

ORIGINAL RESEARCH ARTICLE

Strengthening Youth Friendly Health Services through Expanding Method Choice to include Long-Acting Reversible Contraceptives for Ethiopian Youth

Fariyal F. Fikree¹, Worknesh K. Abshiro², Murtala M. Mai³, Kidest L. Hagos² and Mengistu Asnake²

Evidence to Action, PATH; USA¹; Pathfinder International/Ethiopia²; Evidence to Action/Pathfinder International³

*For Correspondence: E-mail: ffikree@e2aproject.org; Phone: 202-775-1977 Ext1036

Abstract

Despite robust evidence regarding long-acting reversible contraceptive (LARC) low failure rates, immediate return to fertility and safety, LARC uptake among youth is low. We evaluated the effect on contraceptive uptake of training youth-friendly service providers to counsel and provide all contraceptive methods including LARCs in the same unit. A convenience purposive sampling technique was used to select 20 youth friendly health units; ten each in Amhara and Tigray regions, Ethiopia; randomly allocated to the intervention (five) and non-intervention (five) arms. Data were abstracted from the family planning registers over an eleven-month period: three months pre-intervention and eight months post-intervention. Analysis of contraceptive uptake and chi-square tests of association were conducted. The number of LARCs new acceptors in the intervention arm was 781 (pre-intervention=116; post intervention=665) as compared to 358 in the non-intervention arm (pre-intervention=95; post intervention=263). Odds of adopting LARCs at pre-intervention (0.70); rose to 1.30 for the post-intervention phase (p-value <0.0001); comparing intervention to non-intervention study arms. Training youth friendly service providers to counsel and provide all contraceptive methods including LARCs in one location resulted in higher LARCs uptake for all sexually active young women; including those planning on delaying their first pregnancy. (*Afr J Reprod Health* 2017; 21[3]: 37-48).

Keywords: Youth, long-acting reversible contraceptives, expanded method choice, one-stop shop

Résumé

Malgré des preuves solides concernant les contraceptifs réversibles à longue durée de vie (CRLD), les faibles taux d'échec, le retour immédiat à la fertilité et à la sécurité, l'adoption de CRLD chez les jeunes est faible. Nous avons évalué l'effet sur l'adoption des contraceptifs de la formation des fournisseurs des adaptés aux jeunes pour conseiller et fournir toutes les méthodes contraceptives, y compris les CRLD dans la même unité. Une technique d'échantillonnage à usage pratique a été utilisée pour sélectionner 20 unités de santé favorables aux jeunes; dix dans les régions d'Amhara et Tigray, en Ethiopie; allouée au hasard à l'intervention (cinq) et à l'intervention (cinq) bras. Les données ont été extraites des registres de planification familiale sur une période de onze mois: trois mois de pré-intervention et huit mois après l'intervention. L'analyse de l'absorption contraceptive et les analyses d'association chi-carré ont été effectuées. Le nombre de nouveaux accepteurs CRLD dans le bras d'intervention était de 781 (pré-intervention = 116; intervention postale = 665) par rapport à 358 dans le bras de non-intervention (pré-intervention = 95; intervention postale = 263). Les chances d'adopter des CRLD à la pré-intervention (0,70); est passé à 1.30 pour la phase post-intervention (valeur p <0,0001) en comparant l'intervention aux armes d'étude sans intervention. La formation des prestataires de services adaptés aux jeunes pour conseiller et fournir toutes les méthodes contraceptives, y compris les CRLD dans un seul endroit, a entraîné une augmentation de la prise en charge des CRLD pour toutes les jeunes femmes sexuellement actives, y compris ceux qui envisagent de retarder leur première grossesse. (*Afr J Reprod Health* 2017; 21[3]: 37-48).

