


RESEARCH ARTICLE

Prevalence and predictors of unmet contraceptive need in HIV-positive female sex workers in Mombasa, Kenya

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OPEN ACCESS

Citation: Long JE, Waruguru G, Yuhas K, Wilson KS, Masese LN, Wanje G, et al. (2019) Prevalence and predictors of unmet contraceptive need in HIV-positive female sex workers in Mombasa, Kenya. PLoS ONE 14(6): e0218291. <https://doi.org/10.1371/journal.pone.0218291>

Editor: Sphiwe Madiba, Sefako Makgatho Health Sciences University, SOUTH AFRICA

Received: February 20, 2019

Accepted: May 29, 2019

Published: June 19, 2019

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Data Availability Statement: This study was conducted with approval from the Kenyatta National Hospital - University of Nairobi Ethics and Research Committee (KNH-UON ERC), which requires that we release data from Kenyan studies (including de-identified data) only after they have provided their written approval for additional analyses. As such, data for this study will be available upon request, with written approval for the proposed analysis from the KNH/UON ERC. Their application forms and guidelines can be accessed at <http://erc.uonbi.ac.ke/>. To request

Abstract

Objectives

Female sex workers (FSWs) in sub-Saharan Africa are a key population for HIV prevention and treatment interventions, but less attention is given to their family planning needs. We evaluated the prevalence and predictors of unmet contraceptive need in HIV-positive FSWs.

Study design

This cross-sectional analysis used data from an existing longitudinal study of FSWs in Mombasa, Kenya. This analysis included women who were HIV positive, age ≥ 18 years, premenopausal, not currently pregnant or desiring pregnancy, and reported exchanging sex for cash or in-kind payment at the time of enrollment. Unmet contraceptive need was defined as non-use of modern non-barrier contraceptives and not currently trying to become pregnant. Poisson regression was used to identify factors independently associated with unmet contraceptive need.

Results

Among 346 HIV-positive FSWs, 125 (36.1%) reported modern non-barrier contraceptive use, leaving 221 (63.9%, 95%CI 58.8–68.9%) with unmet contraceptive need. Condom use was the only form of contraception for 129 (37.3%) participants. In unadjusted analyses, unmet contraceptive need was associated with physical abuse in the past year by someone other than a regular partner (PR 1.2, 95%CI 1.0–1.5), desire for (more) children (PR 1.3, 95%CI 1.1–1.5), and having 2–3 previous pregnancies compared to 0–1 prior pregnancies (PR 0.8, 95%CI 0.6–0.9). In adjusted analyses, lower number of previous pregnancies and

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Funding: This work was supported by the National Institutes of Health (R01HD072617) awarded to RSM. Infrastructure and logistics support for the Mombasa research site was provided by the University of Washington's Center for AIDS Research (CFAR), an NIH funded program (P30 AI027757) which is supported by the following centers: NIAID, NCI, NIMH, NIDA, NICHD, NHLBI, NCCAM. RSM receives funding for mentoring through National Institute of Child Health and Human Development K24 HD88229. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing interests: I have read the journal's policy and the authors of this manuscript have the following competing interests: RSM receives research funding for a study of high-risk HPV collection methods, paid to the University of Washington, from Hologic Corporation. All other authors declared that no competing interests exist. We confirm that the listed competing interests do not alter our adherence to PLOS ONE data sharing policies.

having desire for future children remained significantly associated with a higher prevalence of unmet contraceptive need.

Conclusions

Unmet need for modern non-barrier contraception was found in two-thirds of HIV-positive FSWs who reported that they were not currently trying to become pregnant, and was higher in women with the lowest number of prior pregnancies (0–1 prior pregnancies) and in those reporting desire for (more) children in the future. These findings highlight the need for concerted efforts to identify and eliminate barriers to contraceptive use in FSWs living with HIV.

Introduction

In sub-Saharan Africa, 37% of female sex workers (FSWs) are estimated to be living with HIV, making this a key population for prevention and treatment interventions [1–3]. Considerable emphasis has been placed on HIV testing and condom promotion among FSWs to target the HIV epidemic [2,4]. In contrast, there has been little effort to address the family planning needs of FSWs [2,5,6]. Unintended pregnancy among FSWs can result in loss of clients, violence from partners, and financial burden [7]. Numerous studies in sub-Saharan Africa have reported high rates of unintended pregnancy and induced abortion, often illegal and conducted in unsafe conditions, as well as low levels of reliable contraceptive use in FSWs [6–12].

A systematic review of research conducted in Africa found limited coverage and a narrow scope of reproductive health services for this key population [2]. Many FSWs desire pregnancy prevention, but report significant barriers to contraceptive use including access to services, male partner preferences, cost, and misconceptions about side effects [13–15]. A qualitative study in Kenya found that FSWs reported unsupportive operational structure (e.g. long wait times, fees, and inconvenient hours) and discriminatory provider interactions as barriers to receiving reproductive health care [13]. These barriers contribute to unmet contraceptive need, defined as lack of contraceptive use in women of childbearing age who are not trying to become pregnant [16].

