

Developing a Family Planning Counseling Intervention for Women and Adolescent Girls in
Resource-Limited Settings

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Abstract

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Introduction: Unintended pregnancy, including both mistimed and unwanted pregnancies, is associated with negative health outcomes for women and children including maternal depression, increased risk of physical violence, premature deliveries, and low birth weight among children. Adolescents, postpartum, and HIV-infected women are key populations at risk of unintended pregnancy, with unique unmet contraceptive needs. Despite contraceptive guidelines and recommendations, underuse and discontinuation of effective contraception remains a great challenge. The studies within this dissertation address gaps in understanding of contraceptive use behavior and counseling experiences of adolescents and women in resource-limited settings to inform development of FP interventions in Kenya.

Methods: To inform contraceptive use behavior of postpartum women, we conducted a systematic literature review and meta-analysis on postpartum contraceptive use, including predictors and barriers among women in resource-limited settings. Using survey data from 109 HIV care and treatment programs in Kenya, we further examined the correlates of receipt of contraceptive counseling among HIV-infected women to determine whether there were differences in who was offered FP services and whether methods offered matched women's preferences. Finally, to improve FP counseling services, we developed an

interactive mobile application for contraceptive choice (iMACC) to guide women through the FP decision-making process. We evaluated the feasibility, acceptability, and utility of our FP decision-aid among postpartum adolescent girls and women, as well as FP providers, in Kenya.

Results: Through the systematic review, we found an overall pooled prevalence of modern contraceptive use among postpartum women of 41.2%. Low uptake was related to low perceived risk of getting pregnant and inadequate contraceptive counseling. In the surveys of HIV-positive women, those who were already using FP, and those who desired to delay pregnancy more than two years, were more likely to receive FP counseling by their health provider. Married women with higher education and other children were more likely to receive counseling on benefits of birth spacing and limiting. Findings from qualitative interviews support the feasibility, acceptability, and utility of the FP counseling decision-aid to tailor counseling to women's unique needs and facilitate decision-making among women with their FP providers in resource-limited settings.

Conclusions: The studies within this dissertation aim to overcome gaps in contraceptive counseling and improve contraceptive use, satisfaction, and continuation among adolescent, postpartum, and HIV-infected women who have unique needs for contraception in resource-limited settings. Uptake of FP services may be improved by providing high quality, individualized FP counseling and by better integrating FP counseling for all women in primary, postpartum, and HIV care.

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GLOSSARY

ANC:	Antenatal care
CI:	Confidence interval
DHS:	Demographic and Health Survey
ECP:	Emergency contraceptive pill
FP:	Family planning
HIV:	Human Immunodeficiency Virus
iMACC:	Interactive mobile application for contraceptive choice
IUD:	Intrauterine device
LARC:	Long-acting reversible contraceptive
LAM:	Lactational amenorrhea method
MCH:	Maternal and child health
mCPR:	Modern contraceptive prevalence rate
OCP:	Oral contraceptive pill
OR:	Odds ratio
PPFP:	Postpartum family planning
PRISMA:	Preferred reporting items for systematic reviews and meta-analyses
PNC:	Postnatal care
SSA:	sub-Saharan Africa

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DEDICATION

To my parents (Gauri Deo and Udit Prasad Deo) and my mentors

CHAPTER 1: Introduction

Unintended pregnancy and associated health risks

Unintended pregnancy, either unwanted or mistimed, is a widespread problem with a range of long-term negative health outcomes for women, their children, and society.[1, 2] It can result from non-use, incorrect use, or inconsistent use of contraceptive methods.[3] In 2017, unintended pregnancies occurred among 89 million women in developing regions, accounting for 84% of unintended pregnancies worldwide (Figure 1).[4] Mothers with unintended pregnancies are at higher risk of anxiety, maternal depression, and reported low emotional well-being.[5] Further, women experiencing unwanted pregnancies are at increased risk of poor birth outcomes, including congenital anomalies, stillbirth, spontaneous abortion, premature delivery and low-birth weight among infants.[5] Moreover, evidence suggests that children who were unwanted at the time of conception are less likely to be breastfed, suffer more negligence and abuse, are at higher risk of incomplete child vaccination, and have poor growth.[6]

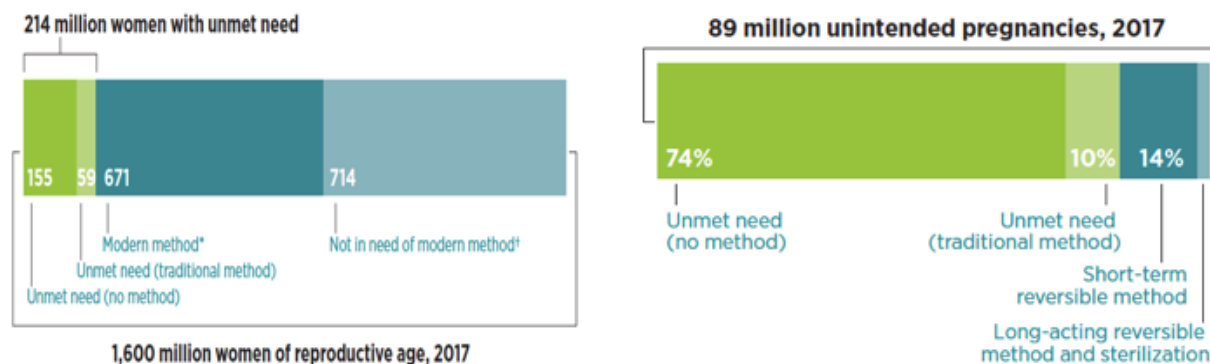


Figure 1. Unmet need and unintended pregnancy (Source: Guttmacher Institute, 2017)

Unmet need for contraception

Unmet need for contraception is defined as women who want to avoid a pregnancy but currently use no contraceptive method or use a traditional method.[7] In 2017, 214 million women of reproductive age in low-income countries had unmet need of modern contraception, including 155 million who used no method of contraception and 59 million who relied on traditional methods. Had this need been satisfied, 67 million

unintended pregnancies and 36 million abortions would have been averted in one year alone.[4] Use of modern contraceptive methods (oral contraceptive pills [OCs], injectables, implants, intra-uterine devices [IUDs], condoms, sterilizations) is lower in resource-limited settings (40%), particularly in sub-Saharan Africa (28%), and the high rate of unmet need in Africa (24%) is double the global average (12%).[8]

Adolescent, HIV-positive, and post-partum women with unique contraceptive needs

Unintended pregnancy is a significant health concern for all reproductive age women; however, it is of particular concern among adolescents, postpartum women, and HIV-infected women. Approximately 16 million adolescent girls between 15 and 19 give birth each year, most of which are unplanned, and another three million undergo unsafe abortion.[9] In resource-limited settings, complications from pregnancy and childbirth are the leading cause of death among girls in this age group, [9] and adolescents are more likely to experience obstructed labor, fistula, and premature delivery as compared to older women.[10] Postpartum women are at risk of pregnancy within three weeks of delivery regardless of next menses, if they are not exclusively breast-feeding and are not using effective contraception.[11] Although 95% of women in their postpartum period wish to delay their subsequent pregnancy in the next 24 months, most (61%) do not use any contraception.[12] And despite prevention of unwanted pregnancy being one of the four pillars of prevention of mother to child HIV transmission, unintended births are just as common among HIV-infected women as among adolescents and postpartum women.[13, 14]

Need for counseling interventions

Most of the key barriers to contraceptive use (e.g., concern over confidentiality, fear of side effects, low perception of risk to pregnancy, lack of awareness on contraceptive methods) could be addressed by FP counseling to aid in making informed decisions that are appropriate for individual need and life stage. [15] Most existing studies have emphasized interventions to improve access to contraception,[16, 17] however women with unmet need for contraception rarely say that they are unaware of contraception, do not have access to the contraception, or it costs too much.[7] Therefore, improving awareness, availability, and

accessibility of contraceptive methods alone will have limited impact on increasing contraceptive use. The process by which contraceptive services are offered and the type of information delivered may play a more important role in the acceptance and uptake of available contraceptive methods.

Context in Kenya

The prevalence of unintended pregnancy is high in Kenya.[18, 19] Over 40% of pregnancies are reported unintended, either unwanted or mistimed.[20] The data reported in the 2017 FP2020 show that less than half of all women (44.8%) used any modern contraceptive methods, and there was an unmet need of 17.2% among married women.[21] Among the method users, almost half (47.9%) of women used injectables. An estimated 35% of maternal deaths in Kenya are attributed to unsafe abortion in Kenya.[22, 23] In the adolescent age group, the 2014 Kenya Demographic and Health Survey (KDHS) estimates pregnancy ranges from 6% to 40% across the 47 counties.[18, 24] Unmet need for FP is higher among all women (18%), particularly among women in rural areas (20%) and with no education (28%).[24] Over one-third of births (37%) are delivered at home with no access to FP services, and postpartum women highly rely on breast-feeding induced amenorrhea, even though exclusively breastfeeding their child only for 4.3 months on average.[24] Less than half of HIV-infected women use any modern contraceptive methods, and most commonly rely on short-acting methods despite having a greater desire of avoiding pregnancy as compared to non-infected women.[25, 26] There is a substantial gap between need and use for FP and effective programs and strategies are required to increase contraceptive access, and FP education and information to increase use.

Family planning decision-aid

Interactive mobile application (“app”) for contraceptive choice (iMACC) is a self-administered, tablet-based counseling decision-aid designed to provide systematic, yet personalized, contraceptive counseling to postpartum adolescent and adult Kenyan women as a strategy to guide them through the FP-decision

making process. Decision support tools are shown to have mixed results, but generally could help improve the method choice process when they are well-designed.[27] Our decision-aid is designed to help prepare women to make deliberated contraceptive choices, rather than only improve overall contraceptive knowledge or replace clinician counseling. Our counseling aid could be an important tool to reach populations and supplement over-worked providers in resource-limited settings. Health care providers are at the forefront in counseling and offering family planning services. Thus, this aid may also help streamline the counseling process and limit already over-stretched health care providers' workload, better educate and engage users, and prepare women to spend face-time with providers on pre-selected method(s) of contraception. Our aid is designed to be incorporated in an existing FP infrastructure, and can be readily adapted to incorporate changing contraceptive guidelines, preferences and values unique to different cultures and populations, and new contraceptive technologies in real-time. Understanding personal preferences of target populations, as well as acceptability and usability of the tool, will help inform optimal development of the intervention.

Study rationale

Inadequate decision support may result in the selection of a method that poorly fit circumstances of women, leading to dissatisfaction and discontinuation of methods. This dissertation aims to understand the contraceptive use behavior, predictors and barriers of contraceptive use, and counseling experiences of women so as to plan and implement services suitable to their needs, by integrating aims from three different data sources. Chapter 2 is a systematic review and meta-analysis of contraceptive use and unmet need, including a summary of facilitators and barriers to uptake and use of FP services in low-resource settings. Chapter 3 focuses on FP use by HIV-positive women, by surveying women accessing 109 HIV care program and assessing correlates of receipt of counseling services. Finally, Chapter 4 informs the development of a new FP decision-aid to support contraceptive decision-making for postpartum adolescent and adult women in Kenya through in-depth interviews with postpartum women and FP providers.

CHAPTER 2. A systematic review and meta-analysis of postpartum contraceptive use, predictors, and barriers among women in resource-limited settings

Background

Short birth intervals between pregnancies increase risks for adverse maternal and infant outcomes, including premature birth, low-birth weight, and infant mortality.[28, 29] Birth intervals shorter than 18 months have the highest mortality risk for infants and children under-five, with decreasing risk as birth intervals increase up to 36 months. [30] As a result, the World Health Organization (WHO) recommends birth intervals of 2-3 years between pregnancies.[29] Postpartum family planning (PPFP),[31] or the initiation of contraceptive methods within the first 12 months following childbirth, can help women space their births, providing important maternal and child health (MCH) benefits. Spacing births by at least two years can reduce maternal mortality by 30% and child mortality by 10%.[32]

The majority (95%) of postpartum women in resource-limited settings report a desire to prevent pregnancy for at least two years following a birth; yet, use of family planning (FP) methods is low (30%) [12] and risk of unintended pregnancy is high (57%) in the postpartum period.[33] Even among women who use modern FP methods, use of highly effective, long-acting reversible contraception (LARC), including intra-uterine devices (IUDs) and implants, is low (< 15%).

Individual studies suggest contraceptive use among postpartum women varies widely across geographical regions in resource-limited settings [34-37]. However, differences in study design, temporal changes in contraceptive use, and definitions of unmet need have made it difficult to compare estimates of contraceptive use and unmet need between settings. Furthermore, individual, societal, or health systems factors affect uptake of contraception during the postpartum period that contribute to the variation.

Identifying similarities and differences in contraceptive use, unmet need for PPF, and factors that affect PPF across low-resource settings is critical to informing strategies to enable women to effectively space and limit pregnancies and improve overall MCH. We conducted a systematic review and meta-analysis to summarize modern contraceptive prevalence rates (mCPRs), reproductive intentions, and unmet need among postpartum women in resource-limited settings. We also reviewed barriers and facilitators to using contraception during the postpartum period.

Methods

Search strategy

We conducted a search for all peer-reviewed published articles on PPF using PubMed, EMBASE, PsycINFO, CINAHL, Scopus, Web of Science, and Global Health databases from January 1997 to May 2018. A combination of Medical Subject Headings or key search terms included: (postpartum OR post-delivery OR parturition OR puerperium) AND (use OR behavior OR preference OR barrier) AND (contraception OR contraceptive OR family-planning) AND (resource-limited OR low income OR middle income). We also conducted an internet search using the Google search engine to identify published online articles related to postpartum contraceptive use that may be excluded from these databases. Titles of articles without abstracts were reviewed for consideration of full-text review; duplicate titles of articles were excluded from the review. Articles and proceedings of several international meetings and conferences on PPF (International seminar on promoting postpartum and post-abortion family planning, International Conference on Family Planning, Family Planning 2020) were included in the full-text review if the abstract or title mentioned postpartum contraception or postpartum family planning.

Inclusion and exclusion criteria

The systematic review and meta-analysis included studies of postpartum women in resource-limited settings based on the World Bank classification.[38] Data through 12 months postpartum were included in the review; studies that report follow-up data beyond 12 months postpartum were included if data could be disaggregated to only include data during the first 12 months postpartum. Studies were included in the review or meta-analysis if one or more of the given outcomes were reported: modern contraceptive prevalence rate; unmet need for FP; and/or reproductive intentions (birth spacing/limiting). Additionally, studies that included data on barriers or facilitators of contraceptive use were included in the review. We also included qualitative studies in the review to explore women's perspectives on contraceptive use. Articles were excluded if they were not in English or did not specify the duration of postpartum follow-up. Reports from Demographic and Health Surveys (DHS) were excluded since contraceptive use for postpartum women included women who delivered in the last five years without disaggregating the postpartum duration. However, analyses of DHS data on postpartum women that include follow-up restrictions through 12 months postpartum were included. One proceeding from an international seminar was included. Unpublished articles, articles for which full-text could not be retrieved, and conference abstracts were excluded.

Abstract review

Articles and reports identified for review were imported into Covidence, a web-based software platform that streamlines citation review, resolution of discrepancies between independent reviewers, and agreement on final consensus data. All imported studies were initially reviewed for inclusion based on information contained in titles, keywords, and abstracts by two independent reviewers. Any unresolved disagreements between the two reviewers were discussed and consensus was reached by involving a third reviewer.

Contraceptive definitions

Contraceptive use was defined as using one or more of the following method(s): male or female condoms, spermicides, oral contraceptive methods [OCPs], injectables, implants, intrauterine devices [IUDs], sub-dermal implants, male and female sterilizations, emergency contraceptive pills [ECPs], LAM, standard days methods [SDM], rhythm/calendar method, withdrawal, or abstinence.[39-41] LARC was defined as the use of implants or IUDs.[41] Modern contraceptive methods included male and female condoms, OCPs, injectables, implants, IUDs, sub-dermal implants, male and female sterilizations, and ECPs; traditional methods included LAM, SDM, rhythm/calendar method, withdrawal, and abstinence.[40]

The modern contraceptive prevalence rate (mCPR) was defined as the percentage of women who were currently using, or whose sexual partner was currently using, at least one method of modern contraception within the first year postpartum. The mCPR was classified according to Track20 three stages of growth in 69 FP2020 focus countries: low (<20%), moderate (20-40%), and high (>40%).[42, 43] Reproductive intentions were defined as women's desire for birth spacing or limiting. Postpartum women who delivered within last year and who wanted to postpone their next pregnancy for ≥ 2 years were classified as desiring contraception for birth spacing, while women who did not want another child were classified as desiring contraception for birth limiting.[44] Unmet need for contraception among postpartum women in the studies included in the review were defined using prospective, retrospective, and current status definitions.[45] Unmet need using a prospective definition included women who did not want a child in the next two years but were not using modern contraceptives (including women who are amenorrhic or abstaining from sex). Unmet need using a retrospective definition followed standard DHS approach and included women based on whether their prior pregnancy was unwanted.[45, 46] Current status definition of unmet need included women who had resumed sex and menses and not using FP, but wanted to delay next pregnancy for two years to assess unmet need.[45] Only studies that included a prospective definition to assess unmet need

were included in the meta-analysis. Weighted averages were calculated to summarize individual characteristics across studies.

Pooled prevalence

To account for study heterogeneity, we conducted a random-effects meta-analysis.[47] Study locations were categorized into three regions: East Africa, West Africa, and South Asia/South East Asia. For the meta-analysis we calculated overall pooled mCPR, unmet need for FP, and desire for birth spacing/limiting, and stratified pooled estimates by region. Differences by study-level characteristics (follow-up period of < 6 months or \geq 6 months postpartum, and year of baseline survey before and after the 2012 London Summit that issued a call for global increase in contraceptive use) that could be the potential sources of heterogeneity were estimated using random-effects meta-regression methods.[48, 49] If 95% confidence intervals (CIs) were not reported, standard errors were calculated to construct 95% CIs.[50] If studies included multiple regions but reported country specific estimates, we included estimates for each country separately to calculate pooled estimates. Statistical analyses were conducted using Stata version 14 (Stata corporation, College Station, TX, USA).

Results

Studies selected for review

Among 669 studies identified, 90 were selected for full-text review, and 35 (34 articles and 1 seminar report) met inclusion criteria (Figure 1). Characteristics of studies included in the review and meta-analysis are summarized in Table 1. Overall, 15 low-and middle-income countries were included, representing a total of 74, 001 postpartum women; the majority of studies (n=23) were conducted in sub-Saharan Africa (8 in West Africa and 15 in East Africa), 7 in South Asia/South East Asia, 1 in Middle East/North Africa, and 4 in multiple regions. More than half (n=25) were cross-sectional, with outcome ascertainment

between 0-12 months postpartum. Among 6 prospective studies and one trial with follow-up, the weighted average duration of follow-up was 3 months postpartum; however, most studies in the review (n=20) had 12 months of follow-up postpartum.[12, 34, 37, 51-57] Among 16 studies that reported maternal age, the weighted mean age of postpartum women was 28 years.

Postpartum contraceptive use and behaviors

Modern contraceptive prevalence rate (mCPR) between 0-12 months postpartum

The postpartum mCPR was reported in 24 studies, with an overall crude pooled estimate of 41.2% (95% CI: 30.1-52.2, $I^2=99.9\%$). The adjusted meta-regression estimate for mCPR was 41.1% (95% CI: 33.5-48.7, $p<0.001$). There was no significant association of the follow-up period ($p=0.948$) and survey year ($p=0.406$) with the detected heterogeneity in mCPR. When evaluated by geographic region, the estimate of mCPR was lowest in West Africa (36.3%, 95% CI: 27.0-45.5, $I^2=92.7\%$), followed by East Africa (39.5%, 95% CI: 28.2-50.8, $I^2=99.8\%$) and South Asia/South East Asia (42.4%, 95% CI: 15.7-69.1, $I^2=100\%$) (Figure 2). Meta-regression estimates for the adjusted mCPR by regions showed similar results. Adjusted estimates were lowest in West Africa (36.6%, 95% CI: 30.9-42.4), followed by East Africa (39.5%, 95% CI: 27.5-51.5), and South Asia/South East Asia (42.5%, 95% CI: 33.6-48.8). In South Asia/South East Asia, mCPR ranged from 4.0% in Pakistan to 65.6% in India, and in East Africa from 10.3% in Ethiopia to 73.7% in Zambia. Variation in mCPR was least in West Africa (25.5% in Ghana to 48.3% in Niger).

Most commonly used contraceptive methods during postpartum

Results show that the method mix varies widely across countries and regions. Among users, the most commonly started (or preferred) modern contraceptive method after birth was injectables, followed by OCPs and condoms. Injectables comprised the majority of the method-mix and ranged from 2.7% in Nigeria [58] to 68.5% in Ethiopia [59]. Respondents were less aware of sterilization methods compared to other

methods as reported by a study conducted in Nigeria.[58] Twelve studies across all regions reported women to be less likely to use LARCs (implants and IUDs), relying more commonly on short-acting methods.[36, 37, 59] The share of LARCs in a method-mix was reported in Indonesia, Kenya, and Ethiopia reflecting recent efforts to promote long-acting methods. Use of LAM and the calendar method was commonly reported by women in West Africa (Figure 3). Only two studies [53, 54] reported the implant as a preferred method of choice after birth.

Reproductive intentions of postpartum women

Only 9 studies reported reproductive intentions of postpartum women; 8 reported birth limiting and 6 reported birth spacing. Overall desire for birth spacing was higher compared to the desire for birth limiting [12, 37, 52, 59-61] in all regions. The pooled prevalence of desire for birth spacing was 54.8% (95% CI: 30.5-79.2%) (Figure 4), while the pooled prevalence of desire for birth limiting was 36.5% (95% CI: 13.1-59.9%) (Figure 5). Desire for birth spacing and birth limiting, independently, were significantly higher (p -value<0.001) in South Asia/South East Asia (67.5% for birth spacing and 58.0% for birth limiting) compared to East Africa (51.2% for birth spacing and 31.7% for birth limiting). Intraregional variation was high in South Asia/South East Asia, 37.6%-97.4% for desire for birth spacing and 23.5%-92.4% for desire for birth limiting.