Mots-clés: Jeunesse, contraceptifs réversibles à action prolongée, choix de méthode élargie, guichet unique

Introduction

Contraception is critical to ensuring the health and well-being of all sexually active youth in addition to improving their opportunities for education and productive livelihoods. By the age of 20 in sub-

Saharan Africa (SSA), an estimated 75% of young people have had at least one sexual experience¹⁻². A substantial proportion of births to married or in union adolescents in SSA are intended³. Despite these statistics, 44% of the roughly 42 million unintended births in 42 SSA countries are to

youth⁴. Desire for delaying, spacing or limiting childbearing is common among married African youth⁵⁻⁶ but many are not using contraception⁷. Unmet need is much higher for adolescents (15 - 19 years) than for older women of reproductive age who want to avoid or delay a pregnancy but use no modern contraceptive method⁸. In 2016, 23 million adolescents had an unmet need for modern contraception and were at elevated risk of unintended pregnancy⁹. Helping young persons and especially adolescents avoid unintended pregnancies reduces the adverse consequences of early childbearing (maternal, infant and child mortality and severe morbidity); with concomitant savings in maternal and child health care; enhances young women's education and economic opportunities; and reduces gender inequality and poverty⁹. While concerted national efforts to provide adolescent friendly services in several low and middle income countries have evolved in the recent past with measurable though uneven improvements in health service utilization¹⁰. However, much still needs to be done to respond to the unmet need for all sexually active young people¹¹.

The majority of unintended pregnancies among contraceptive users occur due to failure rates reflecting incorrect or inconsistent use (9% - 30%) of user dependent short-acting methods¹²⁻¹³. Failure rates for user independent long-acting reversible contraceptives (LARCs), are under 1%¹⁵. Despite the overwhelming evidence regarding implants and intrauterine devices⁷ (IUDs) low failure rates¹³ and safety¹⁴, LARCs uptake among youth is disappointingly low. Reasons for not opting for LARCs include myths and misperceptions among service providers and women, service providers practice patterns, logistical barriers and initial costs despite its proven safety, effectiveness and cost-effectiveness¹⁵⁻²¹. Studies from SSA show that when offered expanded method choice, young persons will often opt for LARCs. In a dedicated LARC provider program in Zambia, among women aged 15 - 49 years, over 50% of short acting hormonal method users switched to LARCs; and implant users were lower parity younger women as compared to the typical older higher parity Zambian modern contraceptive user²². In

Nairobi, Kenya, a quarter of women under twenty-five who came to the Lang'ata Health Center for a contraceptive method; voluntarily chose implants when offered as an alternative to short-acting contraceptives²³.

The Federal Ministry of Health (FMOH), Ethiopia embarked on an ambitious national RH strategy (2006-2015)²⁴ to reduce unwanted pregnancies, increase access and utilization of quality contraceptive services, particularly for married and unmarried young people. The Ethiopia Demographic and Health Survey (EDHS), 2005 and the Ethiopia Mini Demographic and Health Survey (EmDHS), 2014 sheds light on its impact. Modern contraceptive prevalence rate (mCPR) for married and sexually active unmarried women improved appreciably - 9.7%²⁵ to 27.8%²⁶; with notable sharp increases in injectable uptake - 6.8%²⁵ to 21.2%²⁶ respectively. With regards to the youth population, mCPR among the 20-24 year olds grew sharply from 10.4%²⁵ to 31.0%²⁶; less so among adolescents - from 2.5%²⁵ to 9.2%²⁶. However, the EDHS, 2011²⁷ draws attention to the need for continued concerted focus on adolescents' RH and contraceptive choices. While only 1 percent of women aged 15 had started childbearing, a significantly larger proportion (34%) were either mothers or pregnant with their first child by age 19. The unmet need for birth spacing among adolescents was relatively high - 30.3%; declining to 20.3% among women aged 20 - 24²⁷.

In 2009, the FMOH decided to expand the contraceptive mix at community level to include implants. Subsequently, task sharing to enable health extension workers (HEWs) to provide implants at community level was successfully implemented across several regions enabling HEWs to reach women with the greatest need²⁸. While the study demonstrated that HEWs are effective in expanding method choice to reach women at the community level, the mean age of implant acceptors was 28.3 ± 6.0 years, significantly fewer (4.9%) in the 15-19 age group as compared to 20.1% in the 20-24 age group²⁸. Hence, while the policy modification led to a perceptible shift in method mix to implants among the 20-24 year olds (0.1% to 4.5%); there was hardly any shift among adolescents (0.0% to 0.6%)

comparing data from the 2005²⁵ and 2014²⁶ EDHS respectively. Therefore, while task sharing improved LARCs uptake, challenges continue for reaching sexually active adolescents with an expanded method choice including LARCs by HEWs.