Few studies have examined the prevalence and predictors of unmet contraceptive need among African FSWs living with HIV [10,17]. In Kenya, an estimated 45% of FSWs are living with HIV [1]. Accurate information about unmet contraceptive need is vital to inform development of comprehensive HIV care and sexual and reproductive health packages for this population. Further, while condom promotion is common among FSWs, condom use alone may not offer adequate contraceptive protection in this population, as FSWs may not have agency to use condoms during all sex acts with client partners or replace condoms if they break [13,18]. This study evaluated the prevalence and predictors of unmet need for modern non-barrier contraception in FSWs living with HIV in Mombasa, Kenya.

Methods

Procedures

This cross-sectional analysis used data collected during enrollment into a prospective cohort study examining risk factors for HIV transmission from HIV-positive FSWs. Detailed methods have been published [19]. Briefly, eligibility criteria included laboratory confirmed HIV infection, age ≥ 18 years, and self-report of exchanging sex for cash or in-kind payment at the

time of enrollment. In this analysis, women who were post-menopausal, trying to become pregnant, currently pregnant, or in the first six weeks of the postpartum period, were excluded. Recruitment was conducted through community outreach activities at bars, nightclubs, brothels, and other FSW workplaces and enrollment was conducted at the research clinic. All participants received free outpatient care at the clinic, including STI screening and treatment, and antiretroviral therapy (ART) if eligible according to Kenyan National Guidelines. All participants were reimbursed 250 Kenyan shillings (~\$2.50 US dollars) for travel.

Measures

At enrollment, a standardized face-to-face interview was conducted by a study nurse, collecting information on socio-demographics, health, and behavior. A physical examination was performed, including speculum-assisted pelvic examination with collection of genital swabs for STI testing. The primary outcome for this analysis was unmet contraceptive need, defined as not using a modern non-barrier contraceptive method and not currently trying to become pregnant. These items were assessed using standardized questions adapted from the Kenya Demographic and Health Survey (DHS) [16]. To assess fertility desire, women were asked, “Do you want any (more) children?” Those who answered ‘yes’, were then asked about current fertility intent, “Are you trying to get pregnant now?” Those who answered ‘yes’ regarding current fertility intent were excluded from analyses, so fertility desire only assessed those who had future, but not current, desire for children. Use of contraception was assessed as “Current method of contraception,” and included condoms, short- and long-acting reversible contraceptives, and tubal ligation. This exploratory analysis evaluated multiple potential correlates of unmet contraceptive need including sociodemographic characteristics, HIV disclosure, interpersonal factors (identifying a regular partner, partner attitude toward pregnancy) [20], controlling behavior (defined as responding yes to at least one of seven statements: he tries to keep you from seeing your friends; he tries to restrict contact with your family of birth; he insists on knowing where you are at all times; he ignores you and treats you indifferently; he gets angry if you speak with another man; he is often suspicious that you are unfaithful; he expects you to ask his permission before seeking health care for yourself), reproductive health factors (number of previous pregnancies, desire for children in the future), depression, alcohol use, and history of violence with both regular partners and others (e.g. clients) [21]. A regular partner was defined as a partner that was not a sex work client and was someone with whom the woman had an emotional relationship.

Analysis

The prevalence of unmet contraceptive need was calculated as a crude proportion with 95% confidence intervals (CIs). Potential correlates of unmet contraceptive need were evaluated with unadjusted and adjusted Poisson regression with robust variance, which generated prevalence ratios (PR) and 95% CIs. Variables associated with unmet contraceptive need in unadjusted analyses ($p < 0.10$) were retained in the adjusted model. In this exploratory analysis, an α level of 0.05 was used to define statistical significance all comparisons.

This study was approved by the ethics committees of Kenyatta National Hospital and the University of Washington. All participants provided written informed consent.

Results

Between October 2012 and April 2017, 471 HIV-positive FSWs were enrolled. For this analysis, 125 participants were excluded (69 post-menopausal, 51 trying to become pregnant, 3 pregnant, 2 missing data on contraceptive use) leaving an analysis population of 346. Their

median age was 38 years (interquartile range [IQR] 31–42), and 263 (76.0%) reported ever being married (Table 1). The median number of reported pregnancies was 3 (IQR 2–4) and 67 (19.4%) women reported a desire to have children (or have more children) in the future. Half of the women reported experiencing controlling behavior (172, 49.9%), and 74 (21.4%) reported intimate partner violence by their current or most recent regular partner in the past 12 months.