Unmet need for modern contraception

A subset of 5 studies in 8 countries reported unmet need for contraception ranging from 16.3% in Egypt to 96% in Pakistan,[36, 56, 58, 62, 63] highlighting high variability in risk of unintended pregnancy among women in resource-limited settings. Overall, the pooled prevalence of unmet need was 48.5% (95% CI: 19.1-78.0%) across all regions and was highest in West Africa (59.4%, 95% CI: 53.4-65.4%), followed by South Asia/South East Asia (58.4%, 95% CI: 8.1-108.7%), and East Africa (45.6%, 95% CI: 28.4-62.8%) (Figure 6). Within South Asia, unmet need ranged from 31.6% in India to 96.6% in Pakistan, while in East

Africa unmet need ranged from 25.5% in Zambia to 66.0% in Uganda. Stratified pooled prevalence by follow-up period showed high unmet need during the first 6 months (52.1%, 95% CI: 19.3-84.9) compared to the 6-12 months (37.8%, 95% CI: -4.5-80.0) postpartum (Figure 9). Meta-regression result showed that there was no significant association of the follow-up period ($p=0.761$) and survey year ($p=0.44$) with the detected heterogeneity in unmet need.

Factors associated with contraceptive use postpartum

Demographic characteristics. Contraceptive use was consistently higher among younger women (<24 years) in nearly all studies and regions compared to older women (>35 years) [51, 55, 59, 60, 64, 65]. Postpartum contraceptive use was also higher among women with higher levels of education,[51, 52, 57, 61, 62, 64, 66-72] living in urban residence,[34, 57, 61, 67, 68] and with high socio-economic status.[57, 65, 67, 68] However, one study in Sri Lanka reported the inverse relationship; women with low socio-economic status were more likely to use contraception.[72] In several studies, relationships and partner characteristics influenced the likelihood of using contraception during the postpartum period. Married women were consistently more likely to use contraception than women who were single, as were women who reported they had good support from their partner on FP.[31, 52, 73-76] In contrast, contraceptive use was lower among women without current partners, who may have less need for contraception due to lack of or infrequent sexual activity.[52, 59] Factors predictive of contraceptive use are presented in Appendix Figure 1.

Reproductive characteristics. Resumption of menses, marking the return to fertility among postpartum women, has been shown to trigger contraceptive initiation among women in Tanzania, Kenya, and Ethiopia.[34, 52, 59, 63, 66, 69, 76] Women perceive pregnancy risks to be low when they are amenorrhic following delivery and during breastfeeding, despite the possibility of the return to fertility prior to

resumption of menses. Two studies cite breastfeeding as the most frequent reason given by women for non-use of contraception.[37, 55] In several studies, fertility intention influenced subsequent contraceptive use; women who desired to space or limit births were more likely to use contraception compared to women who had a desire for more children.[36, 54, 55, 66]

Facility-based health services. The most consistent health services predictor of postpartum contraceptive use in this review was delivering at a health facility.[57, 61, 68] Several studies reported women who delivered at health facilities were more likely to use contraceptives than women who delivered at home.[36, 57, 58, 61, 67, 68] Contraceptive counseling was another important predictor but only when counseled at both prenatal and postpartum periods, as preferences for contraception may change over time.[52, 57] However, the association between multiple exposures to contraceptive counseling and PPF use was not supported by a study conducted in Ghana,[70] raising a question of quality of counseling. Several studies reported a lack of adequate information during counseling, incomplete counseling, or misinformation due to low provider knowledge.[35, 54, 57, 67] For example, in one study in Ghana, postpartum women were misinformed about the possible side-effects and target population for the IUD, and as a result none accepted it.[54]

Contraception acceptability and availability. Fear of side-effects was identified in most studies as a reason for not using contraception. Fear of detrimental health effects (excessive bleeding, migraine, weight gain); fear of pain, injury and discomfort during insertion; and inconvenience of IUD insertion were frequently described.[37, 52, 54, 57, 58, 60, 63, 73, 74] Acceptability of contraceptive methods was further related to convenience of use, confidentiality the method could offer, and accessibility of contraceptive information and supplies.[12, 35, 57] Inconsistent supply and stock-out of contraceptive products,[35, 57] and poor

accessibility of contraceptive information or lack of awareness of contraceptive methods,[53, 58] were also described.

Personal risk perception and experiences. Perceptions of risk for pregnancy and potential benefits of contraception were major reasons cited for PPF use. Conversely, low perceptions of pregnancy risk and fear of future infertility [34, 58, 59] were reasons reported for non-use of PPF. Past experiences with contraceptive methods have been shown to prepare women for future contraceptive use and was an important predictor of contraceptive use in studies in our review.[31, 60, 62, 66, 76] For example, in Uganda women with prior experience using contraceptive methods showed personal readiness through their capability to choose a contraceptive option and were more likely to use contraceptive methods than women without contraceptive experience (aOR=1.8, 95% CI: 1.36-2.37).[62] Similarly, women who had negative experiences with previous contraceptive methods were more reluctant to use contraceptives later, as demonstrated in a study in Ethiopia where women who experienced problems with prior contraceptive use prior to their last pregnancy were less likely to use contraception in the postpartum period (aOR=0.34, 95% CI: 0.16-0.72).[52]

Socio-cultural factors: Religious and cultural factors also have the potential to influence acceptance and use of contraception. Two studies in the review elucidated cultural norms encouraging childbearing and/or religious prohibition of contraceptive use postpartum.[53, 57] Regionally, there were differences in the relationship between parity and contraceptive use. For example, in South East Asia contraceptive use was higher among women with more children. In Indonesia and India, women with two or more children were more likely to use contraception compared to women with one child.[55, 64] In contrast, postpartum women in Kenya with higher parity (≥ 4) utilized contraception less frequently compared to women with lower parity.[51, 68]

Discussion

Postpartum modern contraceptive use in the past 12 months was low in this meta-analysis, with less than half (41.2%) of women using modern contraceptives. Regionally stratified pooled estimate showed that mCPR was lowest (36.3%) and unmet need was highest (59.4%) in West Africa. The most commonly initiated contraceptive methods during postpartum were injectables, followed by OCPs and condoms. In our pooled analysis of reproductive intentions, desire for birth spacing (54.8%) or birth limiting (36.5%) was high. These findings suggest an urgent need for increased availability of contraceptive methods and high-quality counseling to increase contraceptive use in the postpartum period.

We found substantial geographic variation in PPFp use, with West Africa having the lowest mCPR and highest level of unmet need followed by East Africa and South Asia/South East Asia. Similar to the findings in our study, one other review has reported the lowest contraception use in the countries in West Africa.[77] Social and cultural beliefs in SSA are highly heterogeneous. While traditional practices of postpartum abstinence and reliance on return of menses to initiate contraceptive use are more commonly reported in West Africa,[49, 78] fear of side-effects and concern for partner disapproval are commonly reported in East Africa,[79] possibly explaining the low PPFp use in these regions. Findings of low mCPR in South Asia/South East Asia are supported by a study that assessed current levels of FP indicators and changes between 2012 and 2017 in the focus countries of the FP2020: despite the increase in the number of women of reproductive age using modern contraceptives across the region, there was slow growth in mCPR in Asia (51% to 51.8%).[80] Lack of knowledge of methods, and accessibility to FP services are the main barriers to contraceptive use in South Asia/South East Asia.[81] These barriers and behaviors could possibly explain the reason behind low mCPR and high unmet need across the regions. Wide within-region variation in PPFp use suggests country-level contexts and individual-level beliefs may need to be addressed by geographically or individually targeted counseling approaches.[82]

It is critical for health providers to support postpartum women who want to prevent or delay future pregnancies, ensuring they receive contraceptive methods that are consistent with their future fertility intentions. Women included in this review were limited in their choices of postpartum contraceptive methods, mostly due to inadequate knowledge on LARC safety and efficacy.[53] Women were found to avoid hormonal contraception during lactation due to a belief that hormonal methods could reduce milk production, and transfer hormones into milk that could cause harm to the infant.[83, 84] Findings from our study also suggest that amenorrhic women often perceive themselves to be at low risk of pregnancy without understanding the unreliability of LAM beyond 6 months postpartum.[66] These findings reinforce the need to address women's concerns and inform them about the limitation of methods that are not practiced correctly (e.g., LAM).

Fear of side effects was reported in several studies [37, 52, 54, 57, 58, 60, 73, 74] in our review, and was consistently cited as a formidable barrier that led to low uptake and high discontinuation rates among postpartum women. These findings are similar to studies conducted in Ghana [85] and Nigeria [86] where fear of side effects was the leading reason for non-use of modern contraceptives; however, these studies were conducted among non-postpartum women. Some studies that have observed family planning providers in health centers have found providers conceal true side-effect profiles of hormonal contraceptives from the patients [87] in order to increase acceptance. This purposeful exclusion of discussion of side effects with patients may contribute to method discontinuation, switching, or inconsistent use.[88] To increase uptake of IUDs and implants during the postpartum period, counseling must provide appropriate and accurate information about possible side effects.[88]

Many barriers to contraceptive use among postpartum women, including fear of side-effects, underutilization of MCH services, and lack of adequate contraceptive counseling, are preventable and could

be addressed through public health programming. For example, women who live in rural areas and deliver at home were reported to have high unmet need for FP in the postpartum period.[36, 67] Home delivery is still the most frequent place of delivery in resource-limited settings; preventing women from receiving appropriate maternal health services.[36, 61, 89] Women receiving a continuum of MCH services during antenatal, delivery, and postnatal are more likely to use postpartum contraception, as also reported by a study conducted in Nepal and Nigeria.[90, 91] Our finding underlines the need for a program that increases utilization of MCH services in general, as a window of opportunity to offer women different contraceptive methods. Community-based service delivery approaches that extend contraceptive methods to hard-to-reach populations, particularly in rural areas, may be of benefit.[92] Also, PPFPP if integrated at a variety of points in the continuum of MCH services from antenatal visits to routine immunization visits [93] could increase postpartum contraceptive use, as evident in the recent study conducted in Rwanda and India.[94, 95] Another possible strategy would be to integrate FP counseling in community-based, community health workers (CHWs) lead MCH program that have shown to improve postpartum contraceptive use in Bangladesh.[96]

Our systematic review and meta-analysis had several strengths. The meta-analysis included multiple indicators on contraception, including mCPR, unmet need, and reproductive intentions, and results were disaggregated by region. The focus of our study was in the first year postpartum period during which most of the PPFPP interventions are targeted.[97] This study is also subject to some limitations. Publications that were not in English or did not have available full-text versions were excluded and could bias review findings. Furthermore, results from our pooled analysis are limited to a small number of studies with complete information, as well as their heterogeneous research methodologies. Another limitation of this analysis is that prevalence of contraceptive use was estimated using different definitions of duration of the postpartum period. Postpartum months are a challenging time for women because of changing circumstances that impact their contraceptive need and use. Hence, the start of contraceptive use may vary

widely within 0-6 months and 6-12 months postpartum; that might have induced heterogeneity in the estimates.

Conclusions

A global increase in uptake of PPFp can help women establish healthy birth spacing and limiting practices and reduce adverse maternal and child outcomes. Public health programs can address this urgent need by adopting individualized, high-quality counseling approaches that provide accurate information on a range of FP methods, promote early uptake of LARC, support access to a continuum of maternal health services, and extend FP services through community-based models in rural settings. Our findings also have practical implications, suggesting that integrating FP services into routine MCH services would help increase the use of PPFp. Segmented (early and extended postpartum period) approaches to support PPFp may be effective in reducing unmet need in the early postpartum periods, improving method satisfaction, and reducing discontinuation rates among women who intend to space or limit future pregnancies.

Tables and figures

Table 1. Characteristics of studies on postpartum contraceptive use, by regions (n=35)

First author [Reference]	Publication year	Survey year(s)	Country	Study Design	Study population			Outcomes included in the meta- analysis
					Maternal Age (years) ^a	Time point of assessment	Sample size	
West Africa								
Adanikin [98]	2013	2011-2012	Nigeria	RCT	Mean=29.2	6 months	216	mCPR
Adeyemi [58]	2005	2003-2004	Nigeria	Prospective cohort	Mean=28.5	9-10 months	256	mCPR, unmet need
Eliason [31]	2013	2012	Ghana	Cross-sectional	Mean=25.6	At the clinic	1914	-
Sipsma [67]	2013	2006	Niger	Cross-sectional	Mean=29	6 months	673	mCPR
Robinson [54]	2016	2010	Ghana	Qualitative (FGD)	Range=15-49	0-12 months	13	-
Durosinlorun [84]	2016	2000-2014	Nigeria	Retrospective cohort	Range=<20 to ≥50	6 months	5992	-
Iliyasu [69]	2018	2015	Nigeria	Cross-sectional	Mean=27	12 months	317	mCPR
Morhe [70]	2017	2011	Ghana	Cross-sectional	Mean=31.1	6-12 months	200	mCPR
East Africa								
Balkus [74]	2007	1999-2003	Kenya	Prospective cohort	Range=18-42	12 months	410	mCPR
Hubacher [60]	2013	2011-2012	Kenya	Prospective cohort	Range=18-39	6-12 weeks	671	Birth spacing & limiting
Mumah [51]	2015	2007-2010	Kenya	Prospective cohort	Range=15-49	0-12 months	3579	mCPR, birth limiting
Ndugwa [34]	2011	2007-2008	Kenya	Prospective cohort	Range=11-52	0-12 months	2994	mCPR, birth limiting
Abera [59]	2015	2013	Ethiopia	Cross-sectional	Mean=27.2	6 weeks-12 months	703	mCPR, birth spacing & limiting
Abraha [52]	2017	2015	Ethiopia	Cross-sectional	Mean=27.4	0-12 months	590	mCPR, birth spacing & limiting
O'Shea [53]	2014	2013	Malawi	Cross-sectional	Range=18-35+	0-12 months	634	-
Keogh [66]	2015	2008	Tanzania	Cross-sectional	Range=15-35+	6-12 months	5284	mCPR, birth spacing & limiting
Mengesha [61]	2015	2012	Ethiopia	Cross-sectional	Mean=28.3	12 months	899	mCPR, birth spacing & limiting

Shabiby [73]	2015	2012	Kenya	Cross-sectional	Mean=26	At discharge after birth	185	-
Sileo [62]	2015	2012	Uganda	Cross-sectional	Mean=25.8	3 months	258	mCPR, unmet need
MCHIP [56]	2012	2008-2009	Kenya	Cross-sectional (DHS data)	Range=15-49	0-12 months	2264	Unmet need, birth spacing & limiting
Achwoka [71]	2017	2013	Kenya	Cross-sectional	Mean=25.8	8-10 months	955	mCPR
Gebremariam [75]	2017	2015	Ethiopia	Cross-sectional	Mean=30.8	6-12 months	605	mCPR
Gebremedhin [76]	2018	2015	Ethiopia	Cross-sectional	Range=15-49	12 months	803	mCPR
South Asia/South East Asia								
Chhabra [35]	2016	2014	India	Cross-sectional	Range=15-40	8 weeks	117	mCPR
Kashyap [99]	2016	2015	India	Cross-sectional	Range=18-35	10 weeks	178	mCPR
Mody [64]	2014	2008	India	Cross-sectional	Range=17-45	6 months	1049	mCPR
Withers [55]	2010	2002-2003	Indonesia	Cross-sectional	Mean=29.9	0-12 months	1528	mCPR
FP seminar [57]	2014	NA	India	Seminar report	NS	0-12 months	56	-
Navodani [72]	2017	2014	Sri Lanka	Cross-sectional	Mean=29.4	8-12 weeks	1112	mCPR
Wilopo [65]	2017	2015	Indonesia	Cross-sectional	Range=15-49	6 months	1415	mCPR, unmet need
Middle East/North Africa								
Elweshahi [63]	2018	2016	Egypt	Cross-sectional	Mean=30	12 months	1500	mCPR, unmet need
Multi-regional (South Asia/Sub-Saharan Africa/Central America)								
Moore [37]	2015	2005-2012	21 LMIC	Cross-sectional (DHS data)	Range=15-49	0-12 months	21 countries	-
Ross [12]	2001	1991-1996	27 countries	Cross-sectional (DHS data)	Range=15-49	0-12 months	27 countries	-
Pasha [36]	2015	2011-2012	India, Pakistan, Zambia, Kenya, Guatemala	Prospective cohort	Range=<20 to ≥30	6 weeks	36,687	mCPR, unmet need, birth spacing & limiting
Hounton [68]	2015	2004-2013	Ethiopia, Malawi, and Nigeria	Cross-sectional (DHS data)	Range=15-49	3 months	3 countries	-

Note: DHS (demographic and health survey), FGD (focus group discussion), MCHIP (maternal and child health integrated program), NA (not applicable), NS (not specified), PP (postpartum period), RCT (randomized controlled trial)
^aAge at enrollment

Table 2: mCPR, contraceptive method-mix, and fertility intention or unmet need of postpartum women

Country, Year published [Reference]	N	mCPR (95 % CI)	Contraceptive method-mix among users (%) [Overall]	Fertility intention & Unmet need (%)
Low mCPR (<20%)				
Ethiopia, 2015 [61]	899	10.3	Injectables (8.2) IUD (1.8) OCP (0.3) Implant (0.2)	Desire to space (7.1) Desire to limit (3.1) Unmet need (10.2) ^a
Kenya, 2013 [60]	671	-	Injectables (36.4) Implant (30.1) LNG-IUS (16.2) POP (14.7) IUD (2.5)	Desire to limit (25.5) Unmet need (42.3) ^b
Moderate mCPR (20%-40%)				
Niger, 2013 [67]	673	25.0	<u>Among lactating women*</u> LAM (52.0) Modern methods (25.0) Sterilizations (25.0)	-
Ghana, 2017 [70]		25.5	Injectables (20) OCPs (7.3) Condoms (7.3) Implants (4.5) IUDs (4.5) Sterilization (4.5)	-
21 LMIC, 2015 [37]	-	27.0	Short-acting methods (51.0-96.0)	Desire to space (37.0) Desire to limit (25.0) Unmet need (62.0) ^a
27 countries, 2001 [12]		30.0	Pills (mainly in 0-6 months)	Desire to space (39.1) Desire to limit (25.5) Unmet need (64.6% across countries) ^a
Tanzania, 2015 [66]	5284	34.0	Injectables (12.0) Condoms (10.0) OCP (7.0)	Desire to space (11.0) Desire to limit (27.0) Unmet need (38.0) ^a
India, 2014 [64]	1049	34.7	Condoms (77.8) OCP (11.1) IUD (2.9) Sterilization (2.5)	-
Nigeria, 2013 [98]	108 ^c	35.4	LAM (21.1) Condoms (18.2)	-

India, 2016 [35]	117	36.0 ^f	IUCD (10.3) POP (5.1) Injectables (2.6)	Unmet need (25.6) ^b
Kenya, 2011 [34]	2264	36.0	-	Unmet need (59.0) ^a
High mCPR (>40%)				
Indonesia, 2010 [55]	1528	40.5	Injectables (52.6) Implants (28.6) IUD (9.5) OCPs (5.2) Sterilization (3.9)	Unmet need (41.0) ^a
Nigeria, 2005 [58]	256	40.6	Condoms (12.5) IUCD (10.6) Pills (2.7) Injectables (2.7)	Unmet need (59.4) ^a
Nigeria, 2018 [69]		41.6	Injectables (14.5) OCPs (9.4) IUDs (4.7) Condoms (1.5) Sterilization (1.2)	-
Kenya, 2011 [34]	2994	43.2	Injectables (48.0) Pills (22.0) Condoms (6.0)	Desire to limit (32.2)
India, 2016 [99]	178	44.0	IUD POP Injectables	-
Nigeria, 2016 [84]	2924	47.6 ^g	Injectables (45.9) IUCD (36.8) OCP (12.7)	-
Ethiopia, 2017 [52]	590	48.0 (43.9-52.2)	Injectables (59.7) Implants (24.7) Pills (12.0)	Desire to space (67.1) Desire to limit (14.7)
Ethiopia, 2015 [59]	703	48.4 (44.5-52.1)	Injectables (68.5) OCPs (16.8)	Desire to space (51.1) Desire to limit (46.1)
Kenya, 2015 [51]	3579	49.0- in 6 months 60.0- in 12 months	Injectables Pills Condoms (6.0)	Desire to limit (32.1)
Malawi, 2014 [53]	634	-	<u>Methods planned*</u> LAM (73.0) Implant (67.0) Condom (42.0) Injectables (38.0)	Desire to limit (97.0)
Indonesia, 2017 [65]		50	Injectables (71.2) OCPs (8.8) IUDs (5.9) Implants (3.5)	Unmet need (47)

			Sterilization (5.3)	
Achwoka, 2017 [71]	955	59	Injectables (61%) Implants (10%) OCPs (6%) IUDs (4%) Condoms (2%)	Unmet need (34)
Navodani 2017, [72]	1112	64.5	Condoms (30.4) IUDs (26.7) Injectables (22.9) OCPs (0.8)	-
Gebremariam, 2017 [75]	605	68.1 (64.4-71.8)	Injectables (58.8) Implants (31.8) Pills (4.9) IUDs (3.4) Sterilization (0.1)	
Kenya, 2007 [74]	319 ^d	72.0 ^e	Condoms (65.0) OCPs & Injectables (15.0) IUDs (2.0) Implant (3.0)	-
5 LMIC, 2015 [36]	36, 687	73.5- Zambia 65.5- India 4.0- Pakistan	OCP or injectables (>90) LARC (3.0-10.0)	Unmet need (25.0-96.0) ^a
Ethiopia, 2018 [76]		80.3 (74.5-83.1) [#]	Injectables (34.2) OCPs (22.2) Implants (27.3) IUDs (7) Condoms (2.1) LAM (6.6)	
Egypt, 2018 [63]	1500	80.7	-	Unmet need (16.3)