In response to the limited method mix and lower LARCs uptake by young Ethiopians, the *LARCs and Youth* project was launched within the ongoing *Integrated Family Health Program Plus* (IFHP+) to promote an expanded method mix including LARCs for all sexually active young women at Youth Friendly Service (YFS) units in selected health centers in Amhara and Tigray regions. This paper describes the *LARCs and Youth* project experience in supporting the YFS provider (health officer, nurse or midwife), to counsel and provide all contraceptive methods including LARCs in one location; subsequent shifts in contraceptive method mix among new contraceptive youth clients; their demographic characteristics; and, reasons for LARCs removals among the sub-set of removal clients. The World Health Organization defines youth as persons between the ages of 15-24; and adolescents as persons' ages 10-19²⁹. For the purposes of this paper, adolescents are defined as persons aged 15-19; youth/young persons as persons aged 15 – 24.

Methods

The quasi-experimental study (intervention and non-intervention study arms) documented the effect of the *LARCs and Youth* project on contraceptive uptake among youth who sought contraceptive services at ten intervention and ten non-intervention YFS units across two Ethiopian regions (Amhara and Tigray).

Study area and setting

IFHP+ is implemented by Pathfinder International and John Snow Inc., in partnership with the Ethiopian FMoH. One of IFHP+ programmatic components focuses on improving the sexual and reproductive health (SRH) of youth through service delivery and demand generation activities complying with the World Health Organization (WHO) guidelines³⁰⁻³¹ for offering comprehensive

and integrated quality SRH services in a 'safe' environment. The YFS unit comprises a private consultation room with an adjoining private waiting room located within 248 public health centers across six IFHP+ regions. The YFS unit's direction and service components are prominently displayed on signposts within health centers. Public sector health care providers are identified and employed by the respective *woreda* (district) and health center heads in collaboration with their regional health bureaus (RHBs). They undergo a five day training emphasizing privacy, confidentiality, respect and nonjudgmental attitudes as well as specifics of adolescent SRH based on national YFS standards, protocols and policies to be certified as 'youth friendly'. The YFS program offers an integrated package of preventive and curative SRH services as well as peer education and community dialogues that aim to generate demand and foster an enabling environment for youth to seek SRH services at YFS units³². These dialogues occur during coffee ceremonies (indigenous Ethiopian social platform), talk shows (university settings) and other demand generation activities. Providers counsel on all contraceptive methods, but in most cases only provide short acting methods including injectables on-site. All contraceptive methods including LARCs are provided free of charge.

Sampling

A multi-stage convenience purposive sampling technique was used to select the YFS units for the intervention and non-intervention study arms. Amhara and Tigray regions met the purposive selection criteria of feasibility and practicality for day-to-day project oversight management as these are directly managed by Pathfinder International; our in-country research partner. The January-March, 2014 quarterly family planning (FP) register records from the 43 (Amhara) and 35 (Tigray) YFS clinics were reviewed and 15 clinics from each region that met the client load criteria (100 clients during past quarter) were selected. Next, the proportion of LARCs new acceptors for the January-March, 2014 quarter was reviewed to select ten clinics that met the inclusion criteria (comparable numbers of LARCs new acceptors).

These were then randomly allocated to the intervention study arm (five sites per region) and non-intervention study arm (five sites per region).

Intervention approach

The project intervention comprised a two-pronged approach - *service delivery* limited to LARCs training for the YFS providers and their supportive supervision; and LARCs *demand generation* through raising awareness regarding LARCs myths and misperceptions by IFHP+ peer educators.