Modern non-barrier contraceptive use was reported by 125 (36.1%) women, leaving 221 (63.9%; 95%CI 58.8–68.9%) with unmet contraceptive need. Self-reported condom use was high, with 196 (86.7%) women reporting 100% condom use in the past week. For 129 (37.3%) women, condoms were the only form of contraception.

In unadjusted analysis, physical abuse in the past year by someone other than the current or most recent regular partner (PR 1.2, 95%CI 1.0–1.5) and future desire for more children (PR 1.3, 95%CI 1.1–1.5) were associated with significantly higher prevalence of unmet contraceptive need (Table 2). Compared to 0–1 pregnancies, having 2–3 prior pregnancies was negatively associated with unmet contraceptive need (PR 0.8, 95%CI 0.6–0.9). In adjusted analysis, desire to have children in the future (aPR 1.3 95%CI 1.1–1.5) and having fewer prior pregnancies remained significantly associated with unmet contraceptive need (aPR 0.8, 95%CI 0.7–1.0 in women with 2–3 prior pregnancies vs. 0–1 prior pregnancies).

Discussion

In this population of FSWs living with HIV who reported that they were not currently trying to become pregnant, nearly 90% of women reported condom use during all acts of sexual intercourse in the past week. However, two thirds of women had unmet need for modern non-barrier contraception. A higher prevalence of unmet contraceptive need was independently associated with lower number of previous pregnancies and with desire for more children in the future.

Despite recognition of the importance of family planning among key populations living with HIV [6,22], few studies have examined contraceptive need in FSWs living with HIV. A cross-sectional study of FSWs in Swaziland found that 47% of women had unmet need for modern non-barrier contraceptives [10]. In the Swaziland study, as well as an analysis of data from FSWs in Burkina Faso and Togo, HIV status was not significantly associated with non-barrier contraceptive use, and HIV-positive respondents were no more likely to consistently use condoms than HIV-negative FSWs [10,22]. Preliminary results of an ongoing study of HIV-positive FSWs in Dar es Salaam, Tanzania, found that 31% of participants had unmet need for modern, non-barrier contraception [23]. A number of studies have examined contraceptive use in FSWs without specifically focusing on HIV-positive women. In populations of FSWs from Côte d'Ivoire, Ethiopia, Swaziland, and Madagascar, unmet need for modern non-barrier contraceptive use ranged from 24% to 54% [7–12].

In Kenya, unmet contraceptive need among FSWs was assessed in a 2008 study conducted in the Naivasha and Changamwe districts. This study included both HIV-positive and HIV-negative FSWs, and found that only 13.6% had unmet contraceptive need [8]. However, 39% of women in this study reported condom use as their only form of contraception, and only 41% reported condom use at last sex with an emotional partner. While condoms are essential for reducing FSWs' risk of STIs including HIV, condom use alone is an unreliable contraceptive method, with a 10–15% annual failure rate with typical use [24]. Additionally, FSWs often report difficulty negotiating condom use with clients [8,13], and may use condoms less with intimate or steady partners [10,13]. In light of the limitations of condoms as a sole contraceptive method, a number of recent studies of FSWs, including the analysis presented in this paper, have sought to quantify unmet need for modern non-barrier contraceptives.

Table 1. Enrollment characteristics of 346 HIV-positive female sex workers.

Characteristic	Median (IQR) or n (%)
Age	38 (31, 42)
Highest education level \geq 8 years	213 (61.6)
Ever married	263 (76.0)
Workplace	
Bar/restaurant	186 (53.8)
Nightclub	107 (30.9)
Home/other	53 (15.3)
Years since first sex work	
Less than 5	87 (25.1)
5 to 9	114 (33.0)
10 or more	145 (41.9)
Interpersonal factors	
Current or recent regular partner	286 (82.7)
No regular partner	60 (17.3)
Partner factors	
Regular partner in past 3 months ^a	170 (49.3)
Casual partner in past 3 months	180 (52.0)
Current or most recent regular partner attitude about pregnancy ^b	
Excited	150 (52.8)
Neutral	75 (26.4)
Upset	59 (20.8)
Contraceptive use	
None	92 (26.6)
Condoms only	129 (37.3)
Short / medium acting (DMPA, OCP)	79 (22.8)
Long acting (Implants, TL, IUCD, hysterectomy)	46 (13.3)
Reproductive health factors	
Number of previous pregnancies	3 (2, 4)
Wants to have children in the future	67 (19.4)
Self-reported sexual behavior in the past 7 days	
Condomless sex	30 (8.7)
Abstinent in past week	120 (34.7)
Subset of women not abstinent in past week ^c :	
i. 100% condom use in past week	196 (86.7)
ii. Number of sex acts in past week	2 (1, 4)
iii. Number of sex partners in past week	2 (1, 3)
iv. Any anal sex	1 (0.4)
Depressive symptoms by PHQ-9	
Minimal (0 to 4)	237 (68.5)
Mild (5 to 9)	73 (21.1)
Moderate / severe (10 or higher)	36 (10.4)
Alcohol use by AUDIT ^a	
Non-drinkers	152 (44.1)
Minimal (1 to 6)	103 (29.9)
Moderate (7 to 15)	72 (20.9)
Severe (16 or higher)	18 (5.2)

