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Use of long-acting reversible contraception in a cluster-random sample of female sex workers in Kenya

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Abstract

Objective: To assess correlates of long-acting reversible contraceptive (LARC) use, and explore patterns of LARC use among female sex workers (FSWs) in Kenya.

Methods: Baseline cross-sectional data were collected between September 2016 and May 2017 in a cluster-randomized controlled trial in Mombasa. Eligibility criteria included current sex work, age 16–34 years, not pregnant, and not planning pregnancy. Peer educators recruited FSWs from randomly selected sex-work venues. Multiple logistic regression identified correlates of LARC use. Prevalence estimates were weighted to adjust for variation in FSW numbers recruited across venues.

Results: Among 879 participants, the prevalence of contraceptive use was 22.6% for implants and 1.6% for intra-uterine devices (IUDs). LARC use was independently associated with previous pregnancy (adjusted odds ratio for one pregnancy, 11.4; 95% confidence interval, 4.25–30.8), positive attitude to and better knowledge of family planning, younger age, and lower education. High rates of adverse effects were reported for all methods.

Conclusion: The findings suggest that implant use has increased among FSWs in Kenya. Unintended pregnancy risks remain high and IUD use is negligible. Although LARC rates are encouraging, further intervention is required to improve both uptake (particularly of IUDs) and greater access to family planning services.

KEYWORDS
Cluster-randomized design; Complex sampling; Contraceptive implant; Intra-uterine device; Kenya; Long-acting reversible contraception; Sex work

1 | INTRODUCTION

Female sex workers (FSWs) in many countries have high rates of unintended pregnancy,[1] and experience many barriers to using highly effective contraception. They also have difficulties negotiating condom use with clients and non-paying partners, often facing violence or financial incentives not to use condoms.[2] Therefore, use of condoms alongside a highly effective method is critical for pregnancy prevention.

Long-acting reversible contraceptives (LARCs) including intra-uterine devices (IUDs) and subdermal implants, are not user- or coital-dependent, and accord women greater control in the face of resistant

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male partners.[1] LARCs are considered safe for nulliparous women and women with multiple sexual partners, provided that those with a very high risk of sexually transmitted infections (STIs) receive STI screening or treatment at the time of IUD insertion.[3–5]

The use of LARCs among FSWs is low in many countries,[6] particularly in sub-Saharan Africa, where prevalence is reported as less than 5% in most studies.[1,7] Use of IUDs among FSWs varies considerably between regions, with higher levels in parts of Latin America and Asia.[8,9]

Access to family planning services has increased in parts of Africa in recent decades.[10] In Kenya, LARCs are offered at low or no cost in many public health facilities, and are used by approximately 22% of married women.[11] Uptake by FSWs, however, is unknown. Peer-based HIV-prevention programs for FSWs are common in HIV-endemic countries, but they seldom offer family planning or other sexual or reproductive health services.[12,13] Misconceptions and limited knowledge about contraception have further limited access.[1]

The WHISPER or SHOUT study evaluated the impact of a mobile phone intervention on knowledge and attitudes to contraception (with a focus on LARCs) and on unintended pregnancy rates in a population of FSWs.[14] Using baseline data from that trial, the aim of the present study was to assess the prevalence and correlates of LARC use, and explore patterns of use among FSWs in Mombasa, Kenya.

2 | MATERIAL AND METHODS

The present study analyzed data collected in the WHISPER or SHOUT trial [14] on contraceptive use among FSWs in Kenya between September 1, 2016, and May 31, 2017. The study was approved by the Kenyatta National Hospital, University of Nairobi Ethics and Research Committee, Kenya, and the Monash University Human Research Ethics Committee, Australia, and was registered with the Australian New Zealand Clinical Trial Registry (ACTRN12616000852459). All participants provided written informed consent.