Note: CI (confidence interval), IUD (intrauterine device), mCPR (modern contraceptive prevalence rate), LAM (lactational amenorrhea method), LNG IUS (Levonorgestrel intrauterine system), LMIC (low-and-middle-income countries), OCP (oral contraceptive pill)

* Mutually not exclusive

[#] Contraceptive prevalence rate

^a Prospective definition (women not using modern contraceptives but wanting to space or limit pregnancy)

^b Retrospective definition (women did not plan to become pregnant with prior pregnancy but did not use modern contraceptives)

^c Postnatal counseling group; ^d HIV-1 seropositive women; ^e Hormonal contraceptive users; ^f Pre-counseling group; ^g Breastfeeding group

⁻ Indicates no data available

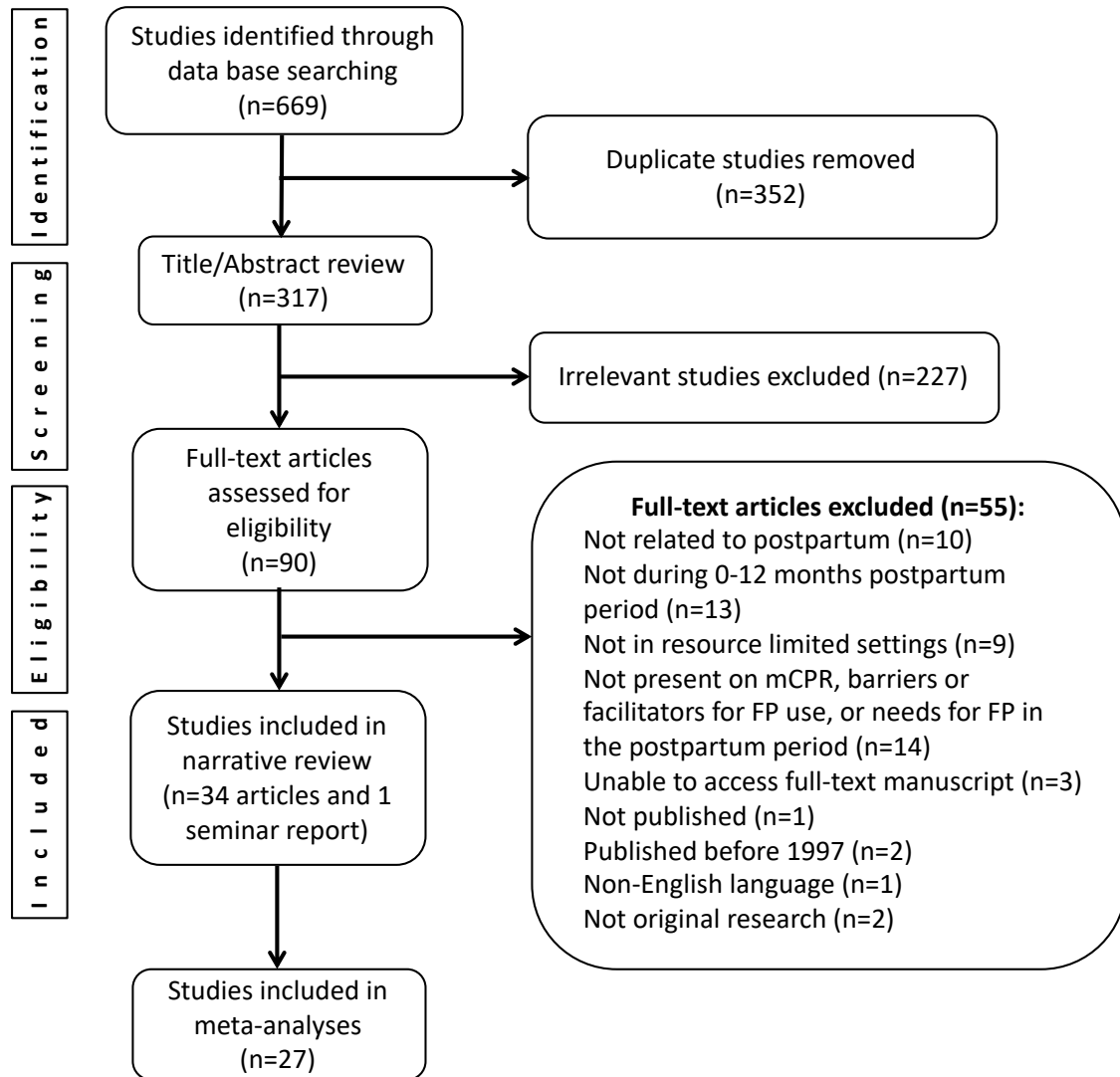


Figure 1. PRISMA flow diagram of literature search results (Search Dates: January 1997-May 2018)

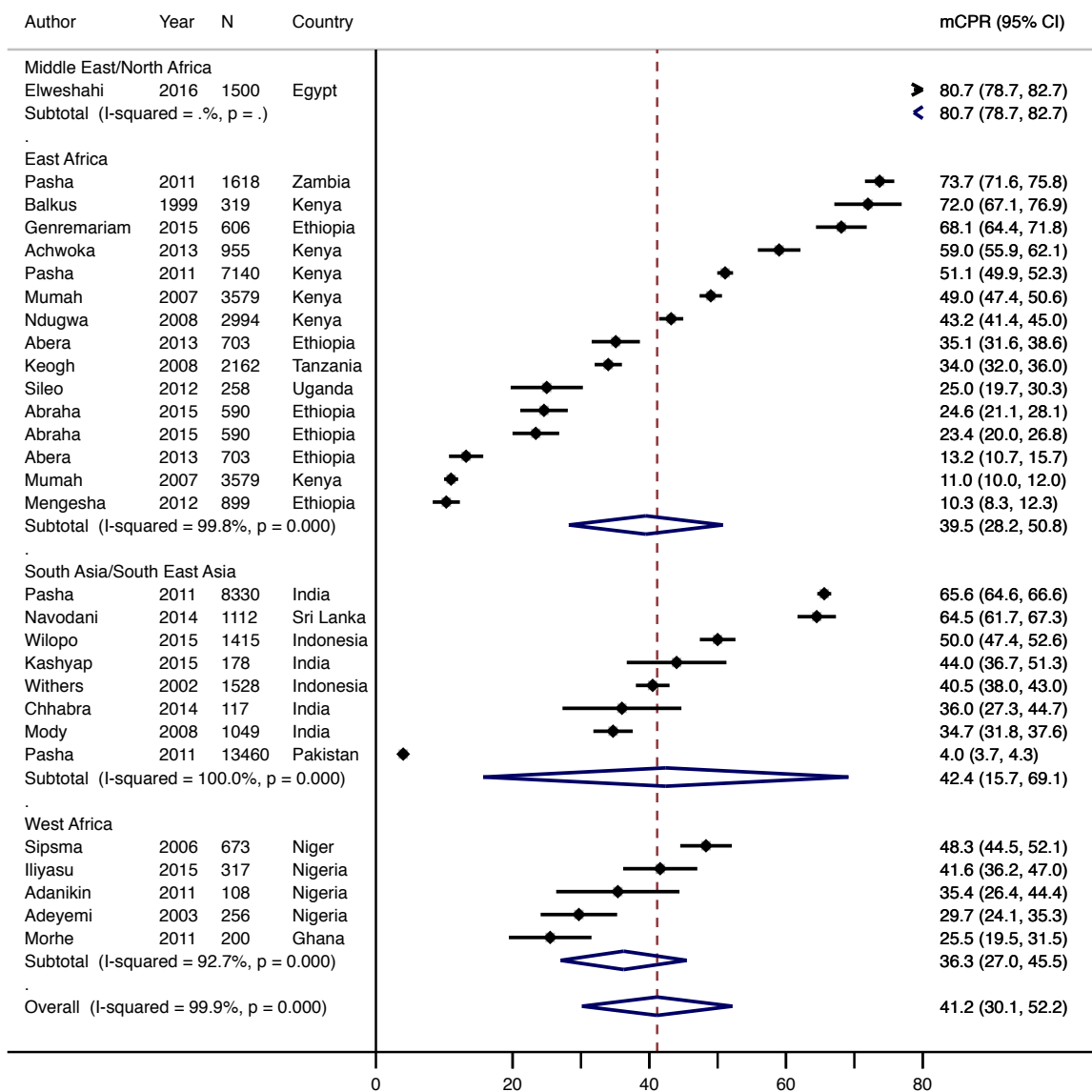


Figure 2. Forest plot of modern contraceptive prevalence rate (mCPR), by region. Year is start of survey year and N is sample size.

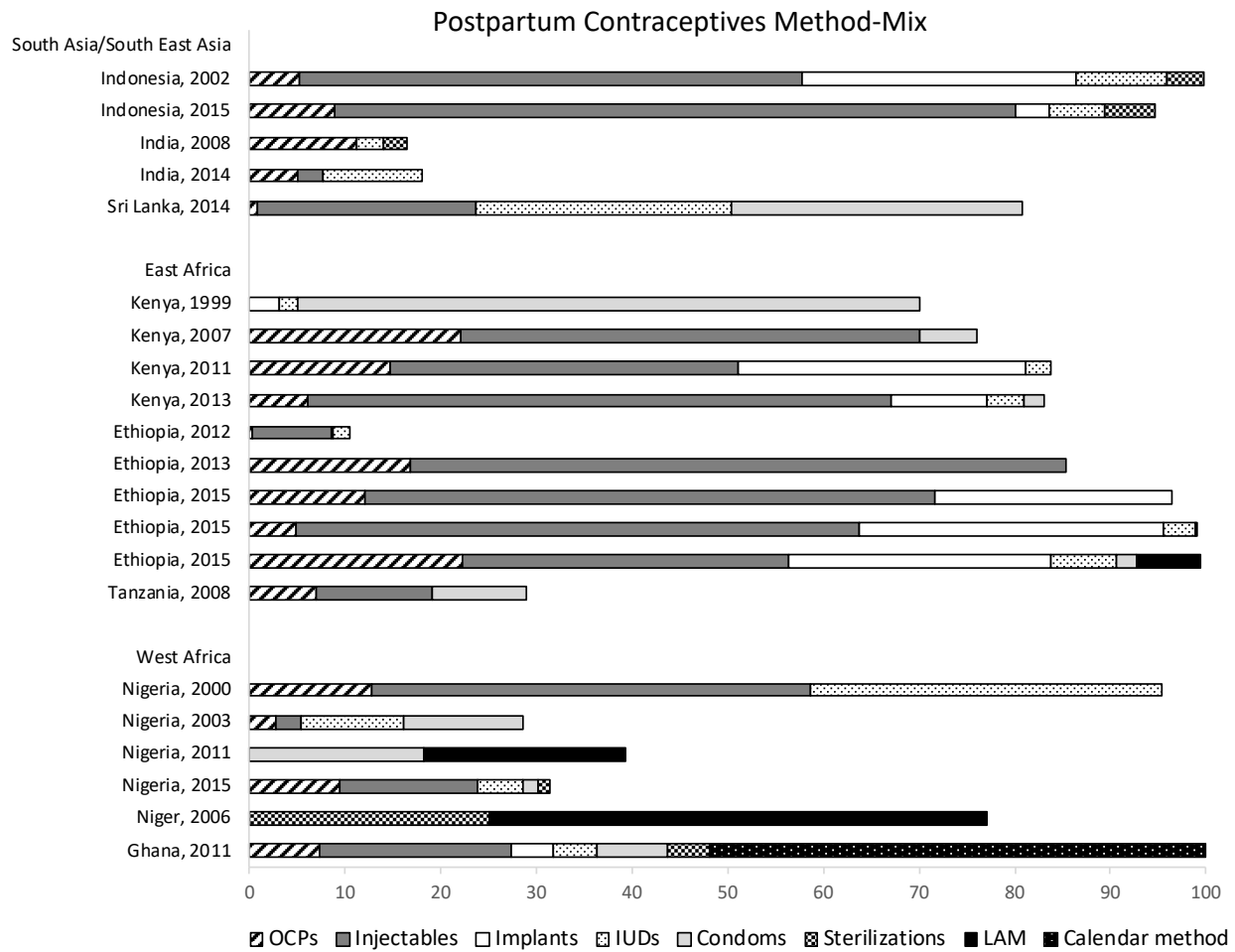


Figure 3. Method-mix of most commonly used postpartum contraceptive methods, by regions. Year is start of survey year.

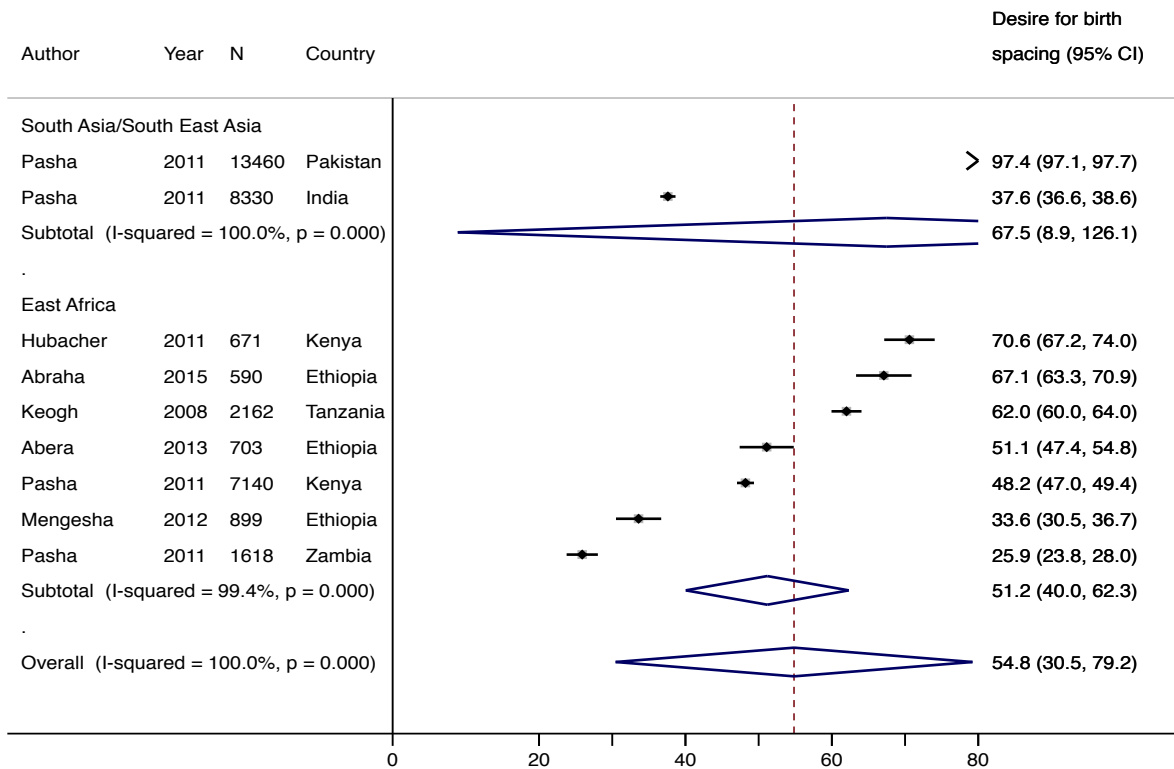


Figure 4. Forest plot of desire for birth spacing, by regions. Year is start of survey year and N is sample size. Outcomes for West and North African countries not available.

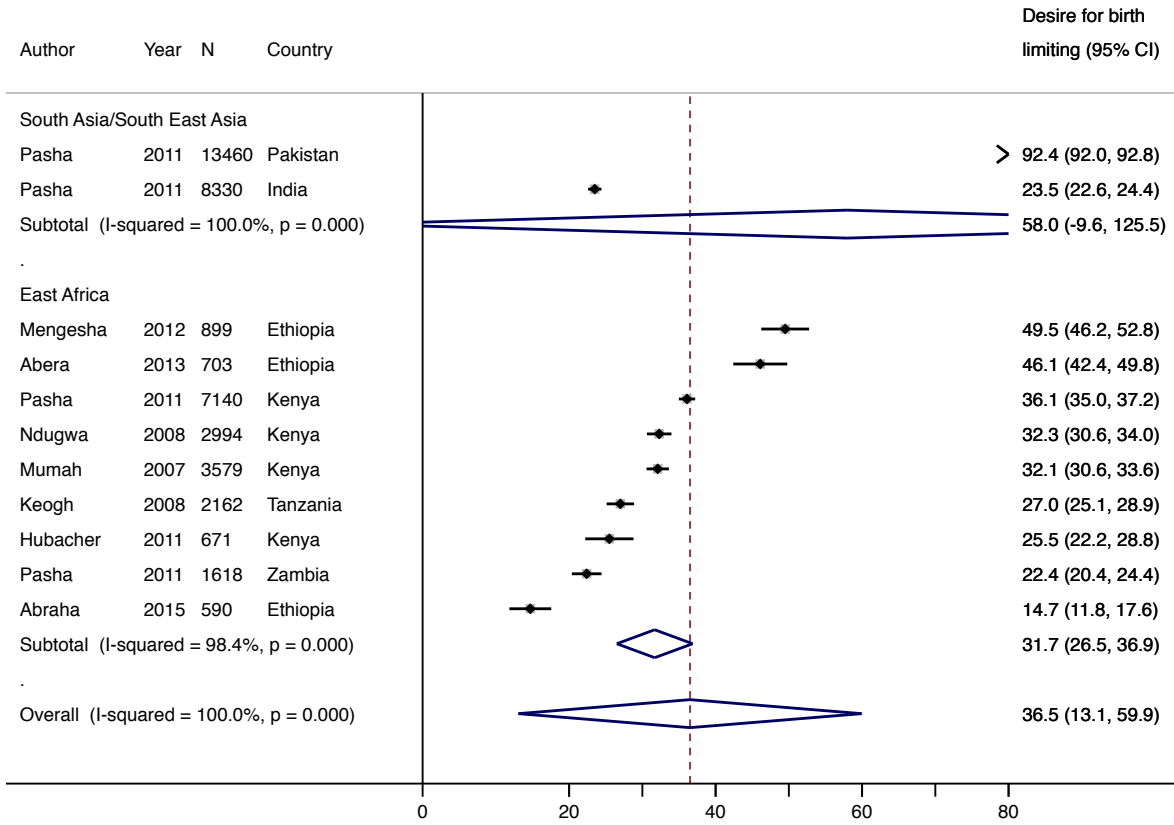


Figure 5. Forest plot of desire for birth limiting, by regions. Year is start of survey year and N is sample size. Outcomes for West and North African countries not available.

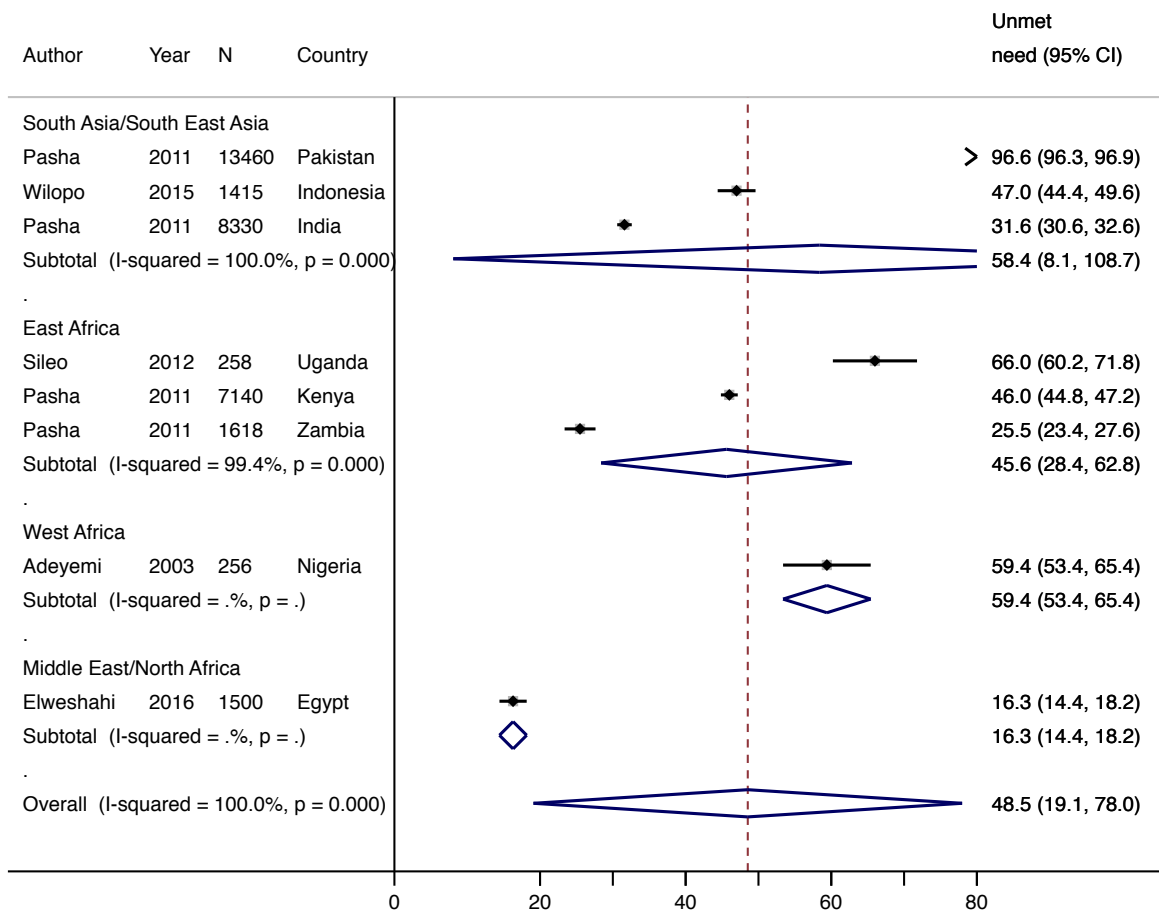


Figure 6. Forest plot for unmet need for contraception, by region. Year is start of survey year and N is sample size.