(Continued)

Table 1. (Continued)

Characteristic	Median (IQR) or n (%)
HIV disclosure	
Not disclosed to anyone outside healthcare setting	132 (38.2)
Disclosed to someone (e.g. acquaintances, religious leader, etc.) but not regular partner (husband, boyfriend/partner)	151 (43.6)
Disclosed to a regular partner	63 (18.2)
History of violence and controlling behaviors	
Sexual abuse in the past 12 months ^{d,e}	32 (9.3)
Physical abuse in the past 12 months ^e	31 (9.0)
Ever had controlling behaviors by a regular partner ^{a,f}	172 (49.9)
Any intimate partner violence in the past 12 months ^f	74 (21.4)

IQR: Interquartile range; AUDIT: Alcohol Use Disorders Identification Test [39]

^aData missing for 1 participant

^bIncluded 284 women who reported that they had a current or most recent regular partner.

^cIncluded 226 women who reported sexual behavior in the past 7 days

^dData missing for 2 participants

^eBy someone other than their current or most recent regular partner

^fIntimate partner violence and controlling behavior are reported among their current or most recent regular partner. Regular partner was defined as a partner that was not a sex work client and was someone with whom the woman had an emotional relationship.

<https://doi.org/10.1371/journal.pone.0218291.t001>

The present analysis found that sex workers who had experienced physical or sexual violence from someone other than their primary partner (e.g. clients) in the past year had a nearly 25% higher prevalence of unmet contraceptive need. This finding was no longer statistically significant at $\alpha = 0.05$ in the multivariable analysis. Nonetheless, this finding suggests the need for more research to clarify the presence, magnitude, and mechanisms that may link physical abuse by clients or other non-regular sexual partners with unmet contraceptive need. Previous research has found that violence against FSWs is associated with reduced ability to negotiate condom use [6,21,25]. As a result, women experiencing violence may be at particularly high risk for unplanned pregnancy.

Despite our exclusion of women who reported currently trying to become pregnant, desire for children in the future was high in this population, and was associated with unmet contraceptive need. In the absence of safer conception services that include antiretroviral therapy and possibly pre-exposure prophylaxis for HIV-negative sex partners, pregnancy attempts in FSWs living with HIV could increase the risk for both transmission to sexual partners and mother-to-child transmission [5,26–29]. In research conducted in Burkina Faso and Togo, 20% of FSWs were trying to conceive, and only 25% of HIV-positive respondents trying to conceive were on ART [5]. One strategy to address both unmet contraceptive need and safer conception would be increasing access to integrated family planning and HIV services [6,30]. Integrated services have been effective in reducing unmet contraceptive need in general population HIV-positive women [31–33], and a similar strategy could be adapted in the context of specialized services for FSWs [2,6,13]. Integrated services could also provide a platform to address related issues such as partner violence and other barriers to contraceptive use [6,21,34], as well as contraceptive strategies for FSWs who do desire pregnancy and may face stigma in other family planning settings [30,35,36]. Currently, little guidance exists on integration of reproductive care for FSWs living with HIV [23,30,35]. To our knowledge, only a single

Table 2. Unadjusted and adjusted association between baseline variables and unmet contraceptive need in HIV-positive Kenyan female sex workers.