The WHISPER or SHOUT study recruited women aged 16–34 years who self-reported sex work in the past 6 months, had a negative urine pregnancy test, and were not planning a pregnancy for the next 12 months. Peer educators recruited the women from sex work venues such as bars and hotels by using two-stage cluster-random sampling. First, 102 sex work venues (clusters) were randomly selected from a sampling frame of mapped venues.[15] The probability of a venue being selected was proportionate to the estimated number of FSWs at that venue. Next, peer educators consecutively recruited FSWs from the selected venues, aiming for 10 women from each. Additional venues were approached until at least 860 women were recruited (the target sample size).

After providing written informed consent, participants completed a clinical assessment, point-of-care testing for HIV, and a structured interviewer-administered questionnaire. Data were collected on electronic tablets using REDCap electronic data capture tools hosted at the Burnet Institute (Vanderbilt University, Nashville, TN, USA).[16]

The outcome of interest, LARC use, was defined as self-reported current use of either contraceptive implants or IUDs. Highly effective contraception methods were defined as implant, IUD, injection, oral contraceptive pill, and permanent contraception methods (those with at least 90% typical use efficacy[17]). Full details of the study measures and variable categories are provided in Supplementary File S1. Knowledge about family planning was classified as high if participants answered at least five of six true-or-false statements correctly. They were considered to have a positive attitude to family planning if they agreed with at least three of four attitude statements. Self-efficacy and stigma were both measured on a 10-item scale,[18,19] each rated between one and four, with four representing greater self-efficacy or stigma. Two additional items measured contraception-specific self-efficacy, defined as high if participants agreed with both statements.

All analyses were undertaken in Stata version 13 (StataCorp, College Station, TX, USA). Correlates of LARC use were identified by using multiple logistic regression, with the level of statistical significance set at 0.05. Covariates were included in the model on the basis of empirical evidence from previous studies or an a priori theoretical basis for this relationship. Exploratory analyses examined the reasons for starting and ceasing use of implants and IUDs. The proportion of women who had experienced adverse effects was calculated, and bivariable logistic regression analyses were used to explore the association between cessation of implant use and experience of adverse effects.

Inverse probability sample weights were derived for each participant to account for variation in the number of FSWs recruited across sex-work venues. Given the non-independence of observations owing to sampling FSWs by venue, cluster sandwich variance estimation was used to produce corrected standard errors in logistic regression and univariate descriptive analyses.

3 | RESULTS

Among 1728 women invited to participate in the study, 1432 (82.8%) expressed an interest in participating; of these, 120 (8.4%) did not attend screening and 430 (30.0%) were deemed ineligible. The main reasons for ineligibility were age (n=119, 27.7%) and not owning a mobile phone (n=105, 24.4%) (Fig. 1). In total, 882 eligible women were enrolled from 93 venues. Three women were subsequently excluded from the analysis because they did not answer the questions on contraceptive use, resulting in a sample size of 879 women for the analysis.

