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An Evaluation of an Enhanced Model of Integrating Family Planning Into HIV Treatment Services in Zambia, April 2018–June 2019

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Abstract

Background: We designed and implemented an enhanced model of integrating family planning (FP) into existing HIV treatment services at 6 health facilities in Lusaka, Zambia.

Methods: The enhanced model included improving FP documentation within HIV monitoring systems, training HIV providers in FP services, offering contraceptives within the HIV clinic, and facilitated referral to community-based distributors. Independent samples of women living with HIV (WLHIV) aged ≥16 years were interviewed before and after intervention and their clinical data abstracted from medical charts. Logistic regression models were used to assess differences in key outcomes between the 2 periods.

Results: A total of 629 WLHIV were interviewed preintervention and 684 postintervention. Current FP use increased from 35% to 49% comparing the pre- and postintervention periods ($P = 0.0025$). Increased use was seen for injectables (15% vs. 25%, $P < 0.0001$) and implants (5% vs. 8%, $P > 0.05$) but not for pills (10% vs. 8%, $P < 0.05$) or intrauterine devices (1% vs. 1%, $P > 0.05$). Dual method use (contraceptive + barrier method) increased from 8% to 18% ($P = 0.0003$), whereas unmet need for FP decreased from 59% to 46% ($P = 0.0003$). Receipt of safer conception counseling increased from 27% to 39% ($P < 0.0001$). The estimated total intervention cost was $83,293 (2018 USD).

Conclusions: Our model of FP/HIV integration significantly increased the number of WLHIV reporting current FP and dual method use, a met need for FP, and safer conception counseling.

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These results support continued efforts to integrate FP and HIV services to improve women's access to sexual and reproductive health services.

Keywords

HIV/AIDS; family planning; women living with HIV (WLHIV); Zambia; implementation science

INTRODUCTION

Globally, an estimated 19.2 million women older than 15 years are currently living with HIV.[1] Of these women, approximately 64% live in East and Southern Africa.[1] In Zambia, HIV prevalence is 11.3% with women disproportionately affected compared with men (58% vs. 42%).[2] In 2019, 30% of Zambian women aged 15–49 years reported having an unmet need for family planning (FP), resulting in an estimated 410,000 unintended pregnancies.[3] Studies from several sub-Saharan African countries indicate that a substantial percentage of pregnancies among women living with HIV (WLHIV) are unintended (defined as pregnancies that are mistimed, unplanned, or unwanted at the time of conception),[4–6] with models suggesting that 533,000 unintended pregnancies could be averted in sub-Saharan Africa annually if unmet need for FP among WLHIV were met.[7]

Unintended pregnancies present significant health risks for WLHIV and their infants including a higher risk for maternal mortality[8–10] and babies born preterm, stillborn, or at low birth weight.[11] In Uganda, unintended pregnancies among WLHIV account for nearly one-quarter of pediatric HIV infections and one-fifth of pediatric AIDS deaths.[12] To prevent these risks, WHO guidance recommends that health care providers counsel WLHIV who wish to delay, space, or limit their pregnancies to use contraception plus condoms to prevent transmission of HIV and other sexually transmitted infections (STIs)–a strategy known as dual method use.[13,14] Among women who wish to become pregnant, safer conception counseling is recommended to support women to achieve their reproductive goals while reducing HIV transmission risk.[15–17] The safer conception package includes HIV testing services, screening for STIs and cervical cancer, antiretroviral treatment (ART) initiation and management, viral load monitoring, counseling on the fertile window and timed condomless sex, preexposure prophylaxis, and disclosure support.[15]

Integrating FP and HIV treatment services, including safer conception counseling, allows WLHIV to make informed decisions about the timing of their pregnancies and reduces the risk of maternal mortality, poor neonatal outcomes,[11,18] and pediatric HIV infection.[19,20] Integration may also improve women's engagement and retention in HIV care by supporting their childbearing desires[21–24] and evidence indicates that integration may also be cost saving.[19,25] A systematic review of 14 interventions to integrate FP and HIV services documented significant increases in contraceptive use among clients enrolled in HIV care, primarily driven by an increase in self-reported condom use.[26] However, dual method use and use of long-acting reversible contraceptives (LARC), such as implants and intrauterine devices (IUDs), remained low,[27–31] posing risks of contraceptive failure, unintended pregnancies, and acquisition of other STIs.[30,31] Sustained use of short-acting methods such as pills and injectables was also poor, with studies reporting 12-month continuation

of the Depo-Provera injection as low as 23%–28%.[32] This review indicates that although FP integration into HIV services can be effective at increasing contraceptive use initially, additional research is needed to identify models for sustaining FP and dual method use.