Service delivery: service providers LARCs training

The service providers' intervention was geared to LARCs competency-based training and supportive supervision; the intervention approach did not include provision of necessary equipment and supplies for LARCs insertion and removal. FP master trainers from the respective Regional Health Bureau's (RHB) pool of master trainers conducted a two-week classroom and practicum training. The didactic and simulated skills training were completed in the first week. During the second week of clinic-based practicum session, trainees acquired LARCs insertion and removal skills under the supervision of the master trainers. A written assessment test, organized into three modules, was administered at three stages (pre, post and six months later):

1. Module I: RH/FP knowledge, 10 questions (5 True/False and 5 multiple choice questions)
2. Module II: FP Counseling, 10 questions (5 True/False and 5 multiple choice questions)
3. Module III: LARCs (Knowledge and Skills), 30 questions (15 True/False and 15 multiple choice)

The supportive supervision to address barriers and challenges the service provider encountered during the past month was conducted during the YFS units' routine monthly meetings that coincided with the research assistants' monthly visits.

LARCs demand creation

The *LARCs and Youth* project trained the existing peer educators associated with the respective

intervention clinics to dispel LARCs myths and misperception and refer prospective LARCs clients to the YFS unit. Peer educators in the intervention and non-intervention study arms continued with their routine demand creation activities described earlier. The analysis in this paper uses only data from the FP service registers; data from the peer educators' monthly referral forms will be reported in a subsequent paper.

Non-intervention approach

The YFS providers did not receive LARCs skills training; they continued to counsel on all contraceptive methods, provide all short-acting methods on-site and refer LARCs clients to the main FP unit. The peer educators did not receive LARCs refresher training and continued their routine family planning demand generation activities, offering condoms and referring clients to their respective YFS units.

Ethical considerations

This study comprised two activities – data extraction and program evaluation. The first activity did not include data collection directly from clients or individuals. All relevant client data were extracted directly from the national Health Management Information System (HMIS) FP register maintained at the YFS unit. This data was de-identified (no identifying information was recorded that could link the data to an individual e.g. name, national ID number, clinic name, etc.). The second activity, the assessment questionnaires with the service providers, was directly related to the trainings they received for program evaluation purposes and meant to inform the program. The interviews were not intended to develop or contribute to 'generalizable' knowledge. The research assistants were trained to protect the privacy of clients' records and the need to keep all data confidential.

Method of data collection

The study reported here involved quantitative data collection from two sources: the public sector HMIS FP service statistics with three additional indicators (parity, marital status, referred by) at the

twenty YFS units and the service providers training assessment questionnaire. The study protocol and data extraction forms for specific FP service statistics were reviewed by the respective IFHP+ and RHB technical staff and subsequently pretested for ease of data abstraction over a two week period (May, 2014). The nationally administered training assessment questionnaire was modified to include additional questions on LARCs knowledge and skills including infection prevention. Two research assistants, one per region, were trained on study objectives, the study design, intervention approach, data-extraction forms, documentation skills and supportive supervision roles. They visited each of the 10 YFS units every month, extracted relevant data from the YFS FP client registers, provided feedback on data quality, and for the intervention clinics provided feedback on barriers and challenges that the service provider encountered during the past month. Service statistics were extracted only on clients (15 - 24 years) over an eleven month period - pre-intervention (June, 2014 to August, 2014) and post-intervention (September, 2014 - April, 2015) from all twenty sites. The results presented in this paper are restricted to these new acceptors - referred henceforth as 'clients/acceptors/adopters'. In addition, information on contraceptive clients who accessed the YFS units for removals are presented. New acceptors are defined as a client who, at the current visit, accepted a FP method for the first time in her/his reproductive life irrespective of discontinuation for pregnancy or any other reason at the health center YFS or FP units.

Service providers were trained over a four-week period (August - September, 2014) - each training period lasted for two weeks. The training assessment questionnaires were completed by 35 (pre), 34 (post) and 24 (six months later) service providers. The training assessment results are presented for the 24 service providers who completed all three assessment rounds.