The mean age of the participants was 25.4 years, and 494 (57.1%) women had a boyfriend or husband (non-paying emotional partner) (Table 1). A median of four clients in the past week was reported. Three-quarters of participants (n=675, 76.0%) had ever been pregnant, and 458 (51.3%) had ever had an unintended pregnancy, with 96 (10.8%) having had one in the previous year. The prevalence of HIV was 12.1% (95% confidence interval [CI], 9.7–14.9). One-quarter of women reported currently using a LARC, including 204 implant users (22.6%) and 13 IUD users (1.6%) (Table 2). Half the women reported using condoms consistently with all partners in the past month, with 235 (26.3%) doing so alongside another method. Binge drinking was common (n=176,
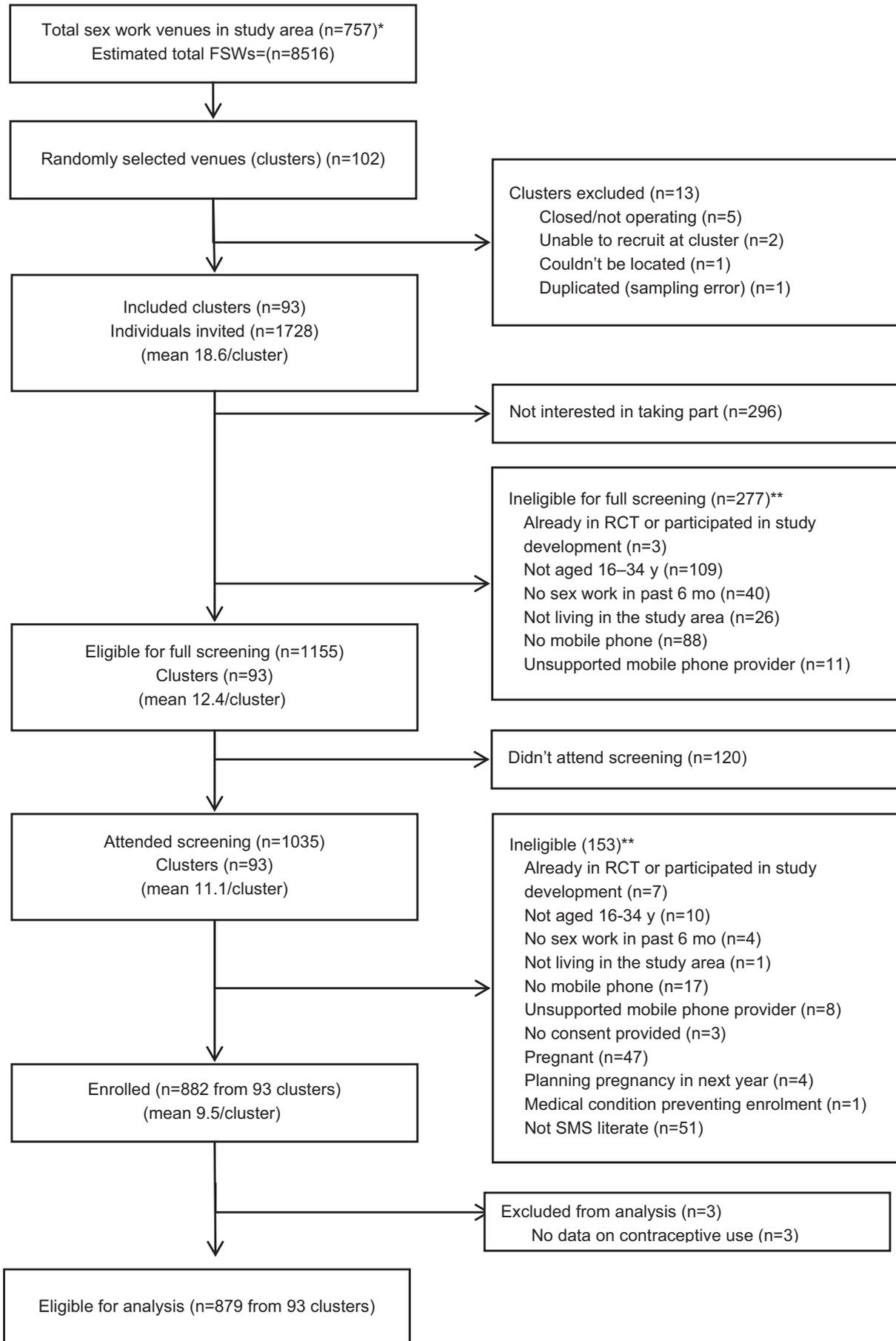
Total sex work venues in study area (n=757)*
Estimated total FSWs=(n=8516)

↓

Randomly selected venues (clusters) (n=102)

Clusters excluded (n=13)
    Closed/not operating (n=5)
    Unable to recruit at cluster (n=2)
    Couldn't be located (n=1)
    Duplicated (sampling error) (n=1)

↓

Included clusters (n=93)
Individuals invited (n=1728)
(mean 18.6/cluster)

Not interested in taking part (n=296)

Ineligible for full screening (n=277)**
    Already in RCT or participated in study
    development (n=3)
    Not aged 16–34 y (n=109)
    No sex work in past 6 mo (n=40)
    Not living in the study area (n=26)
    No mobile phone (n=88)
    Unsupported mobile phone provider (n=11)

↓

Eligible for full screening (n=1155)
Clusters (n=93)
(mean 12.4/cluster)

Didn't attend screening (n=120)