Integrated services are supported by the Zambia Consolidated Guidelines for Treatment and Prevention of HIV Infection,[33] which allow task shifting of some HIV services to community-based distributors (CBDs) to support WLHIV who are stable on ART. This policy allows CBDs to offer contraception and HIV medication refills, ensuring continuity of both HIV treatment and FP services. Unfortunately, implementation at the facility level has been suboptimal.[16] To support these guidelines, we implemented an enhanced model of FP/HIV integrated service delivery at 6 health facilities in Lusaka, Zambia, that included integration of FP case management in HIV clinics and community-based distribution of contraceptives to support FP use between clinic visits. Our primary objectives were to increase contraceptive uptake and dual method use among WLHIV wanting to avoid pregnancy and to improve safer conception counseling for those desiring a pregnancy. Primary evaluation outcomes included the use of a highly effective contraceptive method [eg, oral contraceptive pills (OCPs), injectables, implants, IUDs], vasectomy, or tubal ligation), dual method use (contraceptive + barrier method), an unmet need for FP (defined as not desiring a pregnancy in the next 6 months but not currently using a highly effective contraceptive method to avoid becoming pregnant), and receipt of safer conception counseling.

METHODS

Intervention Model

During the preintervention period, all 6 clinics offered condoms to prevent pregnancy and HIV transmission, but only 3 offered short-acting methods, including OCPs and injectables, as part of routine HIV care. To increase WLHIV's access to FP services, the enhanced model of FP/HIV integrated service delivery included 3 main components[1]: improving documentation and monitoring of FP services by reintroducing the FP form in the electronic medical record system (SmartCare) and providing ongoing mentorship on documenting FP service delivery[2]; strengthening integration of FP services within the HIV clinic by training HIV care providers in FP service delivery and offering a full range of FP methods within the HIV clinic; and[3] introducing a facilitated referral approach to CBDs to support FP use between clinic visits. Trained providers from each clinic included the following[1]: 1–3 nurses to provide both short- and long-acting contraceptive methods,[2] 2 CBDs to provide refills of pills and injectables to WLHIV out in the community if they required a refill before their next ART appointment, and[3] 2 lay counselors to promote FP services during health talks, ask women about their fertility intentions, and notify the nurse or CBD if a woman desired a FP service.

During the intervention, all 6 facilities offered a full range of contraceptive methods within the HIV clinic including male and female condoms, OCPs, injectables, implants, and IUDs. All contraceptive methods were provided by the Zambia Ministry of Health. FP services were offered in a private space within the HIV clinic, and each facility was provided with specula and other necessary equipment (eg, cotton wool, gloves, forceps, etc.) to safely

offer FP services. To create demand, all providers wore promotional shirts advertising the availability of FP services. Preprinted duplicate referral forms were used to track referrals made and services received by CBDs.

Study Setting and Design

Six health facilities in Lusaka, Zambia, were purposefully selected because they had large volumes of WLHIV enrolled in ART services (>2500 WLHIV), had an onsite Maternal Child Health-Family Planning clinic, and received US government funding through the US President's Emergency Plan for AIDS Relief to support HIV care and treatment services. The intervention took place from July 2018 to April 2019.

Two systematic samples of WLHIV were enrolled from the total population of women attending the clinic before and after the intervention to examine the effectiveness of the enhanced model at improving contraceptive uptake and safer conception counseling. Every fifth woman presenting for HIV services was screened for eligibility, and if eligible, enrolled after informed consent was obtained. To be eligible, women had to be of reproductive age (16–49 years), receiving ART, sexually active in the past 3 months, not attending the HIV clinic for the first time (to ensure they had an opportunity to be exposed to the intervention), and able to communicate in English, Bemba, or Nyanja (the 3 most common languages in Lusaka). The preassessment occurred over 3 months from April to May 2018, and the postassessment occurred from May to June 2019. Figure 1 summarizes the intervention activities and time line.

Data Sources

All enrolled women were interviewed, and their medical information abstracted from SmartCare and paper-based records. Medical data abstracted included parity, date of HIV diagnosis, ART start date and regimen, pregnancy status, and estimated date of delivery (if pregnant). The patient questionnaire included questions on women's demographic characteristics, HIV diagnosis, HIV serostatus disclosure, partner HIV status, sexual history, pregnancy, awareness of and attitude about FP, fertility desires, and current FP use.

Two indices were developed in consultation with a panel of experts, including representatives from the Zambia Ministry of Health, FP providers, and implementing partner staff to measure attitude toward and knowledge of FP methods. A 4-item index was used to measure women's attitude toward FP (ie, practicing FP allows couples to prepare for their children, birth spacing helps a mother regain her strength before her next baby, using contraceptives does not cause infertility in a woman, and birth spacing helps protect the health of the baby). Item responses were measured on a three-point numeric scale: agree (2), no opinion (1), and disagree (0). Response values were then summed to create a continuous measure called "Positive attitude towards FP." Although we were not able to do external validation, we did examine the relationship between the positive attitude measure and FP use in the preintervention data using a t test with Satterthwaite variance. The mean score for attitude toward FP index was significantly higher among those reporting the use of any FP method compared with those who did not (8.72 vs. 8.48, $P = 0.0486$) and those reporting dual method use compared with those who did not (9.06 vs. 8.62, $P = 0.0174$). We also

created an “Awareness of FP methods” index, asking women whether they had heard of 8 different methods for preventing or delaying pregnancy (ie, pills, injectables, implants, IUDs, vasectomy, tubal ligation, male condoms, and female condoms). The number of methods that each woman reported being aware of was then summed. In the preintervention data, the mean Awareness of FP methods score was higher for the use of any FP method (6.97 vs. 6.87), but the difference was not significant. However, the mean “Awareness” score was significantly higher for those reporting dual method use than for those who did not (7.29 vs. 6.93, P=0.002).