Data analysis

We grouped new acceptors as LARCs users and users of short-acting methods (oral pills, injectables, condoms, emergency contraceptives

and diaphragm). Analysis of service statistics and chi-squared tests of association were conducted for assessing subsequent shifts in LARCs and short-acting methods uptake (pre-intervention to post-intervention phases) for the intervention and non-intervention study arms. Frequency distribution and binary analysis (intervention arm versus non-intervention arm) are described for age, parity and marital status among LARCs acceptors; and LARC removal clients. The data was analyzed using SPSS Version 22.

Average scores for each of the training assessment modules were computed. Results for 24 service providers and paired t-tests are presented for differences in average scores categorized as immediate (pre - post assessment) and retention (post - six months later assessment). We conducted the non-parametric Wilcoxon signed rank test for matched pairs (median scores) instead of the paired t-test (mean scores) for the Module III retention assessment (normality curve assumption violation - three outliers with average score differences ≥ 9 ; paired t-test was also computed after excluding the three outliers.

Results

Contraceptive uptake

Results for 5,513 new acceptors (intervention arm=3,614; non-intervention arm=1,899) are described, disaggregated, in each study arm, by pre-intervention and post-intervention phases over the eleven-month study period. The overall contraceptive growth rate, 317.2%, in the intervention arm (pre-intervention=867; post-intervention=2,750) was higher as compared to 284.4% for the non-intervention (pre-intervention=494; post-intervention=1,405) arm - a percentage increase of 11% percent. The number of LARCs new acceptors in the intervention arm was 781 (pre-intervention=116; post intervention=665) as compared to 358 in the non-intervention arm (pre-intervention=95; post intervention=263). The number of new acceptors for short-acting methods in the intervention arm was 2,833 (pre-intervention=750; post intervention= 2,083) as compared to 1,541 in the non-intervention arm

Table 1: Percentage Distribution and Odds of Adopting Long-Acting Reversible Contraceptives and Short-Acting Methods among Family Planning Acceptors in the Pre-Intervention (June-August, 2014) and Post-Intervention (September, 2014 - April, 2015) Phases, Disaggregated by Intervention and Non-Intervention Study Arms; June, 2014 - April 2015

Contraceptive Method Adopted	Intervention Arm (%)		Non-Intervention Arm (%)		Odds of adopting LARCs and Short Acting methods in Intervention Sites		p-value
	Pre	Post	Pre	Post	Pre	Post	
LARCs	13.4	24.2	19.2	18.7	0.7	1.30	<0.0001
Short-Acting	86.6	75.8	80.8	81.3	1.07	0.93	<0.7
Total (n)	866	2,748	494	1,405			

Pre: Pre-Intervention Phase (June - August, 2014)

Post: Post-Intervention Phase (September, 2014 - April, 2015)

Table 2: Percentage Distribution of Demographic Characteristics of Larcs Acceptors; Disaggregated by Intervention and Non-Intervention Study Arms; June, 2014 - April 2015

Characteristics	Intervention Arm		Non-Intervention Arm		GRAND TOTAL
	Pre %	Post %	Pre %	Post %	
Age (years)	n = 115	n = 664	n = 95	n = 262	n = 1,136
15 – 19	49.6	54.1	57.9	69.1	57.3
20 – 24	50.4	45.9	42.1	30.9	42.7
Marital Status	n = 116	n = 618	n = 84	n = 245	n = 1,063
Married	72.4	70.9	69.0	52.7	66.7
Living together	13.8	12.0	6.0	14.3	12.2
Single	13.8	17.1	25.0	32.7	21.0
Parity	n = 116	n = 619	n = 84	n = 244	n = 1,064
Nulliparous	70.7	83.0	61.9	77.6	78.8
One	19.8	14.5	33.3	15.9	16.9
Two or more	9.5	2.4	4.8	6.5	4.3

All percentages are column totals

Pre: Pre-Intervention Phase (June - August, 2014)

Post: Post-Intervention Phase (September - April, 2015)

Number varies: client information not recorded in FP register

(pre-intervention=399; post intervention = 1,142).