↓

Attended screening (n=1035)
Clusters (n=93)
(mean 11.1/cluster)

Ineligible (153)**
    Already in RCT or participated in study
    development (n=7)
    Not aged 16-34 y (n=10)
    No sex work in past 6 mo (n=4)
    Not living in the study area (n=1)
    No mobile phone (n=17)
    Unsupported mobile phone provider (n=8)
    No consent provided (n=3)
    Pregnant (n=47)
    Planning pregnancy in next year (n=4)
    Medical condition preventing enrolment (n=1)
    Not SMS literate (n=51)

↓

Enrolled (n=882 from 93 clusters)
(mean 9.5/cluster)

Excluded from analysis (n=3)
    No data on contraceptive use (n=3)

↓

Eligible for analysis (n=879 from 93 clusters)

FIGURE 1 Flow diagram showing recruitment of the study population for the WHISPER or SHOUT trial as per the Consort 2010 statement: "extension to cluster randomized trials".[36] Asterisk: total hotspots and number of FSWs per hotspot in the study area, as enumerated by Cheuk et al.[15] Double asterisk: one reason for ineligibility is reported per participant; criteria were determined in the order shown. Abbreviation: FSW, female sex worker.

TABLE 1 Demographic, reproductive health, sex work, and alcohol use characteristics of the study participants.

Characteristic	Value (n=879)[a]	95% CI[b]
Demographic		
Mean age, y	25.4	25.0–25.9
Education (highest level attained)		
None or some primary	104 (11.4)	9.4–13.8
Primary or some secondary	463 (53.5)	49.8–57.2
Secondary or some tertiary	312 (35.1)	31.5–38.8
Religion		
Protestant	391 (44.1)	40.7–47.6
Catholic	310 (36.1)	32.4–40.0
Muslim	171 (18.9)	15.4–23.0
Other	5 (0.9)	0.3–2.3
Weekly income from sex work, shillings[c]		
<1000	146 (16.2)	13.2–19.8
1000–2000	215 (24.1)	21.1–27.3
>2000	515 (59.7)	55.0–64.3
Number of living children		
0	248 (28.8)	25.0–32.9
1	312 (35.8)	31.8–40.0
≥2	319 (35.4)	31.2–39.9
Current boyfriend/husband	494 (57.1)	52.9–61.1
Reproductive health		
Intimate partner violence in past 12 mo	531 (60.0)	55.3–64.5
Pregnancy history		
Ever pregnant	675 (76.0)	72.2–79.4
Ever had an unintended pregnancy	458 (51.3)	47.5–55.0
Unintended pregnancy in past 12 mo	96 (10.8)	8.9–13.2
Sex and sex work practices		
Main venue for meeting clients		
Bar with lodging	397 (44.2)	38.0–50.5
Bar without lodging	147 (16.9)	13.5–21.0
Lodging/guesthouse	140 (15.1)	10.9–20.5
Street/beach	86 (11.0)	7.7–15.5
Other[d]	109 (12.8)	9.2–17.5
Clients in past week	4 (3–6)	
Number of non-paying partners (boyfriends/husbands) in the past wk[e]		
0	40 (7.4)	5.1–10.7
1	399 (81.7)	77.1–85.5
≥2	54 (10.9)	8.0–14.7
Disclosure of sex work status to boyfriend/husband[e]	138 (28.6)	24.3–33.4

(Continues)

TABLE 1 (Continued)

Characteristic	Value (n=879)[a]	95% CI[b]
Alcohol use		
High-risk drinking[f]	176 (19.9)	16.8–23.5
Sex without a condom while drunk in past week	104 (12.0)	9.8–14.7

[a]Values are given as median (interquartile range) or number (percentage) unless stated otherwise. Inverse probability-weighted percentages are shown (weighted percentages are similar, but not identical to those calculated from counts).
[b]Standard errors are corrected by cluster sandwich variance estimation.
[c]1000 Kenyan shillings is approximately US $10.
[d]Includes brothel, casino, strip club, home, and other.
[e]Among those with a boyfriend/husband.
[f]Five or more alcoholic drinks on one occasion at least monthly.