Approximately 3% of patient–provider interactions were observed throughout the intervention and assessment periods to monitor “fidelity” to the intervention. Days for observations were randomly chosen by study staff at the beginning of each month. Observations of patient–provider interactions were conducted by trained study staff using a standardized checklist and were only conducted after obtaining permission from both the client and provider. Observers noted what FP services were offered to the client during the clinical examination, including assessment of fertility intentions, contraceptive counseling and provision, and safer conception counseling.

Data Analysis

We compared characteristics, including age group, marital status, parity, and time because diagnosis between the preintervention and postintervention participants using a Pearson χ^2 statistic. A Pearson χ^2 statistic was also used to compare the frequency of FP messages and services provided to WLHIV during patient–provider observations before and after the intervention. Primary evaluation outcomes from the pre- and postintervention participant questionnaires (eg, use of a highly effective contraceptive use, dual method use, unmet need for FP, and safer conception counseling) were first compared using bivariate logistic regression with an indicator variable for time period. To examine the relationship of sociodemographic, participant, and partner characteristics with unmet need for FP, we fit bivariate and multiple regression models for preintervention and postintervention periods separately among women who did not want to become pregnant within the next 2 years. Variables with bivariate model with P value less than 0.20 were included in the multiple regression model. All statistical analyses were performed using SAS software version 9.4 (SAS Institute Inc).

The incremental costs associated with integrated services above the standard of care were calculated by abstracting data from expenditure records (including type, quantity, and unit cost), covering the period corresponding to the intervention. Patient–provider observations were used to determine the personnel time devoted to providing FP services. This personnel time was then multiplied by salary records from the different cadres (eg, nurse, nursing aide, lay counselor, etc.) to determine labor costs. All project evaluation costs were excluded as were all contraceptive costs because they were supplied by the Ministry of Health as part of routine services. The cost analysis was conducted from the perspective of the health care system and included only costs typically borne by the health facility and providers. Direct and indirect costs, and productivity losses incurred by clients and their informal caregivers were excluded. All direct medical costs, including labor, equipment and materials,

and direct nonmedical costs such as program support (training, travel, etc), were collected and compiled using an Excel-based template. As needed, costs were converted from Zambia Kwacha to 2018 US dollars.

Ethical Considerations

Protocols for this evaluation were reviewed and approved by Institutional Review Boards at the following institutions: Columbia University, U.S. Centers for Disease Control and Prevention, and the University of Zambia Biomedical Research Ethics Committee.

RESULTS

A total of 629 WLHIV were interviewed preintervention and 684 postintervention with similar numbers of participants enrolled across all 6 health facilities (Table 1). Figure 2 presents a flow chart illustrating enrollment of WLHIV into the pre- and postintervention groups. Approximately 14% of women approached for the preintervention group and 19% approached for the postintervention group were not eligible to participate in the evaluation. The most common reason for noneligibility in both groups was reporting no sexual intercourse in the past 3 months or being younger than 16 years. Eligible women in the preintervention group were more likely to decline enrollment than women in the postintervention group (17% vs. 3%, $P < 0.05$).

Table 1 presents a comparison of demographic and clinical characteristics of WLHIV in the pre- and postintervention assessments. The 2 groups did not vary regarding marital status or parity with most women reporting being married, with 1–5 children. Although the majority of women enrolled in both groups were >30 years, the postintervention group had more women aged 16–29 years (20% vs. 24%), and the preintervention group had more women aged 40–49 years (31% vs. 27%, $P = 0.0038$). Time since HIV diagnosis also varied significantly between the groups ($P < 0.0001$).

During the preintervention period, 35% of women reported currently using an effective contraceptive method compared with 49% at postintervention (adj$P = 0.0025$) (Table 2). Increased use was seen for injectables (15% vs. 25%, adj$P < 0.0001$) and implants (5% vs. 8%, adj$P > 0.05$) but not for pills (10% vs. 8%, adj$P > 0.05$, or IUDs (1% vs. 1%, adj$P > 0.05$). The proportion of women reporting dual method use increased from 8% to 18% (adj$P = 0.0003$), whereas unmet need for FP decreased from 59% to 46% (adj$P = 0.0003$). Receipt of safer conception counseling also increased from 27% to 39% (adj$P = 0.0093$). Among women who reported being pregnant (n = 26), the percentage who wanted the pregnancy increased from 35% to almost 71% at postintervention (adj$P < 0.0001$).