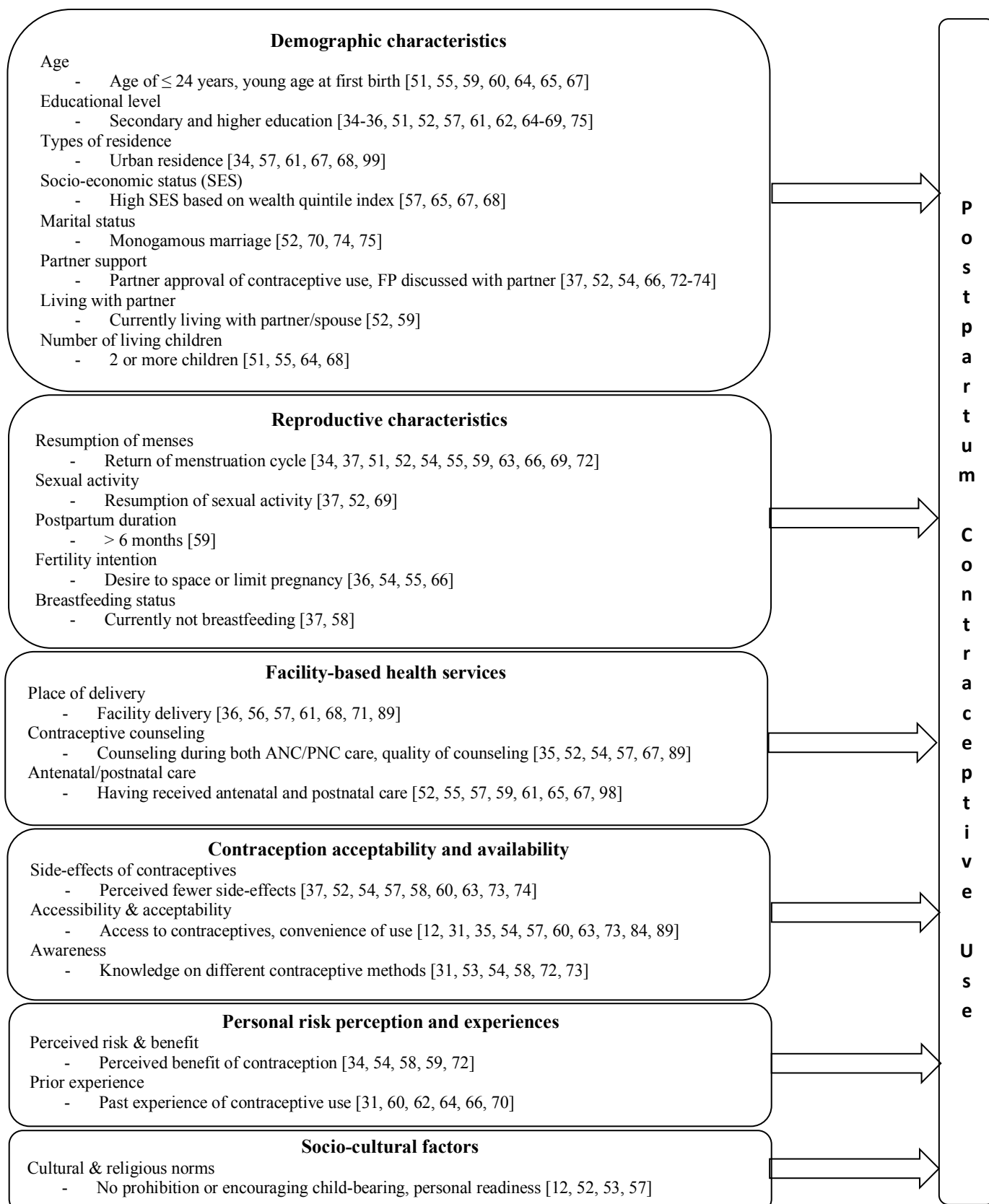


Figure 7: Factors associated with postpartum contraceptive use, 0-12 months postpartum

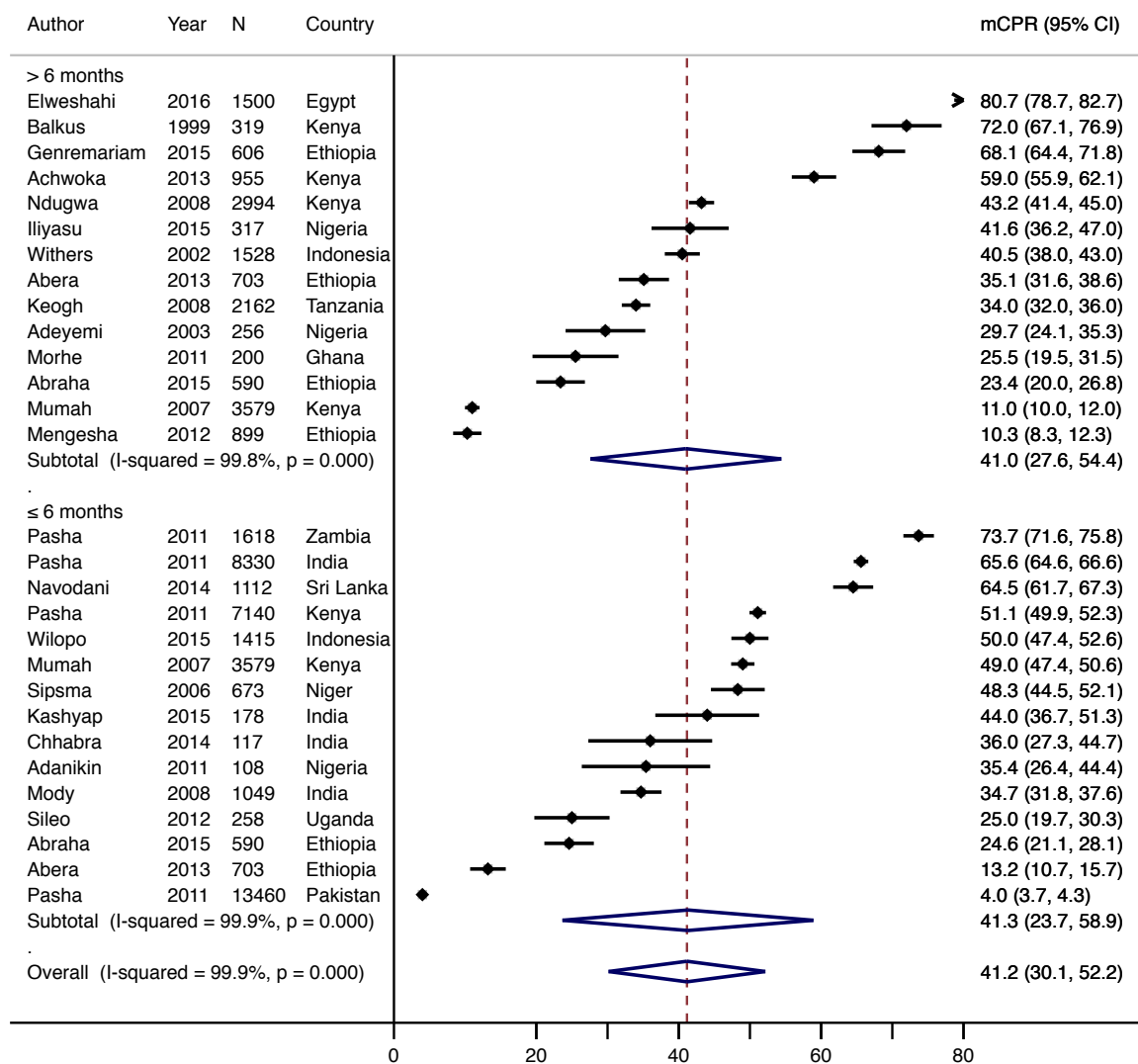


Figure 8. Forest plot of modern contraceptive prevalence rate (mCPR), by postpartum follow-up period. Year is start of survey year and N is sample size.

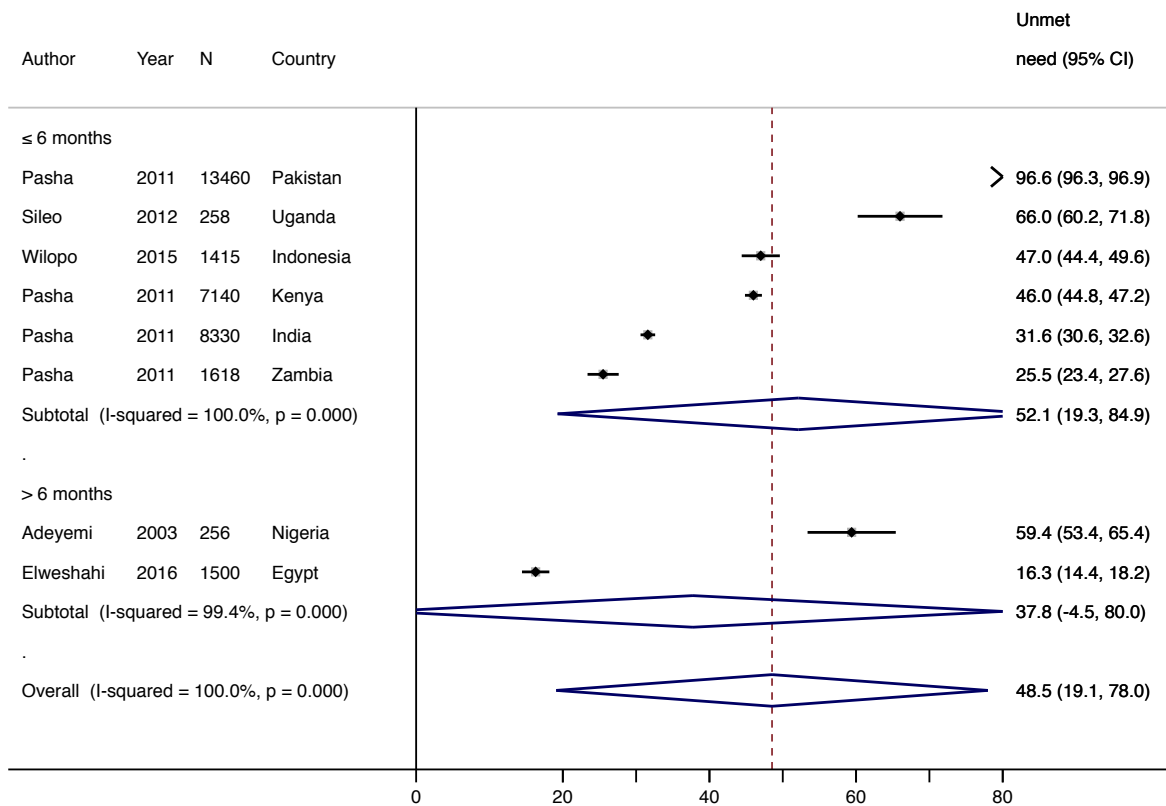


Figure 9. Forest plot for unmet need for contraception, by postpartum follow-up period. Year is start of survey year and N is sample size.

CHAPTER 3. Contraceptive counseling experiences of women attending HIV care and treatment programs in Kenya

Background

More than half of the 33.3 million HIV-infected individuals worldwide are women of reproductive-age. Contraceptive use among HIV-infected women ranges between 42% and 73% in sub-Saharan Africa where the HIV epidemic is concentrated,[100-104] with many women who are not using contraception at risk of unintended pregnancy.[105] Unintended pregnancy rates among HIV-infected women are higher than HIV-uninfected women (50% vs 33%, respectively),[14] particularly in sub-Saharan Africa (SSA) where contraceptive use is lowest.[106] While many (66-92%) HIV-infected women in SSA want to delay, space or limit births, less than half use any modern contraceptive methods, and those who do rely on short-acting methods.[25, 26, 107, 108] Preventing unintended pregnancies not only improves women's health, but is also a critical strategy to prevent mother-to-child HIV transmission.[109] Integration of FP services into HIV care has been proposed as an approach to ensure that women living with HIV have access to family planning (FP) services to reduce unintended pregnancies.[110]

While reducing unmet need for FP is one of the key components of improving reproductive health of HIV-infected women,[15] fulfilling this need is a persistent challenge in SSA.[111] Most studies have emphasized interventions to improve access to contraception;[16] however, very little is known about what helps women to decide on a preferred method. The process by which contraceptive services are offered, the type of information delivered, and women's fertility preferences can be a strong indicators; however, there may be many other important factors that influence uptake.[111] Improving contraceptive counseling services and counseling experiences of women, has been cited as a strategy that could increase uptake of FP services and reduce unmet need for contraception.[112]

Despite contraceptive guidelines and recommendations, underuse, inconsistent patterns of use, and discontinuation of contraceptive methods persists, suggesting ongoing missed opportunities for FP services for HIV-infected women.[14] Studies suggest that few providers offer contraceptive counseling to women with HIV, and those who do, provide inadequate counseling on fertility intentions.[113] Provider counseling influences contraceptive choice of HIV-infected women;[114, 115] however, little is known about what providers prioritize while counseling women seeking HIV services. Also, there is limited knowledge on what characteristics of women make them more likely to be educated about contraception or receive counseling about current and future contraceptive needs. Understanding factors that influence contraceptive counseling in HIV care settings is critical to inform development of new strategies to improve FP counseling services. We examined contraceptive counseling experiences of HIV-infected women attending HIV care and treatment programs in Kenya.

Materials and methods

Study design

Between June and September 2016, a facility-based, cross-sectional survey of HIV-infected women attending HIV Care and Treatment Programs across 109 sites in Kenya was conducted. Surveys were designed to assess the prevalence and correlates of family planning uptake and integration of FP into HIV care.

Population and sample

Facilities were selected for inclusion if they had >1000 female clients receiving antiretroviral therapy (ART). Women were included in the study if they were female, between ages of 15-49 years, HIV-infected, receiving care at one of the selected HIV Care and Treatment Programs, had a history of vaginal heterosexual intercourse within the past six months, and were able and willing to provide informed consent.

Study procedures

Trained study nurses enrolled women and administered a survey using Open Data Kit (ODK)[116] to collect information on sociodemographics, obstetric history, FP use, FP services offered/received, partner characteristics, duration of HIV infection, and partner disclosure. Women were asked several questions about their FP counseling experience. These questions included: whether they discussed FP with anyone (family/friend, nurse/doctor, community health workers) in the last year and which methods were discussed; FP methods of interest; perceptions of receiving enough information on FP to make an informed FP decision; and desire for more information on FP. Women were also asked about their fertility intentions and whether benefits of birth spacing and limiting were discussed with an HIV care provider.

Definitions

Women were classified as receiving contraceptive counseling if FP was discussed or if the benefits of birth-spacing and limiting was discussed with an HIV care provider in the last year. Counties were classified by HIV burden (low, medium, and high) based on the Kenya Country Operation Plan (COP) 2015 Strategic Direction Summary (SDS).[117] A priori potential confounders included age, education, and marital status of women.

Statistical analysis

McNemar's test was used to examine individual pairwise differences in FP methods discussed versus FP methods of current interest, stratified by method. To examine the association between receipt of FP discussion and benefits of birth spacing and limiting discussion, and covariates, we used Poisson generalized linear models with a log-link function.[118] We applied the *svy* command and facility-level clustering adjustments to account for the sampling design and weights in all analyses. A priori cofactors and variables significant at $p < 0.1$ in univariate analysis were included in multivariate models. We

conducted a multi-collinearity diagnosis to account for the inflation in the standard errors (SE) of the parameter estimates caused by collinear predictors.[119] If variables were collinear, we included the variable with the least number of missing data in multivariate models. We conducted a sensitivity analyses on outcomes of different definitions to determine what characteristics of women made them more likely to have had the receipt of enough information on FP, receipt of counseling on ≥ 3 methods, and receipt of counseling on long-acting reversible contraceptive (LARC) methods. Analyses were conducted using Stata version 14 (Stata corporation, College Station, TX, USA).

Ethical considerations

Ethical review committees at the University of Washington [STUDY00001351, Centers for Disease Control and Prevention (CDC), and the Kenya Medical Research Institute (KEMRI) [KEMRI/SERU/CCR/0024/3197] approved all study procedures.

Results

A total of 4805 women attending HIV care and treatment centers participated in the survey. Sixty percent (n=2858) of 4734 women reported having discussed FP with a provider in the last year, and 2046 (72%) of those who had discussed FP with a provider reported having discussed benefits of birth spacing and limiting. The mean age was 34 years, with a mean 9 years of completed education (Table 1). Most (61%) were currently married, and nearly everyone (94%) currently had a partner. The majority (91%) of women were multiparous; with an average of 3 living children. Of those who had delivered within the last year, most had resumed menstruation (92%) and sexual activity (97%). Sixty nine percent had discussed FP with their partner, and three quarters (75%) of them reported having a partner who was very supportive of using FP. Most (93%) were in a relationship of more than one year with their current partner. FP use in the last month was reported by 87% of women, with male condoms being most commonly used (70%). More than half

(65%) of the women had no desire for children in the future and 21% women desired to become pregnant in ≤ 2 years. Most (96%) were currently on ART.

Among women who had any FP discussion with their provider, most were informed about contraceptive methods such as male condoms (88%), injectables (87%), implants (84%), and OCPs (82%) (Figure 1.a). The majority of women who discussed FP with a provider discussed methods they were interested in using. However, 4-14% of women interested in a particular method did not receive information about the method of interest (Figure 1.b). Use of male condoms in the contraceptive method-mix was higher among women who had no FP discussion compared to women who had FP discussion (55% vs. 47%) (Figure 2). The proportion of women who received any FP discussion was highest among women who used injectables (74%) in the last month (Figure 3). Contraceptive use was more common among women who discussed FP with a provider (93%) vs did not discuss FP with provider (78%) (Table 2).

Correlates of receipt of FP discussion in the last year

The average age and completed years of education was similar among women who discussed FP with their provider and those who did not (PR=0.99, 95% CI: 0.99-1.00 and PR=1.01, 95% CI: 0.99-1.02 respectively) (Table 2). Women who had FP discussions were more likely to be currently married (PR=1.17, 95% CI: 1.09-1.24), and live with their primary partner (PR=1.12, 95% CI: 1.07-1.18). FP discussion was more common among women who had discussed FP with their partner in last year (PR=1.55, 95% CI: 1.41-1.71). Women were more likely to have FP discussions if they were using FP in the last month (PR=1.86, 95% CI: 1.54-2.25), had an intention to use FP in the future (PR=1.85, 95% CI: 1.4-2.44), if they had a desire for next children in > 2 years (PR=1.28, 95% CI: 1.19-1.38), had HIV-infected partner (PR=1.16, 95% CI: 1.07-1.27), and had disclosed own HIV status to partner (PR=1.53, 95% CI: 1.35-1.74) ($p < 0.001$ for all). After adjusting for age in years, completed education in years, current marital status, FP used in the last month, concern about side-effects, desire for next children, and having HIV-infected partner in

multivariate analyses, only FP used in the last month (PR=1.74, 95% CI: 1.41-2.15) and desire for next children in > 2 years (PR=1.18, 95% CI: 1.09-1.28) remained significant ($p < 0.001$ for both). All sensitivity analyses on other elements of contraceptive counseling were similar to the primary model (data not shown).

Correlates of receipt of benefits of birth spacing and limiting discussion

Among women who discussed FP with their provider, women who received discussion on benefits of birth spacing and limiting were more likely to be more educated (PR=1.01, 95% CI: 1.00-1.02) and currently married (PR=1.1, 95% CI: 1.05-1.16) compared to women who did not receive information on benefits of birth spacing and limiting. Discussion on benefits of birth spacing and limiting was more likely among women who had primary partner (PR=1.12, 95% CI: 1.05-1.17), were multiparous (PR=1.51, 95% CI: 1.29-1.77), and with higher gravidity (PR=1.02, 95% CI: 1.01-1.03) (Table 3). Women were also more likely to have benefits discussed if FP was discussed with their partner (PR=1.18, 95% CI: 1.1-1.25), they were in a current relationship ≥ 1 year (PR=1.19, 95% CI: 1.05-1.15), and had received FP discussion together with their partner (PR=1.09, 95% CI: 1.05-1.15). After adjusting for age in years, completed education in years, current marital status, multiparity, and FP use in the last month in multivariate analyses, only completed education in years (PR=1.01, 95% CI: 1.00-1.02), current marital status (PR=1.07, 95% CI: 1.02-1.27), and multiparity (PR=1.45, 95% CI: 1.19-1.76) remained significant ($p < 0.001$ for all).

Discussion

In this large, cross-sectional study of HIV-infected women, 60% reported having discussed FP with their health provider in the last year; 72% of whom reported discussing benefits of birth spacing and limiting specifically. Women who used FP and wanted to prevent pregnancies for at least 2 years were more likely to have FP discussions with a provider; whereas, higher education, being married, and multiparity were primary correlates of receiving discussion on benefits of birth spacing and limiting. Additionally, our study

found that there was a mismatch between methods of current interest to women and methods discussed with them.

We found that history of contraceptive use in the last month was associated with receipt of FP discussion by HIV providers among HIV-infected women in Kenya receiving HIV care and treatment services. FP counseling experiences among HIV-infected women in integrated service delivery models have not been previously described; however our findings are similar to a study in the United States conducted among women with breast cancer that found contraceptive users were three times more likely to receive contraceptive counseling at the time of cancer diagnosis.[120] Providers may be prompted to discuss contraception with women who were already using contraception, but may need other prompts to offer these same services to women who are not using FP. Women who were not using any FP are the ideal candidates for FP discussion; however, relatively a small proportion (78%) of these women in our study reported receiving discussions about FP methods.