19.9%), and 104 (12.0%) women had had sex without a condom while drunk in the previous week.

The multivariate logistic regression model included 14 variables (Table 3). There was no evidence of effect modification, so interaction terms were not added. In the multivariate analysis, current use of LARCs was correlated with gravidity. The odds of LARC use among women who reported one previous pregnancy was more than 10-fold higher than that of nulliparous women (adjusted odds ratio [aOR], 11.44; 95% CI, 4.25–30.83), and the association increased with number of pregnancies. Only six nulliparous women used LARCs (2.8%). A high level of family planning knowledge (aOR, 2.52; 95% CI, 1.78–3.56) and positive attitudes to family planning (aOR, 4.58; 95% CI, 2.62–8.00) were also associated with LARC use.

In multivariate analysis, LARC users were younger than non-users (aOR per year of age, 0.91; 95% CI, 0.86–0.96). Women with at least secondary education had a lower odds of LARC use (aOR, 0.42; 95% CI, 0.22–0.83) as compared with those who had not completed primary education. The odds of LARC use was nearly doubled for women whose friends used family planning (OR, 1.92; 95% CI, 1.41–2.61) and those with high contraceptive self-efficacy (OR, 1.86; 95% CI, 1.19–2.88) in bivariate analysis. However, both variables were strongly correlated with positive attitude to LARC and were not independently associated with LARC use after adjustment.

Further analyses explored the experiences of women who had ever used LARCs, including reasons for commencement and cessation, and adverse effects. Three hundred and two (34.2%) women had ever used implants. The most commonly reported reason for use was their effectiveness at preventing pregnancy (n=173, 56.6%), followed by perceived fewer adverse effects (n=49, 16.5%) and longer duration of action (n=49, 16.4%) relative to other contraceptives. Overall, 266 (88.8%) women reported adverse effects, most commonly irregular or

TABLE 2 Contraceptive use characteristics of the sample population.

Contraceptive use	No. (%)[a]	95% CI[b]
Current contraceptive use		
Highly effective method (± condoms)	482 (54.6)	49.8–59.3
Other non-barrier method (± condoms)	53 (5.8)	4.2–7.9
Condoms only	336 (38.8)	34.2–43.5
None	8 (0.9)	0.4–1.9
Current methods of contraception[c]		
Condoms (any)[d]	845 (96.3)	94.1–97.7
Female condoms	14 (1.6)	0.9–2.6
IUD	13 (1.6)	0.9–2.7
Implant	204 (22.6)	19.2–26.3
Pill	68 (8.3)	6.3–10.9
Injection	199 (22.3)	19.3–25.7
Permanent	1 (0.1)	0.01–0.8
Emergency pill	34 (3.7)	2.6–5.1
Natural method (LAM, cycle beads, withdrawal	23 (2.5)	1.6–3.9
Consistent condom use during all sex acts in past month		
With clients[e]	669 (76.4)	72.3–80.1
With boyfriends/husband[f]	157 (32.2)	28.1–36.6
With all partners	441 (50.4)	46.2–54.5
Dual method use (consistent condom use + another highly effective method)	235 (26.3)	22.6–30.5

Abbreviations: IUD, intra-uterine device; LAM, lactational amenorrhea method.
[a]Inverse probability-weighted percentage.
[b]Standard errors are corrected by cluster sandwich variance estimation.
[c]Categories are not mutually exclusive.
[d]Those reporting current use of male or female condoms, or stating use of condoms mostly/always in the past month.
[e]Among those who had sex with clients in the past month (n=874).
[f]Among those who had sex with a boyfriend or husband in the past month (n=486).

heavy bleeding (n=139, 45.6%), lighter or no bleeding (n=123, 42.0%), and pelvic pain (n=93, 30.8%). One-third of those who had ever used implants were no longer doing so (n=98, 34.1%), mostly because of adverse effects (n=81, 83.2%). The adverse effects most strongly associated with cessation were heavier bleeding (OR, 3.26; 95% CI, 1.70–6.28), nausea (OR, 3.73; 95% CI, 2.06–6.74), and weight loss (OR, 3.79; 95% CI, 2.22–6.47).