In multivariable analysis, women in the preintervention group who expressed a positive attitude toward FP were more likely to report an unmet need for FP [adjusted odds ratio (aOR): 1.23, 95% confidence interval (CI): 1.04 to 1.46, $P < 0.0175$]. Other significant correlates of reporting an unmet need for FP in both the pre- and postintervention groups (Tables 3 and 4) included being older [aOR comparing 40–49 years with 16–29 years (aOR_{pre}): 4.14, 95% CI: 1.87 to 9.15, $P < 0.0001$ and aOR_{post}: 4.07, 95% CI: 1.94 to 8.55, $P < 0.0001$, respectively) and talking with a partner about FP (aOR_{pre}: 0.37, 95% CI: 0.23

to 0.59, $P < 0.0001$ and aOR_{post}: 0.32, 95% CI: 0.20 to 0.53, $P < 0.0001$). Among women in the postintervention assessment, 239 (35%) were aware that they could receive pills or injectables from a CBD in their home between their HIV clinical visits. Of these women, 31 (13%) reported receiving a contraceptive method from a CBD within the past 6 months.

In observations of patient encounters, providers were significantly more likely to assess women's fertility intentions (33% vs. 80%, $P < 0.0001$), their current use of FP methods (46% vs. 91%, $P < 0.0001$), and their use of condoms to prevent STIs (65% vs. 87%, $P < 0.0001$) during the postassessment period compared with the preassessment period. Similarly, after the intervention, they were more likely to inquire about partner attitude toward FP (25% vs. 67%, $P < 0.0001$) and women's satisfaction with their current FP method (28% vs. 74%, $P < 0.0001$). Providers were also more likely to counsel about dual method use (46% vs. 77%, $P < 0.0001$) and provide the client's preferred FP method in the ART clinic (18% vs. 61%, $P < 0.0001$). Finally, providers were more likely to ask pregnant women whether they were enrolled in prevention of MTCT services (16 vs. 29%, $P < 0.0001$).

The total intervention cost across all 6 clinics was estimated at $83,293 (2018 USD) over the 10-month period, including labor (40%), supplies (26%), training (14%), and administration (20%). Given that an additional 310 women were using a highly effective method of FP after the intervention, the incremental costs per WLHIV adopting an effective FP method is estimated at $269 (2018 USD).

DISCUSSION

Our model of FP/HIV integration significantly increased the percentage of WLHIV who reported using an effective FP method and dual method use. Injectables were the most frequently used contraceptive. During observations of clinical encounters, providers were more likely to assess for fertility intentions and to provide FP counseling and services after the intervention, likely contributing to the positive outcomes observed. Distribution of contraceptives by CBDs to women between clinic visits may also have contributed to these outcomes. These results are aligned with other studies throughout sub-Saharan Africa, which have also demonstrated the effectiveness of integrated services at increasing contraceptive uptake among WLHIV.[26,34] The estimated cost of $269 per additional WLHIV adopting an effective FP method is higher than previous cost analyses, which ranged from $65 to $113.[20,25] Task shifting services to lower cadres, training additional providers within health facilities to improve accessibility, offering sustained mentoring and supervision of existing trained personnel, and promoting integrated services through facility and community-based demand creation[19,20,25] may help reduce the costs of integrated FP/HIV models.

Integration of FP services into differentiated service delivery models, including community-based ART distribution programs, will be critically important to ensure access to and continuity of contraceptives.[35] Allowing trained community health workers (CHWs) to support community distribution of contraceptive methods, as piloted in this evaluation, can also expand access to FP services by removing the need for clients to come to the clinic for their FP method while receiving ART at the community level. Community-based

provision of injectables by CHWs has been found to be safe, feasible, and acceptable in Benin, Burkina Faso, Niger, Senegal, Zambia, and Uganda.[36–38] Innovative methods like Sayana Press (Pfizer, New York, NY), a prefilled, auto-disabled injection system that delivers Depo-Provera subcutaneously, may also improve WLHIV's access to FP.[39] This method can be distributed by CHWs or given directly to women to self-inject.[40] In Malawi, user discontinuation rates were significantly lower when they self-injected compared with injections given by a provider (27% vs. 55%, $P < 0.0001$),[41] suggesting the potential effectiveness of self-injection at improving method continuity.

Provider bias has been reported as an important barrier to FP access, particularly for people with the highest unmet need, such as adolescents, unmarried women, and the poor.[42,43] In this study, providers received training on how to recognize their implicit biases toward offering FP services to WLHIV and to identify strategies for reducing this bias. After this training, providers were more likely to assess women's fertility intentions, to counsel about dual method use, and to provide the client's FP method of choice in the ART clinic. These findings suggest that provider training, conducted as part of a package of interventions, can increase the proportion of women who receive client-centered FP counseling and services that address their specific needs and life circumstances, which in turn can lead to an increase in the initiation and continuation of contraceptive methods among WLHIV.

Injectables were by far the most common choice for contraceptives, whereas the uptake of LARCs remained low. LARCs are more effective and require less user adherence than injectables. For this reason, WHO guidance recommends that providers use a tiered effectiveness approach that describes contraceptive methods in order of their effectiveness to help clients better understand the effectiveness of each method at preventing pregnancy.[44] However, this approach must be balanced with client-centered counseling that recognizes each woman's individual circumstances and ensures that her contraceptive choices and preferences are met.[45,46] In addition, myths around LARCs causing infertility and birth defects are widespread and may contribute to their low uptake among WLHIV in many settings.[47] This highlights the need for community engagement and formative research to better understand and dispel these myths through human-centered approaches.

