)

FP=Family planning, ANC=antenatal care, PNC=postnatal care, IUD= intrauterine device, OCP = oral contraceptive pill, ART=antiretroviral therapy, STI=sexually transmitted infection. Adolescents are defined as age <20 years. Dual methods include condoms and another modern method. Percentages are weighted.

[1] Effective contraception includes IUDs, implants, oral and injectable contraceptives, and tubal ligations

[2] Number of observations with complete information included in model

[3] Among women with current partners

[4] Excludes 15 women with unknown HIV status

[5] Among HIV-infected women

Table 2

Correlates of effective contraceptive use among Kenyan postpartum women attending maternal and child health clinics with a need for family planning, 2013. (n=733)[1]

	N[2]	Weight Mean (SD) or Unweighted N (Weighted %)			Weighted Poisson generalized linear models			
		Effective contraceptive use						
		No	Yes	p[3]	Crude PR (95% CI)	p	Adjusted PR (95% CI)[4]	p
Sociodemographic characteristics								
Age category (years)	733							
19		16 (6%)	30 (6%)	0.006	1.33 (0.98-1.81)	0.07	1.34 (0.99-1.81)	0.06
20-34		191 (78%)	420 (86%)		1.37 (1.09-1.74)	0.008	1.27 (1.00-1.61)	0.05
35		37 (15%)	39 (8%)		Ref			
Completed education (per year increase)	733	8.8 (4.3)	10.2 (3.3)	<0.001	1.04 (1.02-1.05)	<0.001	1.03 (1.01-1.04)	**0.004**
Both parents alive (vs. one or both deceased)	729	132 (54%)	311 (64%)	0.007	1.16 (1.04-1.30)	**0.01**	1.08 (0.97-1.21)	0.17
Married	733	233 (96%)	466 (95%)	0.9	0.98 (0.77-1.24)	0.9		
Monthly household income 10,000 KSH	606	37 (26%)	118 (36%)	0.05	1.14 (1.01-1.29)	**0.04**		
Relationships and sexual behavior								
Relationship duration (per year increase)[5]	711	6.2 (5.3)	5.2 (4.1)	0.01	0.98 (0.97-1.00)	**0.01**		
Partner age difference (per year older)[5]	646	5.8 (4.7)	5.4 (4.8)	0.4	0.99 (0.98-1.01)	0.4		
1 current sexual partners	711	5 (2%)	20 (4%)	0.15	1.21 (0.98-1.48)	0.07		
Number of lifetime sexual partners	688	1.9 (1.0)	1.9 (1.2)	0.7	0.99 (0.95-1.04)	0.8		
Intimate partner violence (within the past year)	733	106 (43%)	209 (42%)	0.97	1.00 (0.90-1.11)	0.97		
Partner HIV status known[4]	711	159 (67%)	339 (71%)	0.27	1.07 (0.95-1.20)	0.28		
HIV-infected partner[5,6]	498	14 (8%)	16 (5%)	0.13	0.80 (0.58-1.12)	0.2		
Reproductive history								
Gravidity 3	733	108 (44%)	166 (34%)	0.008	0.86 (0.77-0.97)	0.01		
2 living children	733	168 (68%)	281 (57%)	0.004	0.86 (0.78-0.95)	**0.003**		

	N²	Weight Mean (SD) or Unweighted N (Weighted %)			Weighted Poisson generalized linear models			
		Effective contraceptive use			Crude PR (95% CI)	p	Adjusted PR (95% CI)⁴	p
		No	Yes	p³				
4 ANC visits	689	115 (65%)	268 (75%)	0.017	1.18 (1.02-1.38)	0.03	1.09 (0.94-1.27)	0.2
Partner attended ANC	719	83 (35%)	193 (41%)	0.13	1.09 (0.98-1.21)	0.12		
Facility delivery	733	163 (67%)	400 (81%)	<0.001	1.33 (1.15-1.55)	<0.001	1.26 (1.06-1.49)	0.008
Tried to become pregnant (last pregnancy)	732	155 (64%)	327 (68%)	0.33	1.06 (0.94-1.18)	0.34		
Duration of breastfeeding (per month increase)	730	8.9 (0.5)	8.9 (0.6)	0.96	1.00 (0.92-1.10)	0.96		
Discussed FP with provider during ANC or PNC (vs. neither)	733	88 (35%)	262 (53%)	<0.001	1.27 (1.14-1.41)	<0.001		
Discussed FP with provider	733			<0.001				
Never	733	156 (65%)	227 (47%)		ref			
During ANC only	733	28 (11%)	58 (12%)		1.14 (0.97-1.36)	0.12	1.07 (0.89-1.28)	0.5
During PNC only	733	35 (14%)	110 (23%)		1.28 (1.13-1.45)	<0.001	1.25 (1.10-1.42)	0.001
During ANC and PNC	733	25 (10%)	94 (19%)		1.34 (1.18-1.52)	<0.001	1.33 (1.18-1.51)	<0.001
Clinical history								
Ever previously diagnosed with STI	733	7 (3%)	18 (4%)	0.6	1.07 (0.83-1.38)	0.6		
HIV-infected	723	24 (9%)	30 (6%)	0.11	0.84 (0.66-1.07)	0.15		
Currently on ART (vs. not on ART)⁷	54	14 (58%)	17 (57%)	0.96	0.99 (0.61 -1.61)	0.96		

PR=prevalence ratio, p=p-value, CI=confidence interval, FP=FP, ANC=antenatal care, PNC=postnatal care, IUD= intrauterine device, OCP = oral contraceptive pill, ART=antiretroviral therapy, STI=sexually transmitted infection. Dual methods include condoms and another modern method. Women with a need for FP had resumed sexual activity by 9-months postpartum and did not desire more children in the next 2 years. Percentages are weighted.

[1] Effective contraception defined as intrauterine devices, implants, oral and injectable contraceptives, dual methods (condoms and hormonal method) or tubal ligation

[2] Number of observations with complete information included in model

[3] Chi-squared test for proportions and T-tests for continuous measures

[4] Adjusted for education (completed years), age category, both parents being alive, number of ANC visits during last pregnancy and delivery at facility. Number of living children, gravidity and relationship duration were excluded due to collinearity with age. Income was excluded due to collinearity with education. Number of ANC visits during last pregnancy was excluded due to collinearity with facility delivery.

[5] Among women with current male partners

[6] Compared to women with HIV-uninfected male partners

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[7]Among HIV-infected women (n=81)

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