Characteristic	N	n (%) with unmet contraceptive need	Unadjusted PR (95% CI)	p value	Adjusted PR (95% CI)	p value
Age, years				0.43		
20–29	72	41 (56.9)	1			
30–39	141	92 (65.3)	1.2 (0.9, 1.5)		—	
≥ 40	133	88 (66.2)	1.2 (0.9, 1.5)		—	
Highest education level				0.35		
< 8 years	133	89 (66.9)	1			
≥ 8 years	213	132 (62.0)	0.9 (0.8, 1.1)		—	
Marital status				0.45		
Never married	83	50 (60.2)	1			
Married, widowed, separated, or divorced	263	171 (65.0)	1.1 (0.9, 1.3)		—	
Workplace				0.02		0.11
Bar/restaurant	186	113 (60.8)	1		1	
Nightclub	107	79 (73.8)	1.2 (1.0, 1.4)		1.1 (1.0, 1.3)	
Home/other	53	29 (54.7)	0.9 (0.7, 1.2)		0.9 (0.7, 1.2)	
Years since first sex work				0.59		
<5	87	54 (62.1)	1			
5–9	114	77 (67.5)	1.1 (0.9, 1.3)		—	
≥ 10	145	90 (62.1)	1.0 (0.8, 1.2)		—	
Reports having a current or recent regular partner ^a				0.51		
No	60	36 (60.0)	1			
Yes	286	185 (64.7)	1.1 (0.9, 1.4)		—	
Reports controlling behaviors by current or most recent regular partner				0.53		
No	173	108 (62.4)	1			
Yes	172	113 (65.7)	1.1 (0.9, 1.2)		—	
Intimate partner violence in the past 12 months ^b				0.39		
No	272	177 (65.1)	1			
Yes	74	44 (59.5)	0.9 (0.7, 1.1)		—	
Any sexual abuse in the past 12 months ^c				0.11		
No	312	196 (62.8)	1			
Yes	32	24 (75.0)	1.2 (1.0, 1.5)		—	
Any physical abuse in the past 12 months ^c				0.04		0.08
No	314	196 (62.4)	1		1	
Yes	31	24 (77.4)	1.2 (1.0, 1.5)		1.2 (1.0, 1.5)	
Number of previous pregnancies				0.01		0.04
0–1	72	55 (76.4)	1		1	
2–3	166	97 (58.4)	0.8 (0.6, 0.9)		0.8 (0.7, 1.0)	
≥ 4	108	69 (63.9)	0.8 (0.7, 1.0)		0.9 (0.7, 1.1)	
Wants to have (more) children in the future				<0.01		0.01
No	279	169 (60.6)	1		1	
Yes	67	52 (77.6)	1.3 (1.1, 1.5)		1.3 (1.1, 1.5)	
Depressive symptoms by PHQ-9				0.40		
Minimal (0 to 4)	237	147 (62.0)	1			
Mild (5 to 9)	73	48 (65.8)	1.1 (0.9, 1.3)		—	
Moderate / severe (10 or higher)	36	26 (72.2)	1.2 (0.9, 1.5)		—	
Alcohol use by AUDIT				0.62		

(Continued)

Table 2. (Continued)

Characteristic	N	n (%) with unmet contraceptive need	Unadjusted PR (95% CI)	p value	Adjusted PR (95% CI)	p value
Non-drinkers	152	101 (66.5)	1			
Minimal (1 to 6)	103	66 (64.1)	1.0 (0.8, 1.2)		—	
Moderate (7 to 15)	72	41 (56.9)	0.9 (0.7, 1.1)		—	
Severe (16 or higher)	18	12 (66.7)	1.0 (0.7, 1.4)		—	
HIV disclosure				0.47		
Not disclosed to anyone	132	79 (59.9)	1			
Disclosed to someone but not regular partner	151	101 (66.9)	1.1 (0.9, 1.3)		—	
Disclosed to regular partner	63	41 (65.1)	1.1 (0.9, 1.4)		—	
Current or most recent regular partner attitude about pregnancy				0.95		
Excited	150	96 (64.0)	1			
Neutral	75	49 (65.3)	1.0 (0.8, 1.3)		—	
Upset	59	39 (66.1)	1.0 (0.8, 1.3)		—	

^a Regular partner was defined as a partner that was not a sex work client and was someone with whom the woman had an emotional relationship.

^b Intimate partner violence was reported as violence by their current or most recent regular partner.

^c Any sexual violence and any physical violence were reported as violence by someone other than their current or most recent regular partner

PR: prevalence ratio; CI: confidence interval; AUDIT: Alcohol Use Disorders Identification Test; all p-values presented are for global tests.

<https://doi.org/10.1371/journal.pone.0218291.t002>

study has evaluated an integrated HIV and family planning service delivery approach for this population [37]. There was little evidence of change in contraceptive use with the integrated model. The authors note that the lack of change may be due to cultural barriers and misinformation about the side effects of short- and long term contraceptives, and may be more successful if these barriers are addressed [37].

This analysis had several strengths. The sample size of almost 350 women was essential for performing a multivariable analysis to explore which of several variables were independently associated with unmet contraceptive need. Standardized and validated tools were used to measure intimate partner violence, alcohol use, and depression [20,38,39]. In addition, the study assessed fertility desire and intent using questions that are employed by DHS [16], which will facilitate comparison to other literature.

This analysis also had a number of limitations. First, the cross-sectional design does not provide evidence of a temporal relationship between exposures and unmet contraceptive need. Second, this exploratory analysis included multiple exposures without adjusting for multiple comparisons. Further research should be conducted to assess the reproducibility of these relationships. Third, self-reported variables were subject to social desirability and recall biases. Strategies to minimize this bias included interviewer training and use of standardized data collection tools following written standard operating procedures. Fourth, the data collected from this cohort did not include information on contraceptive history or side effects from contraceptives, which may have influenced women’s contraceptive choices. Fifth, our use of a binary variable to assess fertility intent may have resulted in misclassification, as ambivalence in fertility intent has been documented in previous studies [40,41]. Finally, unmet contraceptive need is likely to be context-specific. This study is among the first to examine unmet contraceptive need in African FSWs living with HIV. However, these results may not be generalizable to all FSWs, as the women in this population are part of a long-term research cohort, and findings may be different in other settings in sub-Saharan Africa with differing access and knowledge

of contraception options. Additional studies of HIV-positive FSWs in other settings will be helpful in identifying both variations and common themes.