Women who reported talking about FP with their male partner were significantly less likely to report an unmet need for FP, highlighting the importance of partner communication. Previous studies have also found that men significantly influence women's reproductive health decision making[48,49] and that involving men in FP programs can improve partner communication and contraceptive use.[50,51] Providing FP counseling to both partners can facilitate couple communication and shared decision making around contraception.[52,53] Further operational research, including social and behavioral change interventions to address inequitable gender norms, is needed to determine how best to involve men in FP programs in a way that engages men but still preserves women's autonomy to make informed decisions.

This evaluation is subject to several limitations. First, the study enrolled 2 systematic groups of WLHIV before and after the intervention to measure change in key outcomes. Although we attempted to control for all observed differences between these 2 measurement groups, we cannot completely rule out that there are additional confounders for which we did

not adjust. Second, the health facilities included in this study were purposively selected and may not be representative of other facilities in Lusaka or of nonurban facilities in Zambia. Third, the main outcomes used self-reported data, which is subject to several biases, including social desirability bias and recall bias. Whenever possible, we attempted to validate self-reported data on FP use with information abstracted from participants' medical charts. Finally, observations of patient–provider encounters may have been subject to observation and measurement bias. Providers may have been more likely to provide FP services when under direct observation, leading to an overestimation of providers' fidelity to the intervention. Nevertheless, this evaluation contributes to the growing body of evidence, suggesting the importance of integrating FP and HIV services and to the feasibility of community-based distribution of contraceptives as part of differentiated service delivery models.

In summary, although Zambia has strong national policies supporting FP/HIV integration, implementation at the facility level has often been weak.[54] This study found that a systematic model for integrating FP and HIV services was associated with the increased use of effective contraception and dual method use among WLHIV in Zambia and a met need for FP. Findings from this study provide additional support for efforts to continue integrating FP and HIV services to ensure that all WLHIV have access to sexual and reproductive health services that address their fertility needs and desires.

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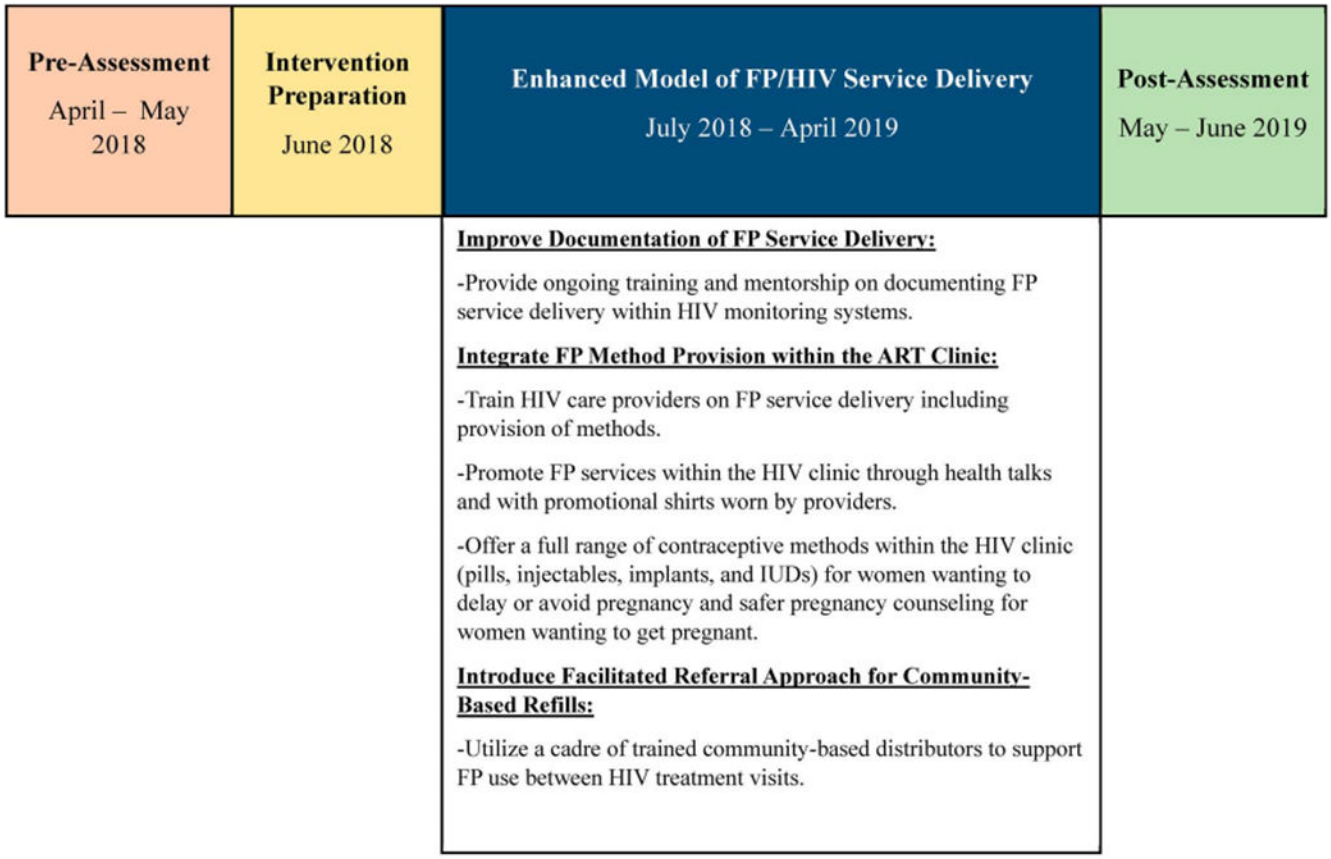

FIGURE 1.