As in other settings,[121] this study also found that women who were married, were multiparous, and had higher education were more likely to have discussed benefits of birth spacing and limiting. Health care providers have been shown to restrict access to contraception based on marital status and parity in Kenya, [122, 123] which may reduce their willingness to discuss benefits with unmarried and nulliparous women. Women with higher education may benefit more from patient-provider interactions because they have better understanding of the methods, enabling them to initiate discussion and participate in shared decision-making. Providers also tend to not engage patients in contraceptive counseling discussions or may rely on patients to initiate discussions if their patients are only interested in a one method or are continuing a method initiated earlier.[124] Providers vary widely in their knowledge and beliefs about who should receive counseling, as well as their own comfort in providing contraceptive counseling; hence, training to deliver counseling services to all HIV-infected women is needed.

We found that most women who discussed FP with a provider and were interested in a specific method did discuss the method of interest; however, there were some methods that were less likely to be discussed, mainly for the tubal ligation, IUDs, and implants. A study conducted in Ghana has suggested that the majority of women who successfully adopt FP methods do so by choosing a method that aligns with their specific preferences i.e., desired duration of effectiveness or to avoid certain side-effects.[125] Our findings may have implications for patient-centered counseling interventions, identifying a need to better clarify side effects or match women to more appropriate/preferred methods.

This study had several strengths. Data were drawn from a nationally representative survey of HIV-infected women who were of reproductive age, sexually active, and engaged in HIV care. Study questionnaires included details on FP integration component, both at individual and provider level that allowed us to examine multiple correlates of contraceptive counseling. This study also had some limitations. While we were able to assess some elements of the FP counseling experience received during HIV care, including receipt of FP discussions and methods discussed, we did not collect data on other important aspects of FP counseling, such as patient-provider interaction.[126] In addition, our sample size was small for a few key populations who are at high risk of unintended pregnancies, adolescents and postpartum women, which limited power to determine whether these groups had specific cofactors impacting likelihood of receiving FP discussions with HIV care providers. Finally, our results may not be generalizable to women not receiving HIV care and treatment programs, and in smaller clinics where there is no integrated model.

Conclusion

Integrating contraceptive counseling into HIV care is an important strategy to reduce unintended pregnancy and pediatric HIV incidence.[127] The provision of high-quality contraceptive counseling encourages contraceptive use and discourages contraceptive discontinuation, and should be an integral part of HIV services. Efforts to integrate FP into HIV care must address FP needs in the context of HIV care, including

counseling on condoms for HIV prevention and use of more effective methods to prevent unintended pregnancies. Contraceptive counseling should be provided to all women and specifically tailored to individual needs of HIV-infected women. Further research is needed to strengthen the evidence-base on correlates of contraceptive counseling delivery in HIV care services and to determine types of counseling approaches or interventions that may facilitate improved uptake of contraceptive use.

Tables and figures

Table 1. Characteristics of HIV-infected women attending HIV care and treatment centers in Kenya (n=4805)

	N ¹	N (%) or Mean (SD)
Sociodemographic and clinical characteristics		
Age (years)	4734	34 (7)
Age category (years)	4734	
≤ 19		138 (3%)
20-24		447 (9%)
25-29		809 (17%)
30-34		1149 (24%)
≥ 35		2191 (46%)
Completed education (years)	4575	9 (3)
Currently married	4717	2854 (61%)
Monthly household income ≥ 10,000KSH ²	4734	2938 (62%)
Currently have a partner	4708	4441 (94%)
Live with primary partner	4441	2846 (64%)
Partner ≥5 years older than woman	3968	2353 (59%)
Partner's education (Secondary or higher)	4020	2664 (66%)
>1-hour travel time to clinic	4734	2034 (43%)
HIV burden counties ³	4734	
High		2330 (49%)
Medium		1360 (29%)
Low		1044 (22%)
Multiparous	4707	4262 (91%)
Parity of > 4	4707	925 (20%)
Number of living children	4261	3 (1)
Pregnancy ended within last year	3789	345 (9%)
Time since last pregnancy ended (years)	2186	7 (5)
Resumed menstruation ⁴	1791	1642 (92%)
Resumed sexual activity ⁴	1793	1735 (97%)
Facility delivery	4222	3422 (81%)
Partner characteristics and sexual behavior		
FP discussed with partner in last year	4534	3136 (69%)
FP use known by partner ⁵	3908	2324 (91%)
Partner support in using FP ⁶	3136	
Very supportive		2352 (75%)
Somewhat supportive		416 (13%)
Not supportive		368 (12%)
Relationship with partner (Monogamous)	4240	3128 (74%)
Current relationship ≥1-year	4411	4096 (93%)
Received FP counseling together with partner	4534	979 (22%)
FP use history		
FP used, last 5 years	4708	4156 (88%)
Methods used, last 5 years ⁷	4156	
OCPs		563 (14%)
Male condoms		2616 (63%)
Injectables		1860 (45%)
IUDs		238 (6%)
Implants		1138 (27%)
FP used, last month	4697	4079 (87%)
Methods used, last month ⁷	4079	
OCPs		326 (8%)
Male condoms		2858 (70%)

Injectables		1303 (32%)
IUDs		230 (6%)
Implants		1039 (25%)
Intention to use FP ⁸	577	244 (42%)
Concerned about side-effects	4734	3097 (65%)
Pregnancy intention		
Desire for next children ⁹	4040	
No desire		2631(65%)
≤ 2 years		829 (21%)
> 2 years		580 (14%)
HIV/ART		
Having HIV-infected partner ¹⁰	3829	2605 (68%)
Disclosed HIV status to partner	4685	3997 (85%)
Currently on ART	4734	4537 (96%)

ART (anti-retroviral therapy), FP (family planning), HIV (human immunodeficiency virus), IUD (intra-uterine device), KSH (Kenyan Shilling), LAM (lactational amenorrhea method), OCP (oral contraceptive pill), SD (standard deviation)

¹ Number of observations with complete information

² 10,000 KSH is approximately 98.6 USD

³ As designated by the Kenya Country Operation Plan (COP) 2015 Strategic Direction Summary (SDS)

⁴ Among women whose last pregnancy within the last year

⁵ Among women who used FP in the last month

⁶ Women who had discussed FP with their partner in the last year

⁷ Categories are not mutually exclusive

⁸ Among women who did not use FP in the last month

⁹ Among women who reported their desire for any children in the future and duration when they want to become pregnant again

¹⁰ Among women who reported the HIV status of their partner and women who had no partner or partner with negative/unknown HIV status

Table 2: Correlates of FP discussions among HIV-infected women attending HIV care and treatment centers in Kenya (n= 4734)

	Weight Mean (SD) or Unweighted N (Weighted %)						
	FP discussed in the last year			Weighted Poisson generalized linear models			
	N ¹	No (n=1876)	Yes (n=2858)	Crude PR (95% CI)	p-value	Adjusted PR (95% CI) ⁷	p-value
Sociodemographic and clinical characteristics							
Age (years)	4734	34 (8)	33 (7)	0.99 (0.99-1.00)	0.08	0.99 (0.99-1.00)	0.10
Completed education (years)	4575	9 (3)	10 (3)	1.01 (0.99-1.02)	0.11	1.00 (0.99-1.02)	0.09
Currently married	4717	1025 (55%)	1829 (64%)	1.17 (1.09-1.24)	<0.001	0.99 (0.93-1.06)	0.98
Monthly household income ≥ 10,000KSH ²	4734	1200 (64%)	1738 (61%)	0.94 (0.88-1.02)	0.15		
Currently have a partner	4708	1681 (91%)	2760 (97%)	1.78 (1.41-2.24)	<0.001		
Live with primary partner	4441	1002 (60%)	1844 (67%)	1.12 (1.07-1.18)	<0.001		
Number of living children	4261	3 (2)	3 (1)	1.02 (1.01-1.04)	0.01		
Pregnancy ended within last year	3789	99 (7%)	246 (10%)	1.15 (1.04-1.27)	0.003		
Time since last pregnancy ended (years)	2186	7 (6)	6 (5)	0.98 (0.97-0.99)	<0.001		
Partner characteristics and sexual behavior							
FP discussed with partner in last year	4534	968 (55%)	2168 (78%)	1.55 (1.41-1.71)	<0.001		
FP use known by partner ³	3908	1175 (87%)	2324 (91%)	1.13 (1.02-1.24)	0.01		
Current relationship ≥ 1-year	4411	1509 (90%)	2587 (94%)	1.23 (1.11-1.37)	<0.001		
Received FP counseling together with partner	4534	257 (15%)	722 (26%)	1.26 (1.18-1.35)	<0.001		
FP use history							
FP used, last month	4697	1453 (78%)	2626 (93%)	1.86 (1.54-2.25)	<0.001	1.74 (1.41-2.15)	<0.001
Intention to use FP ⁴	577	130 (34%)	114 (58%)	1.85 (1.40-2.44)	<0.001		
Concerned about side-effects	4734	1111 (59%)	1986 (69%)	1.20 (1.07-1.34)	0.001	1.13 (1.02-1.25)	0.01
Pregnancy intention							
Desire for next children ⁵	4040			Ref		Ref	
No desire		1087 (71%)	1544 (62%)				
≤ 2 years		304 (20%)	525 (21%)	1.07 (0.99-1.17)	0.07	1.11 (1.02-1.25)	0.01
> 2 years		142 (9%)	438 (17%)	1.28 (1.19-1.38)	<0.001	1.18 (1.09-1.28)	<0.001
HIV/ART							
Having HIV-infected partner ⁶	3829	892 (62%)	1713 (71%)	1.16 (1.07-1.27)	<0.001	1.07 (0.99-1.16)	0.06
Disclosed HIV status to partner	4685	1438 (78%)	2559 (90%)	1.53 (1.35-1.74)	<0.001		
Currently on ART	4734	1776 (95%)	2761 (97%)	1.23 (1.07-1.42)	0.004		

ART (anti-retroviral therapy), FP (family planning), HIV (human immunodeficiency virus), IUD (intra-uterine device), KSH (Kenyan Shilling), LAM (lactational amenorrhea method), OCP (oral contraceptive pill), SD (standard deviation)

¹ Number of observations with complete information

² 10,000 KSH is approximately 98.6 USD

³ Among women who used FP in the last month

⁴ Among women who did not use FP in the last month

⁵ Among women who reported their desire for any children in the future and duration when they want to become pregnant again

⁶ Among women who reported the HIV status of their partner and women who had no partner or partner with negative/unknown HIV status

⁷ Adjusted for age (years), education (completed years), marital status, FP used in the last month, concerned about side-effects, desire for next children, and women having HIV-infected partner. Income was excluded due to collinearity with education. Currently having a partner, living with primary partner, and current relationship of ≥ 1 year with partner were excluded due to collinearity with marital status. FP use known by partner and FP discussed together with partner was excluded due to collinearity with FP discussed with partner in the last year. Pregnancy ended within last year, and time since last pregnancy ended were excluded due to collinearity with number of living children. Intention to use FP was excluded due to collinearity with FP used last month. HIV status disclosure to partner was excluded due to collinearity with having HIV-infected partner.

Table 3: Factors associated with discussion of benefits of birth spacing and limiting among HIV infected women who received any family planning counseling (n= 2858)

	Weight Mean (SD) or Unweighted N (Weighted %)						
	Benefits of birth spacing and limiting discussed			Weighted Poisson generalized linear models			
	N ¹	No (n=764)	Yes (n=2046)	Crude PR (95% CI)	p-value	Adjusted PR (95% CI) ⁵	p-value
Sociodemographic and clinical characteristics							
Age (years)	2810	33 (7)	33 (7)	1.00 (0.99-1.00)	0.73	0.99 (0.99-1.00)	0.55
Completed education (years)	2744	9 (3)	10 (3)	1.01 (1.00-1.02)	0.004	1.01 (1.00-1.02)	0.003
Currently married	2802	444 (58%)	1357 (66%)	1.10 (1.05-1.16)	<0.001	1.07 (1.02-1.27)	0.005
Monthly household income ≥ 10,000KSH ²	2810	462 (60%)	1242 (61%)	1.00 (0.96-1.05)	0.94		
Live with primary partner	2720	437 (61%)	1377 (69%)	1.12 (1.05-1.17)	<0.001		
Multiparous	2808	682 (89%)	1967 (96%)	1.51 (1.29-1.77)	<0.001	1.45 (1.19-1.76)	<0.001
Gravidity	2808	3 (2)	3 (2)	1.02 (1.01-1.03)	0.006		
Number of living children	2649	3 (2)	3 (1)	1.01 (0.99-1.03)	0.18		
Pregnancy ended within last year	2345	64 (10%)	181 (11%)	1.01 (0.93-1.09)	0.84		
Partner characteristics and sexual behavior							
FP discussed with partner in last year	2753	515 (70%)	1625 (80%)	1.18 (1.10-1.25)	<0.001		
Current relationship ≥1-year	2710	655 (92%)	1896 (95%)	1.19 (1.05-1.15)	0.005		
Received FP counseling together with partner	2751	153 (21%)	563 (28%)	1.09 (1.05-1.15)	0.001		
FP use history							
Current FP user (last month)	2794	678 (89%)	1909 (94%)	1.22 (1.09-1.37)	0.01	1.18 (1.03-1.35)	0.01
Intention to use FP ³	194	45 (58%)	69 (59%)	1.01 (0.79-1.27)	0.77		
Pregnancy intention							
Desired for next children ⁴	2479						
No desire		417 (63%)	1114 (61%)	Ref			
≤ 2 years		135 (20%)	379 (21%)	1.01 (0.93-1.09)	0.23		
>2 years		107 (16%)	327 (18%)	1.03 (0.95-1.12)	0.37		

ART (anti-retroviral therapy), FP (family planning), HIV (human immunodeficiency virus), IUD (intra-uterine device), KSH (Kenyan Shilling), LAM (lactational amenorrhea method), OCP (oral contraceptive pill), SD (standard deviation)

¹ Number of observations with complete information

² 10,000 KSH is approximately 98.6 USD

³ Among women who did not use FP in the last month

⁴ 379 women did not report fertility desires

⁵ Adjusted for age (years), education (completed years), marital status, multiparous, FP used in the last month.

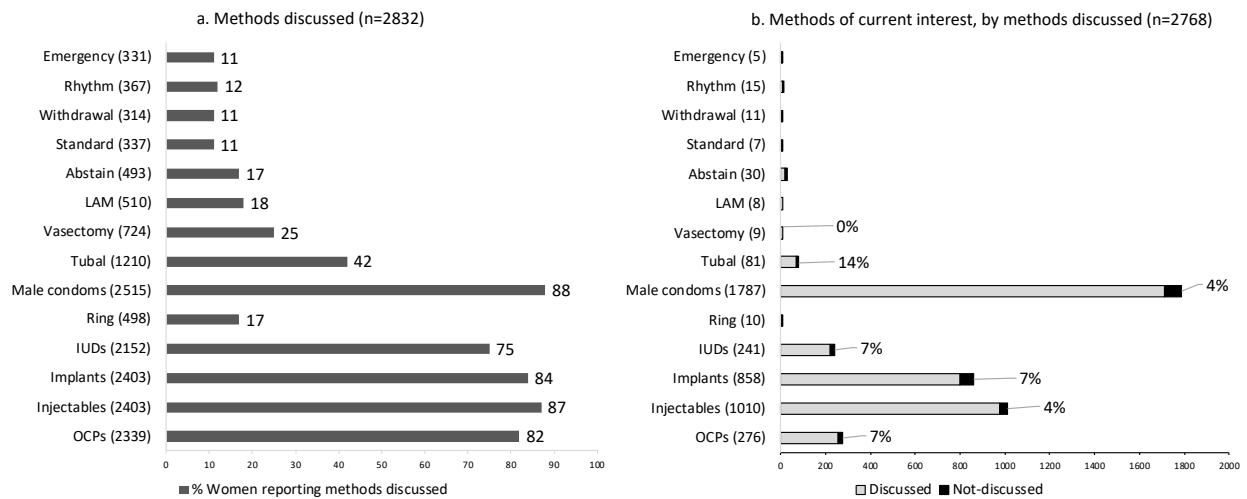


Figure 1: (a) Proportion of contraceptive methods discussed and (b) number of methods of current interest by methods discussed among HIV-infected women who received any FP discussion. Proportions in the figures are not mutually exclusive. Numbers in the parentheses are number of women in each category.

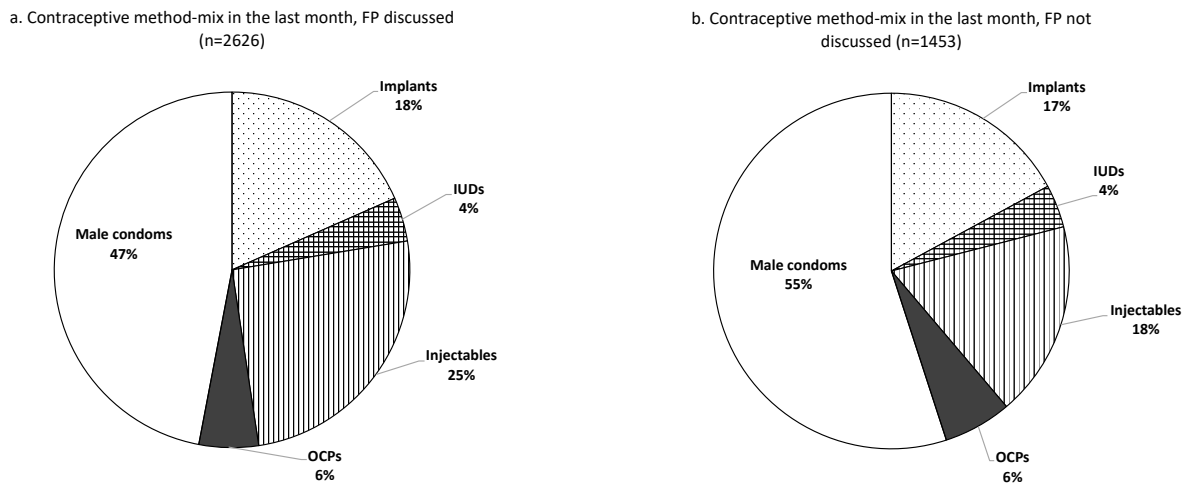


Figure 2: Proportion of contraceptive method-mix in the last month among HIV infected women with and without FP discussion. Sterilizations are not included in the method-mix as it was an exclusion criterion for the study.

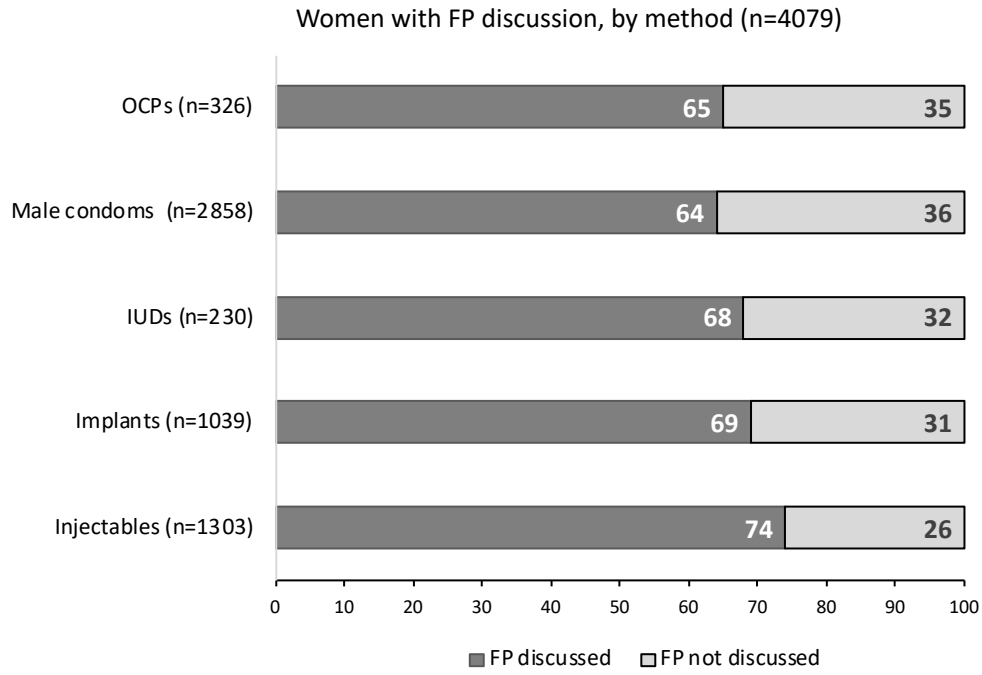


Figure 3: Proportion of women who had FP discussion vs. no FP discussion, by methods. Numbers in the parentheses are number of women in each category.

CHAPTER 4. Acceptability, Feasibility and Utility of a Mobile Health Family Planning Decision-Aid for Postpartum Women in Kenya

Background

Addressing unmet need for family planning (FP) to prevent unintended pregnancies is a high priority for public health, offering an effective strategy to reduce maternal and infant morbidity and mortality.[128] Over 200 million women and girls in low- and middle-income countries (LMICs) who desire pregnancy prevention lack access to FP services, FP information, and effective methods of FP.[129] In sub-Saharan African (SSA), the burden of unintended pregnancies among adolescent girls and young women has been persistently high,[130, 131] contributing to the highest adolescent fertility rates in the world.[132] Up to one-third of adolescents and young women in SSA are at risk of experiencing repeat unintended pregnancy within a year of giving birth,[133] increasing the risk of eclampsia, low birth weight, and preterm delivery.[134, 135] Thus, reducing unmet need for contraception and unintended pregnancy rates among postpartum adolescents and young women is critical to improving maternal and child health overall.