In conclusion, a high prevalence of unmet need for modern non-barrier contraceptives was identified in this population of Kenyan FSWs living with HIV. Despite success in implementing HIV treatment and prevention services for FSWs, a critical gap remains in meeting their contraceptive needs. Interventions are needed to address barriers to contraceptive use in this population. One potential solution would be expanded access to integrated HIV treatment and sexual and reproductive health services that target the women with the greatest need. The impact of integrating these services for FSWs living with HIV has not been fully explored, and presents a promising area of research to improve care delivery to this population.

Acknowledgments

We are grateful to our study participants and our research, clinical, laboratory, outreach and administrative staff for making this study possible.

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References

1. Baral S, Beyrer C, Muessig K, Poteat T, Wirtz AL, Decker MR, et al. Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Infect Dis*. 2012; 12(7):538–49. [https://doi.org/10.1016/S1473-3099\(12\)70066-X](https://doi.org/10.1016/S1473-3099(12)70066-X) PMID: 22424777
2. Dhana A, Luchters S, Moore L, Lafort Y, Roy A, Scorgie F, et al. Systematic review of facility-based sexual and reproductive health services for female sex workers in Africa. *Glob Health*. 2014; 10:46.
3. Luchters S, Chersich MF, Rinyiru A, Barasa M-S, King'ola N, Mandaliya K, et al. Impact of five years of peer-mediated interventions on sexual behaviour and sexually transmitted infections among female sex workers in Mombasa, Kenya. *BMC Public Health*. 2008; 8:143. <https://doi.org/10.1186/1471-2458-8-143> PMID: 18445258
4. UNAIDS: The Gap Report. Geneva, Switzerland: Joint United Nations Programme on HIV/AIDS; 2014.
5. Schwartz SR, Papworth E, Ky-Zerbo O, Anato S, Grosso A, Ouedraogo HG, et al. Safer conception needs for HIV prevention among female sex workers in Burkina Faso and Togo. *Infect Dis Obstet Gynecol*. 2014; 2014:296245. <https://doi.org/10.1155/2014/296245> PMID: 25404849
6. Ippoliti Nicole B., Nanda Geeta, Wilcher Rose. Meeting the Reproductive Health Needs of Female Key Populations Affected by HIV in Low- and Middle-Income Countries: A Review of the Evidence. *Stud Fam Plann*. 2017; 48(2):121–51. <https://doi.org/10.1111/sifp.12020> PMID: 28422301
7. Schwartz S, Papworth E, Thiam-Niangoin M, Abo K, Drame F, Diouf D, et al. An urgent need for integration of family planning services into HIV care: the high burden of unplanned pregnancy, termination of