Intervention activities and time line for the enhanced model of FP/HIV service delivery for women living with HIV in Zambia.

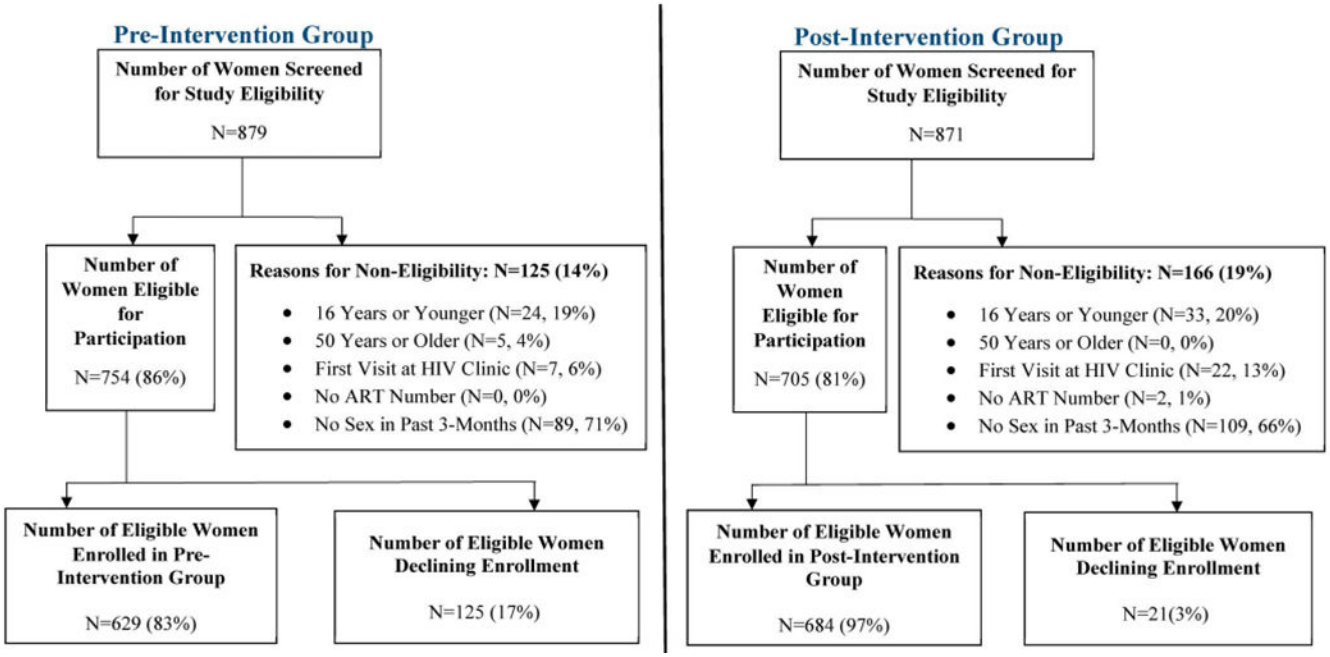

FIGURE 2.

Enrollment flow chart for women living with HIV into the pre- and postintervention groups, Zambia, 2018–2019.

TABLE 1.

Comparison of Demographic and Clinical Characteristics of WLHIV in the Pre- and Postintervention Assessments, Zambia, 2018–2019

	Preintervention, n (%)	Postintervention, n (%)	
Variable	**N = 629**	**N = 684**	***P*** *
Facility			**0.99**
1	106 (16.9)	114 (16.7)	
2	103 (16.4)	115 (16.8)	
3	102 (16.2)	112 (16.4)	
4	106 (16.9)	113 (16.5)	
5	103 (16.4)	114 (16.7)	
6	109 (17.3)	116 (17.0)	
Age group, yr			0.004
16–19	14 (2.2)	4 (0.6)	
20–29	114 (18.1)	161 (23.5)	
30–39	304 (48.3)	336 (49.1)	
40–49	197 (31.3)	183 (26.8)	
Marital status			0.55
Married, monogamous	427 (67.9)	485 (70.9)	
Married, polygamous	18 (2.9)	12 (1.8)	
Cohabiting	4 (0.6)	4 (0.6)	
Single, never married	60 (9.5)	55 (8.0)	
Divorced, separated, widowed	120 (19.1)	128 (18.7)	
Parity			0.34
No children	44 (7.0)	35 (5.1)	
1–2 children	198 (31.5)	223 (32.6)	
3–5 children	313 (49.8)	331 (48.4)	
>5 children	74 (11.8)	95 (13.9)	
Time since HIV diagnosis			<0.0001
<1 yr	82 (13.0)	110 (16.1)	
1–3 yrs	104 (16.5)	120 (17.5)	
3–10 yrs	306 (48.6)	255 (37.3)	
>10 yrs	113 (18.0)	139 (20.3)	
Unknown	24 (3.8)	60 (8.8)	

*Differences between pre- and postintervention participants were tested using Pearson χ^2 tests.