Overall, 40 (4.6%) women had ever used IUDs; the main reasons for commencing use were perceived fewer adverse effects (n=20, 51%) and effectiveness at preventing pregnancy (n=16, 38%). Three-quarters of IUD users reported adverse effects (n=30, 76%), predominantly pelvic pain (n=19, 50%), heavier bleeding (n=10, 26%), and irregular bleeding (n=8, 22%). Twenty-seven (65%) IUD users had ceased use; 17 of them cited adverse effects as the reason.

Similar to LARCs, adverse effects were common with other contraceptives, affecting 189 (90.0%) of pill users and 397 (87.4%) of injection users. Rates of cessation were also high with these methods: 66.0% for oral contraceptives and 57.0% for injections. Adverse effects and difficulty of use were the main reasons for ceasing these methods. Few women reported stopping male (n=11, 2%) or female (n=1, 6%) condoms.

Among the current implant users, implants had been obtained from government health centers (n=86, 42.1%), government hospitals (n=48, 23.7%), mobile outreach services (n=24, 11.9%), and private hospitals or clinics (n=23, 10.9%). Only 10 (5%) women reported obtaining them from sex-worker drop-in centers. A similar pattern was noted for IUDs. In contrast, injections were largely obtained from private hospitals or clinics (n=71, 36.0%), and contraceptive pills (n=31, 45%) and emergency contraceptives (n=3, 97%) from pharmacies. Male condoms were sourced from varied locations including pharmacies (n=217; 27.4%), government health centers (n=101, 13.4%) and sex-worker drop-in centers (n=86; 11.7%).

4 | DISCUSSION

The present study recruited a large representative sample of FSWs from 93 sites in Mombasa, Kenya. Encouragingly, implant use was approximately fourfold higher than, and the 1-year period prevalence of unintended pregnancy was approximately half of the values estimated in 2007 [1] and 2008.[7] Although the two earlier studies did not use random sampling and included a wider age range, the magnitude of the differences suggests that the present findings are due to real changes in the FSW population. The present findings also suggest that implant use is more prevalent among FSWs (22.6%) than among the general population (11%).[20] Nevertheless, this population still faces considerable risks, owing to multiple paying and non-paying partners, low use of dual-method contraception, endemic intimate partner violence, and high-risk drinking with associated sexual risk-taking.

Improvements in implant coverage were not matched by the rate of IUD use (1.6%), which remained negligible and consistent with low estimates in the general population (3%).[20] Fewer public facilities provide IUDs as compared with other contraceptives.[20] Access is also limited by providers' misconceptions about IUDs [21] and interpretation of medical eligibility criteria, with many providers continuing to assume that higher-risk women are ineligible for IUD insertion.[22]

In the present study, gravidity was the strongest independent correlate of LARC use, reflecting similar results in non-sex-worker populations.[23] This may be because women decide to use longer-acting methods after completing their family or experiencing unintended pregnancy. However, it may also reflect an enduring assumption that LARCs are inappropriate for nulliparous women.[21]

Unexpectedly, younger age and lower education were independently associated with LARC use. Younger, less educated women may experience greater difficulty in returning to a clinic for short-acting methods, making LARCs more convenient.[24] An association between use of any contraceptive by FSWs and older age has been

TABLE 3 Characteristics of the study population by LARC use, and bivariate and multivariate logistic regression analyses of LARC use.[a]