- pregnancy, and limited contraception use among female sex workers in Côte d'Ivoire. *J Acquir Immune Defic Syndr*. 2015; 68 Suppl 2:S91–98.
8. Sutherland EG, Alaii J, Tsui S, Luchters S, Okal J, King'ola N, et al. Contraceptive needs of female sex workers in Kenya—a cross-sectional study. *Eur J Contracept Reprod Health Care Off J Eur Soc Contracept*. 2011; 16(3):173–82.
 9. Weldegebreal R, Melaku YA, Alemayehu M, Gebrehiwot TG. Unintended pregnancy among female sex workers in Mekelle city, northern Ethiopia: a cross-sectional study. *BMC Public Health*. 2015; 15:40. <https://doi.org/10.1186/s12889-015-1366-5> PMID: 25636515
 10. Yam EA, Mnisi Z, Mabuza X, Kennedy C, Kerrigan D, Tsui A, et al. Use of dual protection among female sex workers in Swaziland. *Int Perspect Sex Reprod Health*. 2013; 39(2):69–78. <https://doi.org/10.1363/3906913> PMID: 23895883
 11. Khan MR, Turner AN, Pettifor A, Van Damme K, Rabenja NL, Ravelomanana N, et al. Unmet need for contraception among sex workers in Madagascar. *Contraception*. 2009; 79(3):221–7. <https://doi.org/10.1016/j.contraception.2008.09.011> PMID: 19185677
 12. Todd CS, Nasir A, Raza Stanekzai M, Scott PT, Strathdee SA, Botros BA, et al. Contraceptive utilization and pregnancy termination among female sex workers in Afghanistan. *J Womens Health*. 2010; 19(11):2057–62.
 13. Corneli A, Lemons A, Otieno-Masaba R, Ndiritu J, Packer C, Lamarre-Vincent J, et al. Contraceptive service delivery in Kenya: A qualitative study to identify barriers and preferences among female sex workers and health care providers. *Contraception*. 2016; 94(1):34–9. <https://doi.org/10.1016/j.contraception.2016.03.004> PMID: 26976072
 14. Burke HM, Ambasa-Shisanya C. Qualitative study of reasons for discontinuation of injectable contraceptives among users and salient reference groups in Kenya. *Afr J Reprod Health*. 2011; 15(2):67–78. PMID: 22590894
 15. Dynes M, Stephenson R, Rubardt M, Bartel D. The influence of perceptions of community norms on current contraceptive use among men and women in Ethiopia and Kenya. *Health Place*. 2012; 18(4):766–73. <https://doi.org/10.1016/j.healthplace.2012.04.006> PMID: 22579117
 16. Demographic Kenya and Survey Health 2008–09. Edited by Macro I. Calverton, Maryland, USA: Kenya National Bureau of Statistics, National AIDS Control Council, National AIDS/STD Control Programme, National Public Health Laboratory Services, Kenya Medical Research Institute, National Coordinating Agency for Population and Development; 2009.
 17. Schwartz SR, Papworth E, Ky-Zerbo O, Sithole B, Anato S, Grosso A, et al. Reproductive health needs of female sex workers and opportunities for enhanced prevention of mother-to-child transmission efforts in sub-Saharan Africa. *J Fam Plann Reprod Health Care*. 2017; 43(1):50–9. <https://doi.org/10.1136/jfprhc-2014-100968> PMID: 26609081
 18. Huschke S, Coetzee J. Sex work and condom use in Soweto, South Africa: a call for community-based interventions with clients. *Cult Health Sex*. 2019;1–15.
 19. Wilson KS, Deya R, Masese L, Simoni JM, Stoep AV, Shafi J, et al. Prevalence and correlates of intimate partner violence in HIV-positive women engaged in transactional sex in Mombasa, Kenya. *Int J STD AIDS*. 2016; 27(13):1194–203. <https://doi.org/10.1177/0956462415611514> PMID: 26464502
 20. Schraiber L, Latorre MR, Franca IJ, Segri N, D'Oliveira A. Validity of the WHO VAW study instrument for estimating gender-based violence against women. *Rev Saude Publica*. 2010; 44(4):658–66. <https://doi.org/10.1590/s0034-89102010000400009> PMID: 20676557
 21. Panchanadeswaran S, Johnson SC, Sivaram S, Srikrishnan AK, Latkin C, Bentley ME, et al. Intimate partner violence is as important as client violence in increasing street-based female sex workers' vulnerability to HIV in India. *Int J Drug Policy*. 2008; 19(2):106–12. <https://doi.org/10.1016/j.drugpo.2007.11.013> PMID: 18187314
 22. Delvaux T, Nöstlinger C. Reproductive choice for women and men living with HIV: contraception, abortion and fertility. *Reprod Health Matters*. 2007; 15(29 Suppl):46–66.
 23. Project SOAR. Female sex workers living with HIV in Tanzania have both a need for contraception and a desire to have children in the future [Internet]. Washington DC: Population Council; 2018. Available from: http://www.projsoar.org/wp-content/uploads/2018/05/Tz_FP_HIV_ResBrief1.pdf
 24. WHO | Family planning/Contraception [Internet]. WHO. [cited 2018 Apr 16]. Available from: <http://www.who.int/mediacentre/factsheets/fs351/en/>
 25. Deering KN, Shaw SY, Thompson LH, Ramanaiik S, Raghavendra T, Doddamane M, et al. Fertility intentions, power relations and condom use within intimate and other non-paying partnerships of women in sex work in Bagalkot District, South India. *AIDS Care*. 2015; 27(10):1241–9. <https://doi.org/10.1080/09540121.2015.1050981> PMID: 26295360