The postpartum period provides a distinct opportunity to address women's contraceptive needs by providing high quality information on contraceptive options. While 95% of postpartum women in LMICs report a desire to delay subsequent pregnancies for at least two years, women are often discharged from health care facilities without a contraceptive method to use or a plan to initiate contraception.[136] As a result, an estimated 61% of women in these settings have unmet needs for FP during the 0-23 months postpartum.[36, 37] Among women who use FP, more than half rely on short-acting, user dependent methods.[37] In Kenya, 59% of women reported using modern contraception by 9 months postpartum, while only 12% used long-acting reversible contraception (LARC).[137]

Provider, individual, and societal level barriers to FP contribute to sub-optimal modern contraceptive

prevalence rates (mCPR) and limited LARC use among postpartum women in Kenya. Key barriers to postpartum contraceptive use include insufficient knowledge of suitable FP methods, fear of side-effects, and myths and misconceptions about contraception.[79, 138] In addition, lack of provider time and opportunities to receive FP training may contribute to low contraceptive use during the postpartum period. FP counseling could address knowledge gaps; however, it is often not delivered during the postpartum period, or is too comprehensive, making it difficult for women to retain key messages and make informed decisions.[139] Both postpartum women and providers have articulated the need for augmented services to support quality contraceptive counseling.[138] Thus, novel approaches to deliver comprehensive, patient-centered FP counseling that address individual and structural barriers are essential to increase mCPR and contraceptive method-mix.

The rapid expansion of mobile devices in resource limited settings has facilitated delivering healthcare information and communicating with patients in clinical practice.[140] While SMS or text messaging interventions have been shown to be effective in efforts to improve health outcomes for chronic diseases in LMICs,[141, 142] and decision support tools have been effective in helping women select contraceptive methods in the United States, mHealth technologies to support health care decision-making have not been studied in resource-limited settings.[143] The World Health Organization (WHO) introduced a postpartum family planning (PPFP) compendium to address the needs of postpartum women, but it is limited to the English language and mainly focuses on medical-eligibility criteria (MEC).[144] We developed a FP decision-aid (*Interactive Mobile Application for Contraceptive Choice* [iMACC]) that is designed to help prepare postpartum women to make deliberate contraceptive choices and streamline FP counseling services in Kenya. In this study, we interviewed postpartum women and FP providers to evaluate the acceptability, feasibility, and utility of this mobile decision-aid in Kenya.

Methods

Study Design

We conducted a qualitative study to evaluate the acceptability and feasibility of a novel, interactive, mobile decision-aid to provide contraceptive counseling (iMACC). Study participants were also asked to provide feedback for future refinement of the decision-aid. Semi-structured in-depth individual interviews (IDIs) were conducted among postpartum women and FP providers/nurses in Kenya.

Population and Sample

The study was conducted at four Kenyan Maternal Child Health (MCH) clinics: two rural sites in the Nyanza region (Kisumu and Siaya county) and two urban sites in Nairobi. All MCH clinics are high-volume government-run public health facilities that serve low-income populations.

Simple purposive sampling was used to recruit FP providers and nurses referred by clinic administrators. We used stratified purposive sampling to recruit postpartum adolescents (age 14-21 years) and young adult (age 22-24) women. Adolescents ≥ 14 years who were previously pregnant are considered emancipated minors in Kenya and were able to provide their own written consent.[145] Postpartum women ≥ 14 years old attending six-week infant immunization visits, and FP providers/nurses ≥ 18 years working at the MCH clinic were eligible for participation if they could read in either English, Kiswahili, or Dholuo. Women were approached by study staff while waiting for FP services, and FP providers were invited to participate. The sample size was guided by achieving thematic saturation, when no new data or themes emerged from interviews.[146]

Ethical Considerations

This study was approved by the Institutional Review Board of the University of Washington (STUDY00001916) and the Kenyatta National Hospital-University of Nairobi Ethics and Research Committee (P252/05/2017). All participants provided written informed consent and received 400 Kenyan Shillings (~ 4 USD) for their time and participation upon completion of the study.

Description of Mobile App

The interactive mobile application for contraceptive choice (iMACC) was developed using Open Data Kit (ODK), an open source Android™-based application that renders standard forms (XLS form) on a tablet. The iMACC was developed by study team members and nurses in Kenya, and allows women to select one of three languages: English, Kiswahili, or Dholuo (Figure 1). It is designed to provide systematic, yet personalized, contraceptive counseling; guide postpartum women through FP decision-making; and provide accurate information about FP methods, including method characteristics and potential side effects. The iMACC was developed for self-administration while waiting to see a FP provider.

The iMACC combines images and text in a heuristic approach to provide tailored contraceptive counseling to women. It features 14 inquiries to assess some of the most common exclusions for FP based on the WHO medical eligibility criteria (MEC),[147] followed by 48 statements and/or inquiries to assess individual preferences and concerns about FP. To assess FP preferences, women are asked questions about fertility intentions and return to fertility, convenience of use and concealability, partner support for FP, perceptions about potential changes in bleeding patterns, side-effect concerns, cost of FP, and frequency of administration/dosing. Following the assessment, women are provided counseling on six modern methods (oral contraceptive pills, injectables, implants, intra-uterine devices, male condoms, and male and female sterilizations) via the iMACC tool.

Theoretical Framework

iMACC content was guided by three behavioral theories, the Theory of Planned Behavior (TPB),[148] Health Belief Model (HBM),[149] and Social Cognitive Theory (SCT),[150] which encompass elements of behavioral, perceived, and efficacy beliefs. Each of these theories have been successfully used to impact contraceptive behavior in resource-limited settings.[94, 151-153] In this framework, behavioral beliefs

from TPB are hypothesized to change the attitude of women towards contraceptive use by providing realistic expectations of benefits and side-effects of contraceptive methods. Perceived beliefs from HBM are hypothesized to motivate contraceptive use by providing accurate method specific information. Efficacy beliefs from SCT are hypothesized to empower women to make informed decision-making. Overall, the integrated theoretical framework (Figure 2) for iMACC suggests this tool could impact contraceptive behavior by affecting these three beliefs, leading to contraceptive initiation and continuation.

Study Procedures

All study participants completed iMACC independently after instructions were provided by study staff. Following completion of the decision-aid, women were individually interviewed by one of two social scientists experienced in conducting qualitative interviews. IDIs were audio recorded using a digital recorder and transcribed and translated after IDI completion. Feasibility was assessed by inquiring about ease of use; ability to understand content, clarity and adequacy of information provided; appropriateness of length of time required to complete iMACC; and need for clarification and/or semantics.[154] Acceptability was assessed by thorough inquiries related to the features of the tool, technological acceptability (relative advantage over other available decision-aids in the clinic i.e. flip charts, and intention to use), preferences over the content, and satisfaction with the content.[155-157] Utility was assessed by inquiring about usefulness of the tool in making informed decisions, improving knowledge on range of contraceptive options and health concerns, and self-efficacy in readiness for change.[158, 159]

Data Analysis

Transcripts were analyzed using qualitative content analysis, which organizes informational content of textual data into categories derived from the data.[160] A team of three coders created a comprehensive codebook containing 84 code descriptions. Three coders independently coded 33% (n=14) of the transcripts

and compared their coding to identify any inconsistencies. The primary coder (RD) reviewed the coding of all transcripts. Disagreements on thematic codes were resolved through discussion, thus establishing inter-coder agreement and performing investigator triangulation.[161] During the coding process, major themes were identified, organized into concepts, and relationships between concepts were examined. The thematic framework was refined throughout the analytic process by identifying new themes and expanding existing ones. As codes were classified into larger themes, we also searched for meaningful patterns by age of postpartum women (adolescents and young adults) using the constant comparison method. To increase the credibility of the findings, a consensus on the final results was made with the whole research team. Dedoose (Los Angeles, California) was used to maintain an electronic database of transcripts and organize coded data.

Results

A total of 25 postpartum women and 17 FP providers/nurses were enrolled in the study. Fifteen (60%) postpartum women were adolescents between the ages of 14-21. FP providers were between 18-58 years of age. Twenty (48%) participants were from the rural MCH clinics and 22 (52%) from urban clinics (Table 1). We explored three overarching themes in IDIs: feasibility, acceptability, and utility of using a self-administered decision-aid in FP clinics. Since we did not detect significant differences in themes between age groups or clinics, we combined perspectives of all postpartum women and FP providers in our results.

Perceived feasibility of the decision-aid

Organization, Ease of Use, and Comprehension:

Nearly all women and providers felt the FP-decision-aid was self-explanatory and easy to use. When women were asked to use the decision-aid, they noted the ease of navigation through the tool, stating “*all I need to do is answer the questions and swipe.*” Overall, both women and providers thought content was presented in a systematic and simple manner. All providers felt the flow of the material was logical and

would be easy for women to understand. Some women even commented that they could anticipate upcoming inquiries: *“when you are navigating you can even guess the next question because the way the questions have been arranged they have a flow, it’s not jumping on any question, but they have a very systematic flow.”* The majority of women reported no challenges in answering questions or comprehending iMACC content. Both women and providers felt that amount of content provided was appropriate to make contraceptive decisions. One provider said:

“I feel the information is very important because it has picked on the specific things that clients normally ask about family planning methods. So, to me it’s important and it’s also detailed.” – FP provider, 29 years

Overall, the language was appropriate for women to use on their own. However, both providers and women pointed out some medical terms (i.e., aura, blood clot, hypertension, and conception) they believed would be difficult for lay audiences to understand. For example, one provider said:

“...for that word aura and blot clotting in the lung and leg it will be a bit challenging. Some of them don’t even know where the lung is and then they will be wondering blood clot and might think it is a big thing.” – FP provider, 20 years

Time Required, Use of Technology, and Literacy of women:

Participants completed iMACC in ~15-20 minutes. Women stated the length of the time required to complete the session to be *“just sufficient, not too much or too little.”* However, several providers disagreed. They believed the amount of time required will depend on how fast someone is able to read and comprehend. Based on her experience in providing FP counseling, a provider stated,

“For somebody new who has never known about FP, and it is their first time they would take a longer time.” – FP provider, 20 years

Several providers thought the decision-aid would streamline the counseling process by reducing time to provide comprehensive counseling since the decision-aid included all of the information and answers to common questions asked by FP clients. They said, *“It will save time a lot because once you have given the tool to the client she has everything, so when she comes [to us] it will be just review and it will take shorter time.”* However, a few providers were concerned the decision-aid would increase their workload by taking a longer time to counsel women. They believed women might have more questions about a larger number of contraceptive methods after using iMACC, resulting in more time to counsel women on these additional methods.

Overall, women and providers felt the mobile design of iMACC would be an appealing feature for a decision-aid, and women would be able to use it on their own; however, this opinion was not universal. In rural clinics, some providers thought the use of technology was an appealing feature of the decision aid, particularly for younger FP clients. They stated that women who know how to use smart devices would be happy to use such an aid.

“You know young people nowadays like smart phones, so if I can have the tool in the tablet to help educate them, they will even bring more women their peers to the clinic, because they will be saying to them, if you go there, there are tablets that tell you about family planning. It will be exciting for them. That is the generation now, it is digital” – FP provider, 18 years

Other providers in rural clinics expressed concern over self-administrative feature of the tool and said:

“This is a rural area, there are people who have never seen or used touch screen phones, if you want them to go through that tool on their own [it] might not be very possible.”- FP provider, 18 years

However, some providers and women believed there were strategies that could be used to overcome these barriers:

“Some [women] may read [iMACC] and not understand, especially if they are not literate, so for such women someone has to guide them.” – Female participant, 17 years

Both women and providers expressed concerns about literacy being a barrier to using the decision-aid. Providers said they have observed that women can speak well but are not able to read or, may not be able to understand the information if they are literate. So, for such women using a decision-aid would be challenging.

“We will have problems with clients where the education level is zero or little.” – FP provider, 40 years

Women echoed similar concerns:

“I think it is a very interesting tool and it is quite informative, but it would only work with a woman who is literate. It would not work with a woman who is semi illiterate. Yeah so for a woman who is literate and has the knowledge of using a smart phone then I think that it is something that is going to be very interesting and very informative” – Female participant, 16 years

Perceived acceptability of the decision-aid

Confidentiality Supporting Participant Engagement:

The iMACC was perceived to be a confidential decision-aid, and this feature was recognized as a benefit by both women and providers. Women reported there are questions adolescents do not feel comfortable asking healthcare providers or do not like getting probed, so having such a tool would allow them to read and understand information on their own. Furthermore, they stated that they would be more likely to answer questions accurately because they know no one would be able to identify them, as they do not have to enter their name.

“...you know it will be between the client and the tool, nobody else will see what they are filling [answer to the questions], so it has some level of confidentiality.” – Female participant, 20 years

Women also expressed the desire for adolescents to seek FP services discretely. If adolescents receive information through a tablet, others would assume they are using their phone and would not know they are receiving FP services, making the tool more acceptable. Additionally, they reported that adolescents would be able to use iMACC freely, without being pressurized to answer promptly or fear that someone might overhear.

“You know sometimes you may be asked questions, like if you asked me some question directly I may not be able to answer you, but when I am alone with the tablet I can answer.” – Female participant, 18 years

Recommended Features to Improve Interaction and Need for Additional Information:

While iMACC included graphics and photos to promote counseling, women and providers recommended incorporating more graphics/photos and additional multimedia features, such as audio or video elements, to improve quality and promote comprehension. They felt these additional elements could support counseling and would help overcome literacy barriers. One provider described what she would like to see in the tool:

“I feel, if we could have videos to show them, it could be better, it could improve our counseling because as you are talking to the mother, maybe she can see on the screen.” – FP provider, 55 years

Women and providers thought iMACC could include more educational content on procedures associated with LARC and permanent methods. Providers felt that women who had no experience with these methods would need more details about procedures to make an informed choice about LARC and permanent methods. One women in our study echoed this sentiment,

“I feel the information is just okay but for someone who have never used implant sometimes for example apart from reading it is important that someone explains the process further. You know people fear operations.” – Female participant, 28 years

Some providers also thought information about female condoms should be incorporated into the decision-aid. Providers said some women, or couples, preferred female over male condoms. However, women in our study did not mention the need to include information on female condoms and felt the information about male condoms was not helpful:

“About condom and how to use it, that is not very important. Everybody knows about it [condoms].” – Female participant, 21 years

One provider suggested inclusion of a message, not only regarding the effectiveness of contraceptives during breastfeeding, but also about the timing when it would be effective and safe to initiate:

“I saw it is written that Depo is effective in breastfeeding but now it is always effective after 6 weeks it was not clear that way. So, it can cause confusion because some women start using FP as early as even 3 weeks after delivery.” – FP provider, 20 years

Perceived usefulness of the decision-aid

Improved Knowledge with a Personalized Approach:

Overall, women said the decision-aid would be very useful for them in selecting a method that best meets their personal reproductive needs. They reported a more thorough understanding of their contraceptive options after using the aid that would help to choose the best option for them (Table 2). A woman concerned about safety of contraceptives during breastfeeding said, *“I felt Depo was okay because even if you are breastfeeding, it is safe.”* All women and providers noted that inclusion of information on side effects would help women gain a more comprehensive understanding of potential side effects, which was expected to

improve their ability to make informed choices about contraception. For example, one woman demonstrated her understanding by saying, *“I realized that the periods, when they start skipping I should not be worried when I am using family planning and that some of it [is] normal.”*

Further, women described gaining insight on realistic expectations of side effects, which resulted in some women changing the method they intended to use after using iMACC. For example, they commented on how the information about potential menstrual changes that are common with some contraceptive methods are undesirable, and learning about the side effect profile of other methods helped them make a more informed decision about selecting an appropriate contraceptive method. One woman described how iMACC led her to select an implant as her method of choice:

“It has changed my mind because I was contemplating continuing with Depo because I had used it but I used to bleed a lot, it’s like there was something that the providers were supposed to do and they didn’t when I complained. But now after reading this I think I want to go for implants.” – Female participant, 20 years

Dispelling Common Myths and Misconceptions:

All participants thought the decision-aid had the potential to clear myths and misconceptions about FP methods and help women make informed choices after receiving information. One woman revealed one of the misconceptions she had before using iMACC, *“I did not know about the fact that IUCD, you can remove it at any time. I always thought that once you insert it then you have to go with it full time.”* Another woman described how rumors circulating in the community had discouraged her to use contraception, but the decision aid encouraged her to use FP after learning these rumors were untrue when she used the decision aid.

“I would like to use family planning. It was not like what people rumor about in the community that family planning is bad, that it has bad side effects which can even kill you. For example, like

the implants, that if you are inserted wrongly you can lose your arm. I have learnt today from the tool that it is not like that.” – Female participant, 20 years

Providers in our study reaffirmed that there were several widespread myths that prevailed among women in the community, and thought the aid would be beneficial in dispelling the myths. For example, providers said some women do not use IUDs because they believe it will cause persistent backaches and might not be able to do hard work. Providers also said women fear that injectables might reduce their libido and implants move from their hand to the brain, which prevents some women from using these methods. They thought it was important to alleviate these fears, and thought the decision-aid had potential to serve this role.

Improvement in Quality of Patient-Provider Interactions:

The majority of women and providers discussed the potential utility of the decision-aid in improving patient-provider interactions. Overall, most providers felt the decision-aid would allow women to ask more questions before they made contraceptive decisions: *“because they will have the information we will be able to exchange, ask questions and interact more”*

However, some providers disagreed, and thought the majority had already made decisions about which contraceptive method to use before they even come to clinic: *“By the time they will come to us, they will be well vast with the FP knowledge. So, they will just say I want Depo and I will have to give Depo,”*

In this study, FP providers acknowledged that it is a challenge to provide counseling on the full spectrum of FP methods when there were method stock outs or heavy workloads that leave little time to provide counseling services. Providers believed iMACC would be beneficial, allowing them to provide systematic, comprehensive information on all contraceptive methods without needing to rely on their memory alone, reducing the likelihood of forgetting to discuss methods that are of interest to women. One provider reflected on her experience providing FP counseling during a busy workday:

“You see like now, in our daily practice, if there are some methods that we don’t have at that particular moment, you may forget to talk about them but this one is systematic, it’s flowing. So, whether you have it, or you don’t, that client will get that information” – FP provider, 55 years

Discussion

This study explored perceptions of postpartum women and FP service providers to evaluate the potential and inform refinement of a FP decision-aid. Overall, women and providers felt the FP decision-aid was easy to use, had a potential to influence decision-making, and could reduce provider’s workload. Confidentiality was an appealing feature for both women and providers. Most of the contraceptive attributes (e.g., effect on breastfeeding, return to fertility, side-effects) that women prefer during the postpartum period for beginning or resuming contraceptives are included in the tool making it a useful tool for postpartum contraceptive counseling.

The iMACC decision-aid was developed using a combination of three theoretical frameworks previously shown to impact individual behavior change and beliefs. Elements of all frameworks were well represented by the narratives of women in our study. Women explained how the use of FP decision-aid helped them enhance their understanding of benefits and potential side effects of contraceptive methods, and dispel contraceptive myths, which resulted in a feeling of empowerment to make informed decisions.

Our decision-aid is a novel tool that could address significant gaps in FP delivery programs in LMIC settings. It provides postpartum women personalized contraceptive counseling using an interactive platform and a simple decision-algorithm that allows women to use it independently and select a method of their choice. Current decision-aids (e.g., WHO Decision Making Tool,[147] WHO Tiered Effectiveness

Chart,[162] Balanced Counseling Strategy[163]), commonly used in settings like Kenya are flipcharts, charts, or counseling cards that are used during clinical encounters and are mainly designed to support provider counseling practice, rather than allowing user-driven tailoring. iMACC may address postpartum women's informational needs, by providing a platform for confidential counseling and helping them make a decision that best accounts for their individual needs and values, and also complement provider counseling. iMACC also has potential to utilize the time women spend waiting to see a provider to deliver contraceptive counseling, maximizing time with providers to discuss specific questions and concerns.[164]

Results from this pilot study suggest our FP decision-aid is acceptable and feasible to use in resource-limited settings. In order to optimize the effectiveness of the tool, some refinements were suggested. The decision-aid was perceived to have potential for being more useful if interactive methods, such as audio or videos could be incorporated to overcome the barriers of illiteracy and technological unfamiliarity.[164] We also identified several areas where participants felt that information was missing, was not required, or was not detailed enough. Adding content that addresses lack of detail and omitting information deemed not important are expected to further enhance the acceptability of the tool.

Our study had several strengths and some limitations. We included postpartum women in different age groups and FP providers to assess acceptability and feasibility from patient and provider perspectives. Participant from both rural and urban settings were included to capture perceptions from diverse settings within Kenya. We used an integrated theoretical framework to develop iMACC content that is hypothesized to guide contraceptive use among women. However, our results may not be generalizable to other settings. Also, we only included postpartum women in our study and do not know how women who are nulliparous or not postpartum would perceive the decision-aid.

Conclusion

This study provides evidence to optimize development and use of the iMACC decision-aid as an innovative and informative FP tool to provide tailored contraceptive counseling to postpartum women. Our findings suggest an algorithm-based decision-aid to provide contraceptive counseling may aid in appropriate selection of contraceptive methods, potentially improving continuation rates and satisfaction. Further research is needed to evaluate the effectiveness of decision-aids to support contraceptive uptake and use among postpartum women.

Tables and figures

Table 1: Descriptive characteristics of postpartum women (N=25)

Characteristics	N	n (%)
Age (14-21 years)	25	15 (60%)
Currently married	25	19 (76%)
Secondary education or below	25	20 (80%)
Parity of women	25	
1		10 (40%)
2-3		12 (48%)
>3		3 (12%)
MCH centers	25	
Rural		12 (48%)
Urban		13 (52%)

FP (family planning); MCH (maternal and child health)

Table 2: Selected quotations from the interviews of postpartum adolescents and adult women supporting the constructs of the integrated theoretical framework

Increase in knowledge
<p>“I have never used family planning, I always just hear about it, so I learnt today. I have learnt that there are pills that you can use, the injection, you can also do tubal ligation.” - 19 years</p> <p>“I have learnt about the methods of family planning that can be used during breastfeeding and what I have learnt again especially that one for three months injection you can use even if you have never delivered.” – 17 years</p>
Enhance realistic expectations of side-effects
<p>“I can now decide to choose this or the other knowing that it’s obvious to experience minor side effects.” – 25 years</p>
Help to dispel myths
<p>“I have felt that family planning is good. It was not like what people rumor about in the community that family planning is bad, that it has bad side effects which can even kill you. For example, like the implants, that if you are inserted wrongly you can lose your arm. I have learnt today from that tool that it is not like that.” – 20 years</p>

Empower women to make informed decisions

“Because it is not time consuming, it is empowering the women, they read for themselves they have the pictures and everything.” – 18 years

Table 3: Summarized IDI Guides

Women’s IDI topics and key interview questions

How was your experience using FP decision-aid?