Variable	LARC use (95% CI)[b]	Unadjusted analysis		Adjusted analysis	
		OR (95% CI)	P value	OR (95% CI)	P value
Mean age, y	26.1 (25.3–26.8)	1.04 (1.00–1.08)	<0.05	0.91 (0.86–0.96)	<0.01
Education (highest level)					
None or some primary	28.0 (21.0–36.2)	Ref.		Ref.	
Primary or some secondary	29.5 (24.4–35.2)	1.08 (0.69–1.69)		0.95 (0.52–1.72)	
Secondary or some tertiary	14.6 (10.8–19.6)	0.44 (0.27–0.73)	<0.01	0.42 (0.22–0.83)	<0.05
Weekly sex work income, shillings					
<1000	23.2 (16.1–32.1)	Ref.		Ref.	
1000–2000	27.1 (21.4–33.6)	1.23 (0.70–2.17)		1.26 (0.65–2.46)	
>2000	23.2 (19.3–27.6)	1.00 (0.62–1.63)		1.06 (0.59–1.91)	
Total lifetime pregnancies					
0	2.75 (1.21–6.11)	Ref.		Ref	
1	27.9 (22.4–34.2)	13.71 (5.54–33.89)	<0.001	11.44 (4.25–30.83)	<0.001
≥2	33.0 (28.1–38.3)	17.42 (7.32–41.42)	<0.001	17.21 (6.32–46.81)	<0.001
Knowledge, self-efficacy, and attitudes					
High FP knowledge score	38.7 (33.1–44.7)	3.29 (2.40–4.51)	<0.001	2.52 (1.78–3.56)	<0.001
Median general self-efficacy score	3.6 (3.2–3.9)	1.02 (0.71–1.48)		1.11 (0.72–1.70)	
High FP-specific self-efficacy	27.0 (23.2–31.2)	1.86 (1.19–2.88)	<0.01	1.43 (0.86–2.36)	
Positive attitude to FP use	34.7 (30.0–39.9)	5.65 (3.43–9.31)	<0.001	4.58 (2.62–8.00)	<0.001
Partner influence					
Current boyfriend/husband	23.0 (19.1–27.5)	0.87 (0.62–1.22)		0.97 (0.64–1.46)	
Intimate partner violence in last year	27.5 (23.7–31.8)	1.61 (1.16–2.23)	<0.01	1.20 (0.82–1.75)	
Social influence					
Friends use FP (most or all)	28.9 (24.6–33.6)	1.92 (1.41–2.61)	<0.001	1.25 (0.85–1.83)	
Median stigma score	2.8 (2.4–3.0)	0.88 (0.63–1.23)		1.03 (0.71–1.49)	
Health service experience					
Sought health services in past 6 mo	24.2 (20.3–28.5)	1.01 (0.72–1.40)		0.83 (0.56–1.22)	
Expect to be treated with respect by health worker	25.1 (21.6–28.9)	2.94 (1.04–8.25)	<0.05	1.12 (0.30–4.13)	

Abbreviations: CI, confidence interval; FP, family planning; OR, odds ratio.
[a]Sample size, n=858 women (21 women had missing values for at least one variable). The proportion using LARC did not differ significantly between those with and without complete data. Values are given as mean (95% CI), median (IQR), or percentage (95% CI).
[b]Inverse probability-weighted percentage. Standard errors are corrected by cluster sandwich variance estimation.

noted,[1,25] but it may reflect the predominance of condoms and short-acting methods in those studies, or the influence of gravidity. Studies examining LARC use in non-sex-worker populations have rarely found a clear association with age,[23,24] and have reported mixed results regarding education.[23,26]

Knowledge and positive attitude to family planning were correlates of LARC use, consistent with findings in other populations.[26] Social norms and contraceptive self-efficacy may lie on the same causal pathway as positive attitude, or may measure the same underlying construct. Education about LARCs has been found to improve attitude and uptake.[21] In the present sample, these individual factors had greater influence on LARC use than structural factors such as the presence of a boyfriend or husband, sex-work-related stigma, and violence. This is surprising given the known influence of structural determinants on sexual health risks.[2,25,27] Structural determinants may have a greater influence on use of condoms and other user-dependent methods than on LARC use.