26. Wilson KS, Wanje G, Masese L, Simoni J, Shafi J, Adala L, et al. A prospective cohort study of fertility desire, unprotected sex, and detectable viral load in HIV-positive female sex workers in Mombasa, Kenya. *J Acquir Immune Defic Syndr*. 2018; 78(3):276–282. <https://doi.org/10.1097/QAI.0000000000001680> PMID: 29543635
27. Melaku YA, Zeleke EG, Kinsman J, Abraha AK. Fertility desire among HIV-positive women in Tigray region, Ethiopia: implications for the provision of reproductive health and prevention of mother-to-child HIV transmission services. *BMC Womens Health*. 2014; 14:137. <https://doi.org/10.1186/s12905-014-0137-2> PMID: 25407330
28. Eakle R, Gomez GB, Naicker N, Bothma R, Mbogua J, Escobar MAC, et al. HIV pre-exposure prophylaxis and early antiretroviral treatment among female sex workers in South Africa: Results from a prospective observational demonstration project. *PLOS Med*. 2017; 14(11):e1002444. <https://doi.org/10.1371/journal.pmed.1002444> PMID: 29161256
29. Heffron R, Pintye J, Matthews LT, Weber S, Mugo N. PrEP as Peri-conception HIV Prevention for Women and Men. *Curr HIV/AIDS Rep*. 2016; 13(3):131–9. <https://doi.org/10.1007/s11904-016-0312-1> PMID: 26993627
30. Warren Charlotte E., Mayhew Susannah H., Hopkins Jonathan. The Current Status of Research on the Integration of Sexual and Reproductive Health and HIV Services. *Stud Fam Plann*. 2017; 48(2):91–105. <https://doi.org/10.1111/sifp.12024> PMID: 28493283
31. Cohen CR, Grossman D, Onono M, Blat C, Newmann SJ, Burger RL, et al. Integration of family planning services into HIV care clinics: Results one year after a cluster randomized controlled trial in Kenya. *PLOS ONE*. 2017; 12(3):e0172992. <https://doi.org/10.1371/journal.pone.0172992> PMID: 28328966
32. Newmann SJ, Zakaras JM, Tao AR, Onono M, Bukusi EA, Cohen CR, et al. Integrating family planning into HIV care in western Kenya: HIV care providers' perspectives and experiences one year following integration. *AIDS Care*. 2016; 28(2):209–13. <https://doi.org/10.1080/09540121.2015.1080791> PMID: 26406803
33. Kosgei RJ, Lubano KM, Shen C, Wools-Kaloustian KK, Musick BS, Siika AM, et al. Impact of Integrated Family Planning and HIV Care Services on Contraceptive Use and Pregnancy Outcomes: A Retrospective Cohort Study. *J Acquir Immune Defic Syndr*. 2011; 58(5):e121–6. <https://doi.org/10.1097/QAI.0b013e318237ca80> PMID: 21963940
34. Wagman JA, Gray RH, Campbell JC, Thoma M, Ndyababo A, Ssekasanvu J, et al. Effectiveness of an integrated intimate partner violence and HIV prevention intervention in Rakai, Uganda: analysis of an intervention in an existing cluster randomised cohort. *Lancet Glob Health*. 2015; 3(1):e23–33. [https://doi.org/10.1016/S2214-109X\(14\)70344-4](https://doi.org/10.1016/S2214-109X(14)70344-4) PMID: 25539966
35. Yam EA, Kidanu A, Burnett-Zieman B, Pilgrim N, Okal J, Bekele A, et al. Pregnancy Experiences of Female Sex Workers in Adama City, Ethiopia: Complexity of Partner Relationships and Pregnancy Intentions. *Stud Fam Plann*. 2017; 48(2):107–19. <https://doi.org/10.1111/sifp.12019> PMID: 28263396
36. Beckham SW, Shembilu CR, Brahmabhatt H, Winch PJ, Beyrer C, Kerrigan DL. Female Sex Workers' Experiences with Intended Pregnancy and Antenatal Care Services in Southern Tanzania. *Stud Fam Plann*. 2015; 46(1):55–71. <https://doi.org/10.1111/j.1728-4465.2015.00015.x> PMID: 25753059
37. Thyda L, Sineng S, Delvaux T, Srean C, Mary S, Vuochnea P, et al. Implementation and Operational Research: Integration of Family Planning Services in a Peer-Managed HIV Care Clinic Serving Most-at-Risk Populations in Phnom Penh, Cambodia. *J Acquir Immune Defic Syndr*. 2015; 69(4):e120–126. <https://doi.org/10.1097/QAI.0000000000000635> PMID: 25850605
38. Monahan P, Shacham E, Reece M, Kroenke K, Ong'or W, Omollo O, et al. Validity/reliability of PHQ-9 and PHQ-2 depression scales among adults living with HIV/AIDS in western Kenya. *J Gen Intern Med*. 2009; 24(2):189–97. <https://doi.org/10.1007/s11606-008-0846-z> PMID: 19031037
39. Saunders J, Aasland O, de la Fuente J, Grant M. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption-II. *Addiction*. 1993; 88(6):791–804. PMID: 8329970
40. Aiken ARA, Borrero S, Callegari LS, Dehlendorf C. Rethinking the Pregnancy Planning Paradigm: Unintended Conceptions or Unrepresentative Concepts? *Perspect Sex Reprod Health*. 2016; 48(3):147–51. <https://doi.org/10.1363/48e10316> PMID: 27513444
41. Wekesa E, Askew I, Abuya T. Ambivalence in pregnancy intentions: The effect of quality of care and context among a cohort of women attending family planning clinics in Kenya. *PloS One*. 2018; 13(1):e0190473. <https://doi.org/10.1371/journal.pone.0190473> PMID: 29315327