Were you able to navigate the aid and find the counseling section?

How do you feel about the information in this aid?

How do you feel about the usefulness of this aid in decision-making?

How do you feel about using this FP decision-aid for your FP decision-making?

What kind of information do women find helpful when they make decisions about FP?

FP providers IDI topics and key interview questions

How long have you been providing family planning information or services to clients?

Based on your experience, what influences a postpartum adolescent or adult woman when she is making a choice about family planning?

What is your typical approach to family planning counseling?

What questions do you typically ask women during a counseling session?

What questions women typically ask you in a counseling session?

Have you heard of and/or using any other decision making and counseling tools for providing family planning counseling services?

How interested do you think adolescent girls and adult women will be in using this FP decision-aid?

Were you able to navigate the aid and find the counseling section?

How do you feel about the information in this aid?

How do you feel about the usefulness of this aid in decision-making?

Would you use this aid for counseling if it were available in your clinic?

FP (family planning); IDI (in-depth interview)

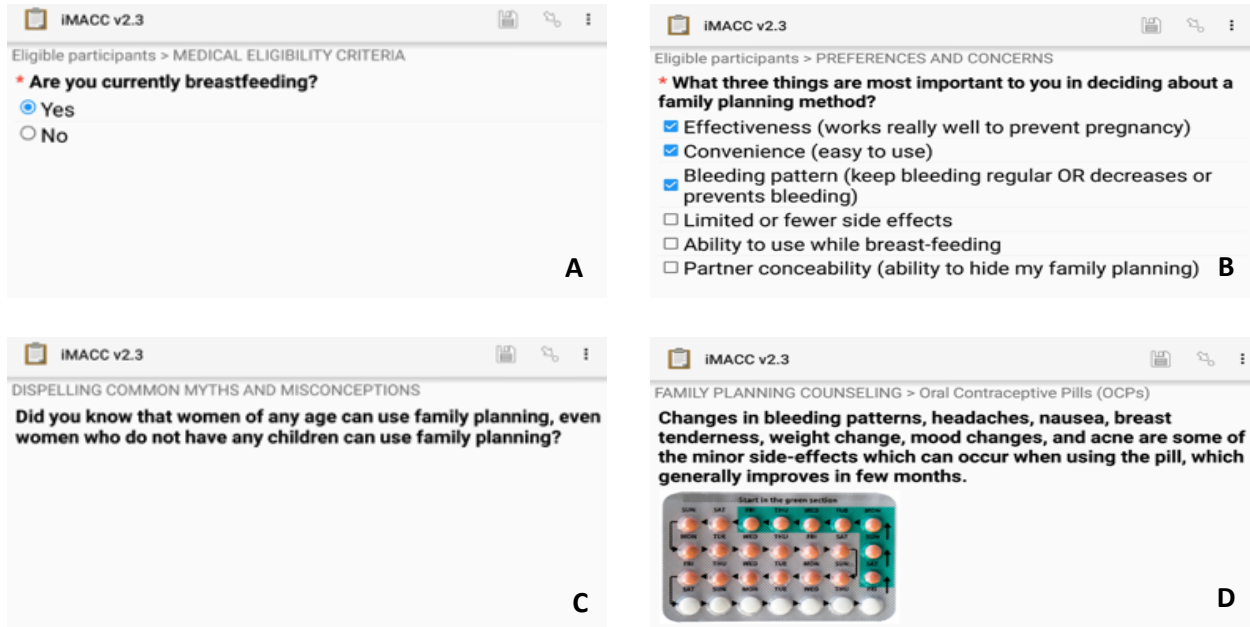


Figure 1: iMACC screen shots of selected content of (A) Assessment of medical eligibility criteria (B) Assessment of preferences and concerns (C) Dispelling common myths and misconceptions (D) Provision of information about oral contraceptive pills.

Use of iMACC Family Planning Decision Aid: Intervention Dimensions, Mediating Effects and Outcomes

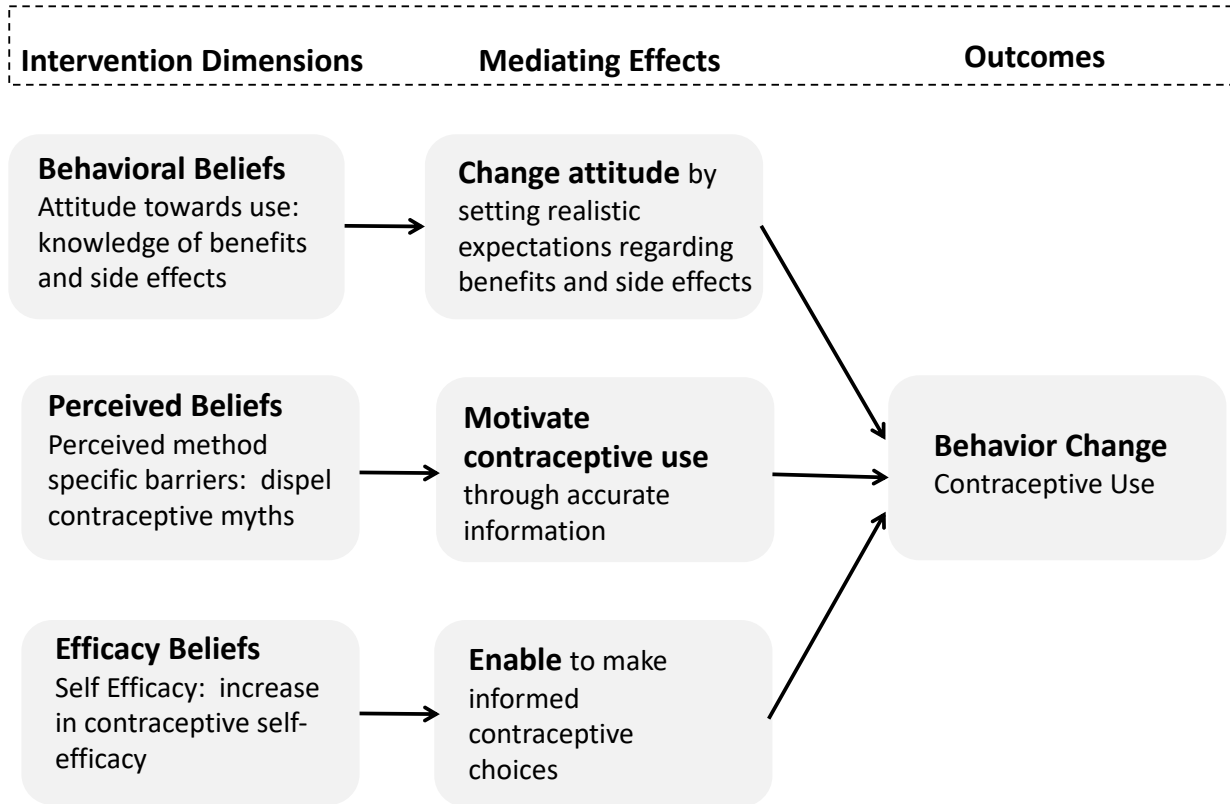


Figure 2. Integrated theoretical framework guiding contraceptive use

CHAPTER 5: Conclusion

FP provides control over pregnancy timing and prevention of unintended pregnancy. A quality contraceptive counseling can increase contraceptive use and decrease unintended pregnancy; hence understanding optimal method of delivery, key information required, and timing of counseling is important. Contraception counseling should be tailored to a woman's perceived needs, with such counseling occurring frequently and within the context of her health literacy. It would of utmost importance to integrate counseling services into the continuum of MCH and HIV care services.

BIBLIOGRAPHY

1. Thomas A: **Policy solutions for preventing unplanned pregnancy.** *Center on Children and Families at Brookings Institution Retrieved March 2012*, **26**:2012.
2. Sedgh G, Singh S, Hussain R: **Intended and unintended pregnancies worldwide in 2012 and recent trends.** *Studies in Family Planning* 2014, **45**:301-314.
3. Klima CS: **Unintended pregnancy: consequences and solutions for a worldwide problem.** *Journal of Nurse-Midwifery* 1998, **43**:483-491.
4. Darroch JE, Audam S, Biddlecom A, Kopplin G, Riley T, Singh S, Sully E: **Adding it up: investing in contraception and maternal and newborn health, 2017.** *Fact Sheet New York: Guttmacher Institute* 2017.
5. Gipson JD, Koenig MA, Hindin MJ: **The effects of unintended pregnancy on infant, child, and parental health: a review of the literature.** *Studies in Family Planning* 2008, **39**:18-38.
6. Marston C, Cleland J: **Do unintended pregnancies carried to term lead to adverse outcomes for mother and child? An assessment in five developing countries.** *Population Studies* 2003, **57**:77-93.
7. Sedgh G, Ashoford LS, Hussain R: **Unmet need for contraception in developing countries: examine women's reasons for not using a method.** The Guttmacher Institute; 2016.
8. **United Nations. Trends in contraceptive use worldwide. Department of Economic and Social Affairs. Population Division. New York: United Nations 2015.**
9. World Health O: **Preventing early pregnancy and poor reproductive outcomes among adolescents in developing countries: What the evidence says.** 2012.
10. Sedgh G, Finer LB, Bankole A, Eilers MA, Singh S: **Adolescent pregnancy, birth, and abortion rates across countries: levels and recent trends.** *Journal of Adolescent Health* 2015, **56**:223-230.
11. Sober S, Schreiber CA: **Postpartum contraception.** *Clinical Obstetrics and Gynecology* 2014, **57**:763-776.
12. Ross JA, Winfrey WL: **Contraceptive use, intention to use and unmet need during the extended postpartum period.** *International Family Planning Perspectives* 2001:20-27.
13. Ezugwu EC, Iyoke CA, Nkwo PO, Ezegwui HU, Akabueze JC, Agu PU: **Unintended pregnancy among HIV-positive pregnant women in Enugu, southeast Nigeria.** *International Journal of Gynecology & Obstetrics* 2016, **132**:60-63.
14. Iyun V, Brittain K, Phillips TK, le Roux S, McIntyre JA, Zerbe A, Petro G, Abrams EJ, Myer L: **Prevalence and determinants of unplanned pregnancy in HIV-positive and HIV-negative pregnant women in Cape Town, South Africa: a cross-sectional study.** *BMJ Open* 2018, **8**:e019979.
15. Chibwasha CJ, Li MS, Matoba CK, Mbewe RK, Chi BH, Stringer JSA, Stringer EM: **Modern contraceptive and dual method use among HIV-infected women in Lusaka, Zambia.** *Infectious Diseases in Obstetrics and Gynecology* 2011, **2011**.
16. Bankole A, Keogh S, Akinyemi O, Dzekedzeke K, Awolude O, Adewole I: **Differences in unintended pregnancy, contraceptive use and abortion by HIV status among women in Nigeria and Zambia.** *International Perspectives on Sexual and Reproductive Health* 2014, **40**:28-38.
17. Mayondi GK, Wirth K, Morroni C, Moyo S, Ajibola G, Diseko M, Sakoi M, Magetse JD, Moabi K, Leidner J: **Unintended pregnancy, contraceptive use, and childbearing desires among HIV-infected and HIV-uninfected women in Botswana: across-sectional study.** *BMC Public Health* 2016, **16**:44.
18. Ikamari L, Izugbara C, Ochako R: **Prevalence and determinants of unintended pregnancy among women in Nairobi, Kenya.** *BMC Pregnancy and Childbirth* 2013, **13**:1.
19. Magadi M: **Poor pregnancy outcomes among adolescents in South Nyanza Region of Kenya.** *African Journal of Reproductive Health* 2006, **10**:26-38.

20. Mumah J, Kabiru CW, Mukiira C, Brinton J, Mutua M, Izugbara C, Birungi H, Askew I: **Unintended pregnancies in Kenya: a country profile**. STEP UP Research Report. Nairobi: African Population and Health Research Center; 2014.
21. FP2020: **Family Planning 2020. Kenya. Commitment Maker Since 2012**. Accessed on May 15th, 2018. Available at <http://www.familyplanning2020.org/entities/77>
22. Kabiru CW, Ushie BA, Mutua MM, Izugbara CO: **Previous induced abortion among young women seeking abortion-related care in Kenya: a cross-sectional analysis**. *BMC Pregnancy and Childbirth* 2016, **16**:104.
23. Evens E, Otieno-Masaba R, Eichleay M, McCarraher D, Hainsworth G, Lane C, Makumi M, Onduso P: **Post-abortion care services for youth and adult clients in Kenya: a comparison of services, client satisfaction and provider attitudes**. *Journal of Biosocial Science* 2014, **46**:1-15.
24. KDHS: **Kenya National Bureau of Statistics. Kenya Demographic and Health Survey 2014**. . 2014.
25. Akelo V, Girde S, Borkowf CB, Angira F, Achola K, Lando R, Mills LA, Thomas TK, Lecher SL: **Attitudes toward family planning among HIV-positive pregnant women enrolled in a prevention of mother-to-child transmission study in Kisumu, Kenya**. *PloS One* 2013, **8**:e66593.
26. 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**. *BMC Public Health* 2015, **15**:1.
27. Schivone GB, Glish LL: **Contraceptive counseling for continuation and satisfaction**. *Current Opinion in Obstetrics and Gynecology* 2017, **29**:443-448.
28. Appareddy S, Pryor J, Bailey B: **Inter-pregnancy interval and adverse outcomes: Evidence for an additional risk in health disparate populations**. *The Journal of Maternal-Fetal & Neonatal Medicine* 2017, **30**:2640-2644.
29. Marston C: **Report of a WHO Technical Consultation on Birth Spacing Geneva Switzerland 13-15 June 2005**. 2006.
30. Rutstein SO: **Effects of preceding birth intervals on neonatal, infant and under-five years mortality and nutritional status in developing countries: evidence from the demographic and health surveys**. *International Journal of Gynecology & Obstetrics* 2005, **89**:S7-S24.
31. Eliason S, Baiden F, Quansah-Asare G, Graham-Hayfron Y, Bonsu D, Phillips J, Awusabo-Asare K: **Factors influencing the intention of women in rural Ghana to adopt postpartum family planning**. *Reproductive Health* 2013, **10**:34.
32. Prata N, Passano P, Rowen T, Bell S, Walsh J, Potts M: **Where there are (few) skilled birth attendants**. *Journal of Health, Population, and Nutrition* 2011, **29**:81.
33. Amelya M, Andriyana H, Nababan B, Rusdianto E: **Postpartum Contraception in Indonesian Teenager**. *KnE Medicine* 2016, **1**:81-88.
34. Ndugwa RP, Cleland J, Madise NJ, Fotso J-C, Zulu EM: **Menstrual pattern, sexual behaviors, and contraceptive use among postpartum women in Nairobi urban slums**. *Journal of Urban Health* 2011, **88**:341-355.
35. Chhabra HK, Mohanty IR, Mohanty NC, Thamke P, Deshmukh YA: **Impact of structured counseling on choice of contraceptive method among postpartum women**. *The Journal of Obstetrics and Gynecology of India* 2016, **66**:471-479.
36. Pasha O, Goudar SS, Patel A, Garces A, Esamai F, Chomba E, Moore JL, Kodkany BS, Saleem S, Derman RJ: **Postpartum contraceptive use and unmet need for family planning in five low-income countries**. *Reproductive Health* 2015, **12**:1.
37. Moore Z, Pfitzer A, Gubin R, Charurat E, Elliott L, Croft T: **Missed opportunities for family planning: an analysis of pregnancy risk and contraceptive method use among postpartum women in 21 low-and middle-income countries**. *Contraception* 2015, **92**:31-39.
38. **The World Bank. World Bank Countries and Lending Groups**. Available at <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>.

39. Festin MPR, Kiarie J, Solo J, Spieler J, Malarcher S, Van Look PFA, Temmerman M: **Moving towards the goals of FP2020—classifying contraceptives.** *Contraception* 2016, **94**:289-294.
40. Hubacher D, Trussell J: **A definition of modern contraceptive methods.** *Contraception* 2015, **92**:420-421.
41. Hindin MJ, Kalamar AM: **Country-specific data on the contraceptive needs of adolescents.** *Bulletin of the World Health Organization* 2017, **95**:166.
42. Scoggins S, Bremner J: **FP2020 momentum at the midpoint 2015-2016.** 2016.
43. Track20: **The S-Curve: Putting mCPR Growth in Context.** Available at http://www.track20.org/download/pdf/S_Curve_One_Pager.pdf. 2017.
44. Van Lith LM, Yahner M, Bakamjian L: **Women's growing desire to limit births in sub-Saharan Africa: meeting the challenge.** *Global Health: Science and Practice* 2013, **1**:97-107.
45. Cleland J, Shah IH, Benova L: **A fresh look at the level of unmet need for family planning in the postpartum period, its causes and program implications.** *International Perspectives on Sexual and Reproductive Health* 2015, **41**:155-162.
46. Rossier C, Bradley SEK, Ross J, Winfrey W: **Reassessing unmet need for family planning in the postpartum period.** *Studies in Family Planning* 2015, **46**:355-367.
47. Borenstein M, Hedges LV, Higgins J, Rothstein HR: **A basic introduction to fixed-effect and random-effects models for meta-analysis.** *Research Synthesis Methods* 2010, **1**:97-111.
48. Berkey CS, Hoaglin DC, Mosteller F, Colditz GA: **A random-effects regression model for meta-analysis.** *Statistics in Medicine* 1995, **14**:395-411.
49. Tsui AO, Brown W, Li Q: **Contraceptive Practice in sub-Saharan Africa.** *Population and Development Review* 2017, **43**:166-191.
50. Dallal GE: **The Standard Error of a Proportion.** Available at <http://www.jerrydallal.com/lhsp/psd.htm>. 1998.
51. Mumah JN, Machiyama K, Mutua M, Kabiru CW, Cleland J: **Contraceptive adoption, discontinuation, and switching among postpartum women in Nairobi's urban slums.** *Studies in Family Planning* 2015, **46**:369-386.
52. Abraha TH, Teferra AS, Gelagay AA: **Postpartum modern contraceptive use in northern Ethiopia: prevalence and associated factors.** *Epidemiology and Health* 2017, **39**.
53. O'Shea MS, Rosenberg NE, Hosseinipour MC, Stuart GS, Miller WC, Kaliti SM, Mwale M, Bonongwe PP, Tang JH: **Effect of HIV status on fertility desire and knowledge of long-acting reversible contraception of postpartum Malawian women.** *AIDS care* 2015, **27**:489-498.
54. Robinson N, Moshabela M, Owusu-Ansah L, Kapungu C, Geller S: **Barriers to intrauterine device uptake in a rural setting in Ghana.** *Health Care for Women International* 2016, **37**:197-215.
55. Withers M, Kano M, Pinatih GNI: **Desire for more children, contraceptive use and unmet need for family planning in a remote area of Bali, Indonesia.** *Journal of Biosocial Science* 2010, **42**:549-562.
56. MCHIP: **Maternal and Child Health Integrated Program. Kenya 2008-2009 DHS Reanalysis for PFP. Family Planning Needs during the First Two Years Postpartum in Kenya.**; 2012.
57. **International Seminar Report. Promoting Postpartum and Post-Abortion Family Planning: Challenges and Opportunities. Cochin, India, 11-13.** 2014.
58. Adeyemi AB, Ijadunola KT, Orji EO, Kuti O, Alabi MM: **The unmet need for contraception among Nigerian women in the first year post-partum.** *The European Journal of Contraception & Reproductive Health Care* 2005, **10**:229-234.
59. Abera Y, Mengesha ZB, Tessema GA: **Postpartum contraceptive use in Gondar town, Northwest Ethiopia: a community based cross-sectional study.** *BMC Women's Health* 2015, **15**:19.
60. Hubacher D, Masaba R, Manduku CK, Veena V: **Uptake of the levonorgestrel intrauterine system among recent postpartum women in Kenya: factors associated with decision-making.** *Contraception* 2013, **88**:97-102.