TABLE 2.

Comparison of Key Outcome Variables Before and After Integration of FP Within HIV Treatment Services at 6 Health Facilities in Lusaka, Zambia

Variable	Preintervention, n (%)	Postintervention, n (%)	Unadjusted *P*	Adjusted *P*[*]
Women not desiring a pregnancy	N = 379	N = 402		
Use of effective method	133/355 (37)	195/401 (49)	0.0020	0.0016
Use of dual methods[†]	30/355 (8)	73/401 (18)	0.0001	0.0004
Unmet need for FP[‡]	209/355 (59)	184/401 (46)	0.0004	0.0004
Use of IUD	7/355 (2)	5/401 (1)	0.4300	NA[*]
Use of injectables	20/355 (6)	30/401 (7)	0.3093	0.2568
Use of implants	59/355 (17)	111 (28)	0.0003	0.0004
Use of pills	45/355 (13)	45/401 (11)	0.5380	0.4577
Women desiring a pregnancy	N = 210	N = 249		
Discussed safer conception	56/205 (27)	97/249 (39)	0.0093	N/A[*]

[*]Adjusted model includes facility, age group, and time since diagnosis. The adjusted model could not be fit for use of IUD or discussion of safer conception because of insufficient data.

[†]Defined as condom use plus another effective method of contraception.

[‡]Defined as not desiring a pregnancy in the next 6 mo but not currently using any FP method to prevent becoming pregnant.

TABLE 3.

Correlates of Unmet Need for FP Among Women Living With HIV in the Preintervention Group (N = 355)

	Preintervention		
Variable	**N (%)**	**OR (95% CI)**	**AOR (95% CI)**
Age group, yr			
16–29	25 (48.1)	Ref	Ref
30–39	83 (48.5)	1.02 (0.55 to 1.92)	1.27 (0.61 to 2.67)
40–49	101 (76.5)	3.52 (1.79 to 6.92)	4.14 (1.87 to 9.15)
Marital status			
Married or cohabiting	148 (55.6)		Ref
Single	14 (63.6)	1.40 (0.57 to 3.44)	1.54 (0.48 to 4.99)
Divorced/widowed/separated	47 (70.1)	1.87 (1.05 to 3.33)	1.65 (0.79 to 3.44)
Parity			NA
0–1 prior births	24 (66.7)	Ref	
2–4 prior births	118 (56.7)	0.66 (0.31 to 1.38)	
5+ prior births	66 (60.0)	0.75 (0.34 to 1.65)	
Education			
None, some primary	47 (51.1)	Ref	Ref
Finished Primary	94 (58.8)	1.36 (0.81 to 2.28)	1.41 (0.80 to 2.49)
Secondary, college or university	68 (66.0)	1.86 (1.04 to 3.31)	1.99 (1.02 to 3.90)
Time to get to clinic			NA
≤15 min	37 (67.3)	1.42 (0.68 to 2.96)	
16–30 min	68 (57.1)	0.92 (0.51 to 1.67)	
31–60 min	58 (54.7)	0.83 (0.45 to 1.53)	
>60 min	42 (59.2)	Ref	
Convenient clinic hours			NA
Yes	137 (58.8)	0.98 (0.63 to 1.54)	
No	71 (59.2)	Ref	
Health			
Excellent	60 (61.9)	Ref	Ref
Good	114 (55.1)	0.76 (0.46 to 1.24)	0.73 (0.42 to 1.27)

Preintervention			
Variable	**N (%)**	**OR (95% CI)**	**AOR (95% CI)**
Fair, poor, very poor	35 (68.6)	1.35 (0.66 to 2.77)	1.00 (0.45 to 2.21)
Self-reported partner HIV status			NA
Don't know	42 (63.6)	Ref	
Positive	120 (60.3)	0.87 (0.49 to 1.54)	
Negative	47 (52.2)	0.62 (0.33 to 1.20)	
Disclosed to partner			
Yes	179 (57.6)	0.63 (0.32 to 1.24)	1.09 (0.44 to 2.66)
No or no partner	30 (68.2)	Ref	Ref
Positive attitude toward FP*		1.10 (0.95 to 1.28)	1.23 (1.04 to 1.46)
Awareness of FP methods†		1.10 (0.86 to 1.42)	NA
Talked with provider about FP methods at last visit			NA
Yes	36 (53.7)	0.77 (0.45 to 1.31)	
No	172 (60.1)	Ref	
Ever talked with main partner about FP methods			
Yes	75 (46.6)	0.40 (0.26 to 0.61)	0.37 (0.23 to 0.59)
No	132 (68.8)		
Who decides whether the participant should have more children			NA
Participant herself	32 (59.3)	Ref	
Participant and partner	88 (59.1)	0.99 (0.53 to 1.87)	
Someone else	80 (57.6)	0.93 (0.49 to 1.77)	

*A 4-item index was used to measure women's attitude toward FP (ie, practicing FP allows couples to prepare for their children, birth spacing helps a mother regain her strength before her next baby, using contraceptives does not cause infertility in a woman, and birth spacing helps protect the health of the baby). Item responses (numeric value) were measured on a three-point scale: agree (2), no opinion (1), and disagree (0). Response values were then summed to create a continuous measure called "Positive attitude towards FP."