Adverse effects were experienced by most women for all highly effective contraceptive methods and seemed to be more common than reported elsewhere.[28,29] The rate of LARC discontinuation was high, but the duration of use was not known, preventing a comparison with other studies. There was a lower rate of cessation of implants as compared with IUDs, pills, or injections.[30] Reduced bleeding caused by implants may be beneficial for sex workers, because bleeding can interfere with work. Heavier bleeding was associated with implant cessation, consistent with other research.[30] Heavy bleeding caused by copper IUDs might negatively impact on sex work and exacerbate iron deficiency anemia, which is likely to be high in the present

population.[14,31] Future studies should investigate whether hormonal IUDs, with their tendency to suppress bleeding, would have a higher uptake than copper IUDs.[32] It would be particularly interesting to determine whether negative perceptions of the copper IUD are transferred to the hormonal one. Targeting additional resources at raising IUD uptake might help to overcome these barriers. It is possible, however, that such efforts might not raise uptake and that the method has low acceptability in this setting. If that is the case, then it may be better to target programmatic resources to other family planning priorities.

Pelvic pain was a frequently reported adverse effect and is also a symptom of cervicitis and pelvic inflammatory disease. The long-held misconception that IUDs cause pelvic inflammatory disease [21] may lead to their unnecessary removal, when in fact it is safe to leave them in situ while concurrent STIs are treated.[4]

Quality education and counseling on the benefits and adverse effects of LARCs can improve uptake and continuation rates [21,23] by managing expectations, countering common myths, and providing reassurance on the safety of bleeding disturbances.[32] However, counseling is likely to be insufficient or incomplete in many settings.[30] While Kenya has clear guidelines on contraceptive counseling,[5] one study noted that only 60% of women were counseled on adverse effects when they obtained contraception.[11] Further work is required to determine how guidelines are applied in practice, particularly for sex workers who are subject to discrimination by health workers.[33] Research in South Africa has indicated that, to improve uptake, LARCs need to be available from a wider range of trained service providers, including mobile outreach clinics for harder-to-reach populations such as FSWs, and counseling should be reoriented to emphasize LARCs as a "first-line" contraceptive method.[34] Only 20% of private facilities in Kenya supply LARCs, whereas more than 65% supply other methods [20] — an observation reflected in the present data. Sex worker drop-in-centers supplied very few contraceptives (other than male condoms). This highlights a missed opportunity for these acceptable and widely used centers [33] to improve access to all methods including LARCs.

The study has some important limitations. The data were collected by self-report, increasing the risk of recall bias and social desirability bias; however, it would not be possible or practicable to obtain such personal data by other means. Age was an inclusion criterion, so the results cannot be extrapolated to all ages. There are also limitations around the measurement of pregnancy intention, which may affect the reliability of these data. Some participants may not have intended to get pregnant, but nonetheless desired pregnancy for different reasons. FSWs often have mixed pregnancy intentions depending on their partners, so they must rely on short-acting methods with all partners except the desired father.[35] They may also prefer not to disclose a true intention owing to the stigma surrounding sex work and motherhood.

Interpretation of the analysis is also limited by the cross-sectional design. Correlates such as knowledge may follow rather than precede LARC use. Other variables that might be associated with the outcome were not included; for example, stigma from health workers may be an important structural determinant.[33] Because there were very few current users of IUDs, the results of the regression were dominated by implant users. The low number of IUD users also precluded further examination of their adverse effects, patterns of use, and removal. The analysis of adverse effects had some limitations: there were no data on duration of bleeding, which is a predictor of cessation,[30] and prolonged bleeding may have been instead reported as heavy or irregular.

In conclusion, despite the multiple sexual risks and difficulties accessing services faced by FSWs in Kenya, implant use has increased and self-reported unintended pregnancy was lower as compared with previous estimates in this population. LARC use was strongly associated with gravidity, knowledge, and attitudes toward family planning. FSWs reported very high rates of contraceptive adverse effects. This population would benefit from interventions to improve uptake of LARCs, particularly IUDs, which are currently under-used.

AUTHOR CONTRIBUTIONS

Under the leadership of the Principal Investigator (SL), FHA, PG, MSCL, MFC, WJ, MT, MS, PAA, and MH contributed to study design. GM and CG contributed to data acquisition in Kenya under the supervision of PG. FHA and PAA led the analyses. FHA and MSCL drafted the first manuscript. All authors contributed to data interpretation, provided critical input into the draft, and approved the final version of the manuscript.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

File S1. Study measures and scoring.