61. Mengesha ZB, Worku AG, Feleke SA: **Contraceptive adoption in the extended postpartum period is low in Northwest Ethiopia.** *BMC Pregnancy and Childbirth* 2015, **15**:160.
62. Sileo KM, Wanyenze RK, Lule H, Kiene SM: **Determinants of family planning service uptake and use of contraceptives among postpartum women in rural Uganda.** *International Journal of Public Health* 2015, **60**:987-997.
63. Elweshahi HMT, Gewaifel GI, Sadek SSELD, El-Sharkawy OG: **Unmet need for postpartum family planning in Alexandria, Egypt.** *Alexandria Journal of Medicine* 2017.
64. Mody SK, Nair S, Dasgupta A, Raj A, Donta B, Saggurti N, Naik DD, Silverman JG: **Postpartum contraception utilization among low-income women seeking immunization for infants in Mumbai, India.** *Contraception* 2014, **89**:516-520.
65. Wilopo SA, Setyawan A, Pinandari AW, Prihyugiarto T, Juliaan F, Magnani RJ: **Levels, trends and correlates of unmet need for family planning among postpartum women in Indonesia: 2007–2015.** *BMC Women's Health* 2017, **17**:120.
66. Keogh SC, Urassa M, Kumogola Y, Kalongoji S, Kimaro D, Zaba B: **Postpartum contraception in northern Tanzania: patterns of use, relationship to antenatal intentions, and impact of antenatal counseling.** *Studies in Family Planning* 2015, **46**:405-422.
67. Sipsma HL, Bradley EH, Chen PG: **Lactational amenorrhea method as a contraceptive strategy in Niger.** *Maternal and Child Health Journal* 2013, **17**:654-660.
68. Hounton S, Winfrey W, Barros AJD, Askew I: **Patterns and trends of postpartum family planning in Ethiopia, Malawi, and Nigeria: evidence of missed opportunities for integration.** *Global Health Action* 2015, **8**:29738.
69. Iliyasu Z, Galadanci HS, Danlami KM, Salihu HM, Aliyu MH: **Correlates of postpartum sexual activity and contraceptive use in Kano, northern Nigeria.** *African Journal of Reproductive Health* 2018, **22**:103-112.
70. Morhe ESK, Ankobea F, Asubonteng GO, Opoku B, Turpin CA, Dalton VK: **Postpartum contraceptive choices among women attending a well-baby clinic in Ghana.** *International Journal of Gynecology & Obstetrics* 2017.
71. Achwoka D, Pintye J, McGrath CJ, Kinuthia J, Unger JA, Obudho N, Langat A, John-Stewart G, Drake AL: **Uptake and correlates of contraception among postpartum women in Kenya: results from a national cross-sectional survey.** *Contraception* 2017, **97**:227-235.
72. Navodani KT, Fonseka P, Goonewardena CS: **Postpartum family planning: missed opportunities across the continuum of care.** *Ceylon Medical Journal* 2017, **62**:87-91.
73. Shabiby MM, Karanja JG, Odawa F, Kosgei R, Kibore MW, Kiarie JN, Kinuthia J: **Factors influencing uptake of contraceptive implants in the immediate postpartum period among HIV infected and uninfected women at two Kenyan District Hospitals.** *BMC Women's Health* 2015, **15**:62.
74. Balkus J, Bosire R, John-Stewart G, Mbori-Ngacha D, Schiff MA, Wamalwa D, Gichuhi C, Obimbo E, Wariua G, Farquhar C: **High uptake of postpartum hormonal contraception among HIV-1-seropositive women in Kenya.** *Sexually Transmitted Diseases* 2007, **34**:25.
75. Gebremariam A, Gebremariam H: **Contraceptive use among lactating women in Ganta-Afeshum District, Eastern Tigray, Northern Ethiopia, 2015: a cross sectional study.** *BMC Pregnancy and Childbirth* 2017, **17**:421.
76. Gebremedhin AY, Kebede Y, Gelagay AA, Habitu YA: **Family planning use and its associated factors among women in the extended postpartum period in Addis Ababa, Ethiopia.** *Contraception and Reproductive Medicine* 2018, **3**:1.
77. RamaRao S, Ishaku S, Liambila W, Mane B: **Enhancing contraceptive choice for postpartum women in sub-Saharan Africa with the progesterone vaginal ring: a review of the evidence.** *Open Access Journal of Contraception* 2015, **6**:117.
78. Iliyasu Z, Kabir M, Galadanci HS, Abubakar IS, Salihu HM, Aliyu MH: **Postpartum beliefs and practices in Danbare village, Northern Nigeria.** *Journal of Obstetrics and Gynaecology* 2006, **26**:211-215.

79. Keesara S, Juma PA, Harper CC, Newmann SJ: **Barriers to postpartum contraception: differences among women based on parity and future fertility desires.** *Culture, Health & Sexuality* 2018, **20**:247-261.
80. Cahill N, Sonneveldt E, Stover J, Weinberger M, Williamson J, Wei C, Brown W, Alkema L: **Modern contraceptive use, unmet need, and demand satisfied among women of reproductive age who are married or in a union in the focus countries of the Family Planning 2020 initiative: a systematic analysis using the Family Planning Estimation Tool.** *The Lancet* 2017.
81. Najafi-Sharjabad F, Yahya SZS, Hejar Abdul Rahman MH, Manaf RA: **Barriers of modern contraceptive practices among Asian women: A mini literature review.** *Global Journal of Health Science* 2013, **5**:181.
82. Cleland J, Shah IH, Daniele M: **Interventions to Improve Postpartum Family Planning in Low- and Middle-Income Countries: Program Implications and Research Priorities.** *Studies in Family Planning* 2015, **46**:423-441.
83. Truitt ST, Fraser AB, Grimes DA, Gallo MF, Schulz KF: **Hormonal contraception during lactation: systematic review of randomized controlled trials.** *Contraception* 2003, **68**:233-238.
84. Mohammed-Durosinlorun A, Abubakar A, Adze J, Bature S, Mohammed C, Taingson M, Ojabo A: **Comparison of contraceptive methods chosen by breastfeeding, and non-breastfeeding, women at a family planning clinic in Northern Nigeria.** *Health* 2016, **8**:191.
85. Hindin MJ, McGough LJ, Adanu RM: **Misperceptions, misinformation and myths about modern contraceptive use in Ghana.** *Journal of Family Planning and Reproductive Health Care* 2013:jfprhc-2012.
86. Asekun-Olarinmoye EO, Adebimpe WO, Bamidele JO, Odu OO, Asekun-Olarinmoye IO, Ojofeitimi EO: **Barriers to use of modern contraceptives among women in an inner city area of Osogbo metropolis, Osun state, Nigeria.** *International Journal of Women's Health* 2013, **5**:647.
87. Senderowicz L: **Side-effects and contraceptive uptake in urban Burkina Faso.** *Contraception* 2015, **92**:364.
88. Chebet JJ, McMahan SA, Greenspan JA, Mosha IH, Callaghan-Koru JA, Killewo J, Baqui AH, Winch PJ: **"Every method seems to have its problems"-Perspectives on side effects of hormonal contraceptives in Morogoro Region, Tanzania.** *BMC Women's Health* 2015, **15**:97.
89. Sonalkar S, Mody S, Phillips S, Gaffield ME: **Programmatic aspects of postpartum family planning in developing countries: a qualitative analysis of key informant interviews in Kenya and Ethiopia.** *African Journal of Reproductive Health* 2013, **17**:54-56.
90. Kafle RB, Dulal KP, Pandey KP: **Continuum of maternal health care and the use of postpartum family planning in Nepal.** 2017.
91. Akinlo A, Bisiriyu A, Esimai O: **Maternal healthcare use and postpartum contraception in Nigeria.** Nigeria Fellows Working Paper. Available at: http://www.iussp.org/sites/default/files/event_call_for_papers/IUSSP-%20NigeriaFellowsWorkingPaperRevised_0.pdf.
92. Solo J, Malarcher S: **Mobile outreach services: expanding access to a full range of modern contraceptives.** 2014.
93. **Postpartum Family Planning (PPFP) Toolkit. Integration opportunities.** Accessed on May 14th, 2018. Available at: <https://www.k4health.org/toolkits/ppfp/integration-opportunities>.
94. Dulli LS, Eichleay M, Rademacher K, Sortijas S, Nsengiyumva T: **Meeting postpartum women's family planning needs through integrated family planning and immunization services: results of a cluster-randomized controlled trial in Rwanda.** *Global Health: Science and Practice* 2016, **4**:73-86.
95. Achyut P, Mishra A, Montana L, Sengupta R, Calhoun LM, Nanda P: **Integration of family planning with maternal health services: an opportunity to increase postpartum modern contraceptive use in urban Uttar Pradesh, India.** *Journal of Family Planning and Reproductive Health Care* 2015:jfprhc-2015.

96. Ahmed S, Ahmed S, McKaig C, Begum N, Mungia J, Norton M, Baqui AH: **The effect of integrating family planning with a maternal and newborn health program on postpartum contraceptive use and optimal birth spacing in rural Bangladesh.** *Studies in Family Planning* 2015, **46**:297-312.
97. Blazer C, Prata N: **Postpartum family planning: current evidence on successful interventions.** *Open Access Journal of Contraception* 2016, **7**:53-67.
98. Adanikin AI, Onwudiegwu U, Loto OM: **Influence of multiple antenatal counselling sessions on modern contraceptive uptake in Nigeria.** *The European Journal of Contraception & Reproductive Health Care* 2013, **18**:381-387.
99. Kashyap C, Mohanty IR, Thamke P, Deshmukh YA: **Acceptance of Contraceptive Methods Among Postpartum Women in a Tertiary Care Center.** *The Journal of Obstetrics and Gynecology of India* 2017, **67**:91-97.
100. Mutiso SM, Kinuthia J, Qureshi Z: **Contraceptive use among HIV infected women attending Comprehensive Care Centre.** *East African Medical Journal* 2008, **85**:171-177.
101. Hancock NL, Chibwesa CJ, Bosomprah S, Newman J, Mubiana-Mbewe M, Sitali ES, Bolton-Moore C, Mbwili-Muleya C, Chi BH: **Contraceptive use among HIV-infected women and men receiving antiretroviral therapy in Lusaka, Zambia: a cross-sectional survey.** *BMC Public Health* 2016, **16**:1.
102. Wekesa E, Coast E: **Contraceptive need and use among individuals with HIV/AIDS living in the slums of Nairobi, Kenya.** *International Journal of Gynecology & Obstetrics* 2015, **130**.
103. Yaya I, Patassi AA, Landoh DE, Bignandi EM, Kolani K, Namoro A-DD, Djalogue L, Ekouevi DK, Saka B: **Modern contraceptive use among HIV-infected women attending HIV care centres in Togo: a cross-sectional study.** *BMJ Open* 2018, **8**:e019006.
104. Laryea DO, Amoako YA, Spangenberg K, Frimpong E, Kyei-Ansong J: **Contraceptive use and unmet need for family planning among HIV positive women on antiretroviral therapy in Kumasi, Ghana.** *BMC Women's Health* 2014, **14**:126.
105. Agboghroma CO: **Contraception in the context of HIV/AIDS: a review: review article.** *African journal of Reproductive Health* 2011, **15**:15-24.
106. **World Contraceptive Patterns 2013.** United Nations, Department of Economic and Social Affairs. Population Division. Available at: <http://www.un.org/en/development/desa/population/publications/pdf/family/worldContraceptivePatternsWallChart2013.pdf>.
107. Rights PwSR: **Monitoring the Integration of Family Planning and HIV Services.** 2016.
108. C Sarnquist C, Rahangdale L, Maldonado Y: **Reproductive health and family planning needs among HIV-infected women in Sub-Saharan Africa.** *Current HIV Research* 2013, **11**:160-168.
109. Framework UO: **We can prevent mothers from dying and babies from becoming infected with HIV.**
110. Adeniyi OV, Ajayi AI, Moyaki MG, Ter Goon D, Avramovic G, Lambert J: **High rate of unplanned pregnancy in the context of integrated family planning and HIV care services in South Africa.** *BMC Health Services Research* 2018, **18**:140.
111. Madsen EL, Kuang B, Ross J: **Tracking changes in states of contraceptive use over time in sub-Saharan Africa through cohort and period analyses.** *Journal of Biosocial Science* 2015, **47**:329-344.
112. Wilson EK, Krieger KE, Koo HP, Minnis AM, Treiman K: **Feasibility and acceptability of a computer-based tool to improve contraceptive counseling.** *Contraception* 2014, **90**:72-78.
113. Ippoliti NB, Nanda G, Wilcher R: **Meeting the reproductive health needs of female key populations affected by HIV in low-and middle-income countries: A Review of the evidence.** *Studies in Family Planning* 2017, **48**:121-151.
114. Njuguna E, Ilovi S, Muiruri P, Mutai K, Kinuthia J, Njoroge P: **Factors influencing the utilization of family planning services among HIV infected women in a Kenyan health facility.**

- International Journal of Reproduction, Contraception, Obstetrics and Gynecology* 2017, **6**:1746-1752.
115. Imbuki K, Shaffer DN, Sinei SK, Todd CS, Stibich MA: **Factors influencing contraceptive choice and discontinuation among HIV-positive women in Kericho, Kenya.** *African Journal of Reproductive Health* 2010, **14**:103-114.
 116. Hartung C, Lerer A, Anokwa Y, Tseng C, Brunette W, Borriello G: **Open data kit: tools to build information services for developing regions.** In; 2010. ACM: 18.
 117. **COP 2015. Kenya Country Operational Plan: Strategic Direction Summary.** Available at: <https://www.pepfar.gov/documents/organization/250293.pdf>. 2015.
 118. Cleophas TJ, Zwinderman AH: **Poisson Regression for Binary Outcomes (52 Patients).** In *SPSS for Starters and 2nd Levelers*. Springer; 2016: 273-277
 119. Vatcheva KP, Lee M, McCormick JB, Rahbar MH: **Multicollinearity in regression analyses conducted in epidemiologic studies.** *Epidemiology (Sunnyvale, Calif)* 2016, **6**.
 120. Johansen SL, Lerma K, Shaw KA: **Contraceptive counseling in reproductive-aged women treated for breast cancer at a tertiary care institution: a retrospective analysis.** *Contraception* 2017, **96**:248-253.
 121. Dude A, Matulich M, Estevez S, Liu LY, Yee LM: **Disparities in Postpartum Contraceptive Counseling and Provision Among Mothers of Preterm Infants.** *Journal of Women's Health* 2018.
 122. Tumlinson K, Pence BW, Curtis SL, Marshall SW, Speizer IS: **Quality of care and contraceptive use in urban Kenya.** *International Perspectives on Sexual and Reproductive Health* 2015, **41**:69.
 123. Tumlinson K, Okigbo CC, Speizer IS: **Provider barriers to family planning access in urban Kenya.** *Contraception* 2015, **92**:143-151.
 124. Akers AY, Gold MA, Borrero S, Santucci A, Schwarz EB: **Providers' perspectives on challenges to contraceptive counseling in primary care settings.** *Journal of Women's Health* 2010, **19**:1163-1170.
 125. Rominski SD, Morhe ESK, Maya E, Manu A, Dalton VK: **Comparing women's contraceptive preferences with their choices in 5 urban family planning clinics in Ghana.** *Global Health: Science and Practice* 2017, **5**:65-74.
 126. Ferguson S, Trupin L, Yazdany J, Yelin E, Barton J, Katz P: **Who receives contraception counseling when starting new lupus medications? The potential roles of race, ethnicity, disease activity, and quality of communication.** *Lupus* 2016, **25**:12-17.
 127. O'Reilly KR, Kennedy CE, Fonner VA, Sweat MD: **Family planning counseling for women living with HIV: a systematic review of the evidence of effectiveness on contraceptive uptake and pregnancy incidence, 1990 to 2011.** *BMC Public Health* 2013, **13**:935.
 128. Prata N, Weidert K, Sreenivas A: **Meeting the need: youth and family planning in sub-Saharan Africa.** *Contraception* 2013, **88**:83-90.
 129. Singh S, Sedgh G, Hussain R: **Unintended pregnancy: worldwide levels, trends, and outcomes.** *Studies in Family Planning* 2010, **41**:241-250.
 130. Phillips SJ, Mbizvo MT: **Empowering adolescent girls in Sub-Saharan Africa to prevent unintended pregnancy and HIV: A critical research gap.** *International Journal of Gynecology & Obstetrics* 2016, **132**:1-3.
 131. Yakubu I, Salisu WJ: **Determinants of adolescent pregnancy in sub-Saharan Africa: a systematic review.** *Reproductive Health* 2018, **15**:15.
 132. Beguy D, Ndugwa R, Kabiru CW: **Entry into motherhood among adolescent girls in two informal settlements in Nairobi, Kenya.** *Journal of Biosocial Science* 2013, **45**:721-742.
 133. Thurman AR, Hammond N, Brown HE, Roddy ME: **Preventing repeat teen pregnancy: postpartum depot medroxyprogesterone acetate, oral contraceptive pills, or the patch?** *Journal of Pediatric and Adolescent Gynecology* 2007, **20**:61-65.
 134. Ganchimeg T, Ota E, Morisaki N, Laopaiboon M, Lumbiganon P, Zhang J, Yamdamsuren B, Temmerman M, Say L, Tunçalp Ö: **Pregnancy and childbirth outcomes among adolescent**

- mothers: a World Health Organization multicountry study. *BJOG: An International Journal of Obstetrics & Gynaecology* 2014, **121**:40-48.
135. Hindin MJ, Kalamar AM, Thompson T-A, Upadhyay UD: **Interventions to prevent unintended and repeat pregnancy among young people in low-and middle-income countries: a systematic review of the published and gray literature.** *Journal of Adolescent Health* 2016, **59**:S8-S15.
 136. Baldwin MK, Edelman AB: **The effect of long-acting reversible contraception on rapid repeat pregnancy in adolescents: a review.** *Journal of Adolescent Health* 2013, **52**:S47-S53.
 137. Achwoka D, Pintye J, McGrath CJ, Kinuthia J, Unger JA, Obudho N, Langat A, John-Stewart G, Drake AL: **Uptake and correlates of contraception among postpartum women in Kenya: results from a national cross-sectional survey.** *Contraception* 2017.
 138. Velonjara J, Crouthamel B, O'Malley G, Wiggins M, Matemo D, John-Stewart G, Unger JA, Kinuthia J, Drake AL: **Motherhood increases support for family planning among Kenyan adolescents.** *Sexual & Reproductive Healthcare* 2018.
 139. Lopez LM, Grey TW, Chen M, Hiller JE: **Strategies for improving postpartum contraceptive use: evidence from non-randomized studies.** *Cochrane Database Systematic Review* 2014, **11**.
 140. Modi S: **Mobile health technology in developing countries: The case of Tanzania.** *Pepperdine Policy Review* 2013, **6**:E1.
 141. Lee SH, Nurmatov UB, Nwaru BI, Mukherjee M, Grant L, Pagliari C: **Effectiveness of mHealth interventions for maternal, newborn and child health in low-and middle-income countries: Systematic review and meta-analysis.** *Journal of Global Health* 2016, **6**.
 142. Beratarrechea A, Lee AG, Willner JM, Jahangir E, Ciapponi A, Rubinstein A: **The impact of mobile health interventions on chronic disease outcomes in developing countries: a systematic review.** *Telemedicine and e-Health* 2014, **20**:75-82.
 143. Dehlendorf C, Fitzpatrick J, Steinauer J, Swiader L, Grumbach K, Hall C, Kuppermann M: **Development and field testing of a decision support tool to facilitate shared decision making in contraceptive counseling.** *Patient Education and Counseling* 2017, **100**:1374-1381.
 144. Sonalkar S, Gaffield ME: **Introducing the World Health Organization postpartum family planning compendium.** *International Journal of Gynecology & Obstetrics* 2017, **136**:2-5.
 145. KEMRI Na: **Guidelines for Conducting Adolescent HIV Sexual and Reproductive Health Research in Kenya.** National AIDS and STI Control Programme (NASCOP) & Kenya Medical Research Institute (KEMRI). Accessed on February 23, 2018.; 2015.
 146. Fusch PI, Ness LR: **Are we there yet? Data saturation in qualitative research.** *The Qualitative Report* 2015, **20**:1408.
 147. WHO: **World Health Organization. Medical eligibility criteria for contraceptive use. Fifth Edition,** Available at: http://apps.who.int/iris/bitstream/10665/181468/1/9789241549158_eng.pdf. 2015.
 148. Ajzen I: **The theory of planned behavior.** *Organizational behavior and human decision processes* 1991, **50**:179-211.
 149. Green EC, Murphy E: **Health belief model.** *The Wiley Blackwell Encyclopedia of Health, Illness, Behavior, and Society* 2014.
 150. Bandura A: **Social cognitive theory.** *Handbook of Social Psychological Theories* 2011, **2012**:349-373.
 151. Hall KS: **The health belief model can guide modern contraceptive behavior research and practice.** *Journal of Midwifery & Women's Health* 2012, **57**:74-81.
 152. Molla M, Nordrehaug Åstrøm A, Brehane Y: **Applicability of the theory of planned behavior to intended and self-reported condom use in a rural Ethiopian population.** *AIDs care* 2007, **19**:425-431.
 153. Lopez LM, Tolley EE, Grimes DA, Chen M, Stockton LL: **Theory-based interventions for contraception.** *The Cochrane Library* 2013.

154. Ismail R, Linder LA, MacPherson CF, Fugate Woods N: **Feasibility of an iPad application for studying menopause-related symptom clusters and women's heuristics.** *Informatics for Health and Social Care* 2016, **41**:247-266.
155. Blitchtein-Winicki D, Zevallos K, Samolski MR, Requena D, Velarde C, Briceño P, Piazza M, Ybarra ML: **Feasibility and Acceptability of a Text Message-Based Smoking Cessation Program for Young Adults in Lima, Peru: Pilot Study.** *JMIR mHealth and uHealth* 2017, **5**.
156. Ahlan AR, Ahmad Ble: **User acceptance of health information technology (HIT) in developing countries: A conceptual model.** *Procedia Technology* 2014, **16**:1287-1296.
157. Lewis CC, Fischer S, Weiner BJ, Stanick C, Kim M, Martinez RG: **Outcomes for implementation science: an enhanced systematic review of instruments using evidence-based rating criteria.** *Implementation Science* 2015, **10**:155.
158. Christison AL, Daley BM, Asche CV, Ren J, Aldag JC, Ariza AJ, Lowry KW: **Pairing motivational interviewing with a nutrition and physical activity assessment and counseling tool in pediatric clinical practice: a pilot study.** *Childhood Obesity* 2014, **10**:432-441.
159. Sundaresan P, Ager B, Turner S, Costa D, Kneebone A, Pearse M, Woo H, Tesson S, Juraskova I, Butow P: **A randomised controlled trial evaluating the utility of a patient Decision Aid to improve clinical trial (RAVES 08.03) related decision-making.** *Radiotherapy and Oncology* 2017, **125**:124-129.
160. Elo S, Kyngäs H: **The qualitative content analysis process.** *Journal of Advanced Nursing* 2008, **62**:107-115.
161. Carter N, Bryant-Lukosius D, DiCenso A, Blythe J, Neville AJ: **The use of triangulation in qualitative research.** In *Oncology Nursing Forum*; 2014. 2014
162. Stanback J, Steiner M, Dorflinger L, Solo J, Cates W: **WHO tiered-effectiveness counseling is rights-based family planning.** *Global Health: Science and Practice* 2015, **3**:352-357.
163. León FR, Vernon R, Martin A, Bruce L: **The Balanced Counseling Strategy: A toolkit for family planning service providers.** *Washington, DC: Population Council* 2008.
164. Rodriguez J, Abutouk M, Roque K, Sridhar A: **Personalized contraceptive counseling: helping women make the right choice.** *Open Access Journal of Contraception* 2016, **7**:89.