†Women were asked whether they had heard of 8 different methods for preventing or delaying pregnancy (ie, pills, injectables, implants, IUDs, vasectomy, tubal ligation, male condoms, and female condoms). The number of methods that each woman reported being aware of was then summed to create a continuous measure called "Awareness of FP methods."

NA indicates that the variable was not included in the adjusted model because the bivariate model *P* value was ≥0.20.

TABLE 4.

Correlates of Unmet Need for FP Among Women Living With HIV in the Postintervention Group (N = 402)

	Postintervention		
Variable	**N (%)**	**OR (95% CI)**	**AOR (95% CI)**
Age group, yr			
16–29	25 (30.9)	Ref	Ref
30–39	72 (38.5)	1.40 (0.8 to 2.44)	1.40 (0.71 to 2.74)
40–49	87 (65.4)	4.24 (2.34 to 7.65)	4.07 (1.94 to 8.55)
Marital status			
Married or cohabiting	122 (41.9)	Ref	Ref
Single	18 (64.3)	2.49 (1.11 to 5.59)	2.19 (0.73 to 6.59)
Divorced/widowed/separated	44 (53.7)	1.6 (0.98 to 2.62)	0.76 (0.40 to 1.45)
Parity			
0–1 prior births	17 (40.5)	Ref	Ref
2–4 prior births	89 (42)	1.06 (0.54 to 2.09)	1.90 (0.76 to 4.73)
5+ prior births	77 (52.7)	1.64 (0.82 to 3.29)	2.25 (0.83 to 6.08)
Education			NA
None, some primary	39 (53.4)	Ref	
Finished primary	60 (44.4)	0.70 (0.39 to 1.24)	
Secondary, college, or university	85 (44.0)	0.69 (0.40 to 1.18)	
Time to get to clinic			NA
≤15 min	19 (47.5)	1.11 (0.5 to 2.47)	
16–30 min	64 (46.4)	1.06 (0.58 to 1.94)	
31–60 min	74 (45.7)	1.03 (0.57 to 1.86)	
>60 min	27 (45)	Ref	
Convenient clinic hours			
Yes	152 (43.8)	0.54 (0.30 to 0.96)	0.63 (0.33 to 1.2)
No	32 (59.3)	Ref	Ref
Health			
Excellent	53 (45.3)	Ref	Ref
Good	86 (40.0)	0.81 (0.51 to 1.27)	0.72 (0.43 to 1.20)

Postintervention			
Variable	**N (%)**	**OR (95% CI)**	**AOR (95% CI)**
Fair, poor, very poor	45 (65.2)	2.26 (1.22 to 4.19)	1.72 (0.86 to 3.44)
Self-reported partner HIV status			
Don't know	40 (65.6)	Ref	
Positive	106 (42.2)	0.38 (0.21 to 0.69)	0.57 (0.22 to 1.46)
Negative	38 (42.7)	0.39 (0.20 to 0.77)	0.72 (0.26 to 1.95)
Disclosed to partner			
Yes	160 (44.0)	0.42 (0.21 to 0.86)	0.75 (0.25 to 2.30)
No or no partner	24 (64.9)	Ref	Ref
Positive attitude toward FP*		0.84 (0.7 to 1.00)	0.89 (0.73 to 1.09)
Awareness of FP methods†		0.92 (0.73 to 1.15)	NA
Talked with provider about FP methods at last visit			
Yes	60 (39.5)	0.66 (0.44 to 0.99)	0.85 (0.53 to 1.37)
No	124 (49.8)	Ref	Ref
Ever talked with main partner about FP methods			
Yes	74 (33.5)	0.32 (0.21 to 0.48)	0.32 (0.20 to 0.53)
No	110 (61.1)	Ref	Ref
Who decides whether the participant should have more children			NA
Participant herself	35 (54.7)	Ref	
Participant and partner	96 (44.2)	0.66 (0.38 to 1.15)	
Someone else	50 (43.5)	0.64 (0.34 to 1.18)	

*A 4-item index was used to measure women's attitude toward FP (ie, practicing FP allows couples to prepare for their children, birth spacing helps a mother regain her strength before her next baby, using contraceptives does not cause infertility in a woman, and birth spacing helps protect the health of the baby). Item responses (numeric value) were measured on a three-point scale: agree (2), no opinion (1), and disagree (0). Response values were then summed to create a continuous measure called "Positive attitude towards FP."

†Women were asked whether they had heard of 8 different methods for preventing or delaying pregnancy (ie, pills, injectables, implants, IUDs, vasectomy, tubal ligation, male condoms, and female condoms). The number of methods that each woman reported being aware of was then summed to create a continuous measure called "Awareness of FP methods."

NA indicates that the variable was not included in the adjusted model because the bivariate model *P* value was ≥0.20.