Statistically significant differences in LARCs uptake are noted comparing pre-intervention to post-intervention phases though not for short-acting methods. In other words, the odds of adopting short-acting methods at pre-intervention (1.07); declined to 0.93 for the post-intervention phase (p-value <0.7); whereas the odds of adopting LARCs at pre-intervention (0.70); rose to 1.30 for the post-intervention phase (p-value <0.0001); comparing intervention to non-intervention study arms. (Table 1)

Background characteristics

Overall, the demographic profile of the 1,136 LARCs adopters depicts a younger group of married clients who are delaying their first birth; at pre-intervention and post-intervention phases of

both study arms. However, interesting demographic differentials are noted comparing the intervention arm to non-intervention arm during the post-intervention phase. For example, around 70% of adolescents adopted LARCs in the non-intervention sites as compared to 54% in the intervention sites. A similar trend is noted for marital status - around 33% of single women adopted LARCs in the non-intervention sites as compared to 17% in the intervention sites. However, this pattern reversed for parity - nulliparous LARCs adopters were higher in the intervention study arm (83.0%) as compared to the non-intervention study arm (77.6%). (Table 2)

Training assessment scores

Average scores for all three modules improved from pre-training scores with, as expected; some

decline in retention assessment average scores. Module III immediate assessment average scores improved significantly (16.0 to 20.0; p-value <0.001) whereas the retention assessment average scores depicted a non-significant decline in the median scores (p-value <0.1) for 24 service providers; paired t-test after excluding three outliers (n=21) was also non-significant (p-value <0.2). (Table 3)

LARC removals

We report 270 youth clients who sought services at the 20 YFS units for removals (intervention arm = 214; non-intervention arm = 56) either for implants (93.9%) or IUDs (6.1%); none were new acceptors. However, 52 switched methods from their current LARCs method to another contraceptive method. The main method switched to were injectables though three opted for either implants or IUD. The most common removal reasons recorded were duration completed (39.6%) and opting for pregnancy (31.1%). Removal clients in the intervention study arm were generally older (69.5%), married (91.4%) and nulliparous (66.5%) as compared to the non-intervention study arm. (Table 4)

Discussion

The data from our study contributes to the growing body of evidence²²⁻²³ that supports the underlying premise that when service providers are trained to counsel and offer LARCs in one location; LARCs uptake increases. In other words, our findings illustrate that young Ethiopian clients are interested in user independent contraceptive methods, consider these methods safe and appropriate when offered counseling and services by skilled YFS providers in one location. Furthermore, our study findings also substantively support the *full access, full choice* call to action articulated in the Global Consensus statement '*Expanding Contraceptive Choice for Adolescents and Youth to Include Long-Acting Reversible Contraception*'³³ launched in November, 2015.

Studies have documented different programmatic approaches with the goal of *full access, full choice* to meet women's reproductive health aspirations, reduce unmet need, and prevent unintended

pregnancy and short inter-pregnancy intervals. Programmatic approaches such as the dedicated provider program in Zambia²² or the CHOICE multi-faceted approach in St Louis, USA³⁴, demonstrate that if young clients are given appropriate counseling, full access and free choice unencumbered by costs; LARCs uptake rises. Our study design, quasi-experimental with counterfactual nested in 20 YFS units supported by IFHP+ across two regions in Ethiopia, enabled us to demonstrate the 'add value' of competency-based LARCs skill training in offering *full access, full choice* in the YFS unit. The salient finding that 'for every 100 women who accepted LARCs in the non-intervention study arm, the number of women accepting LARCs in the intervention study arm rose from 70 (pre-intervention phase) to 130 women (post-intervention phase) illustrates the statistically significant 'add value' of our programmatic approach. We acknowledge that a two week competency-based LARCs training alone will not convert a YFS provider to a LARCs champion, though will facilitate confidence and trust in offering LARCs at the YFS unit rather than referring to the main FP unit. Supportive supervision and demand generation in the intervention study arm are facets that might have also contributed to the 'add value' outcome. Our non-significant retention training assessment study findings regarding LARCs knowledge and skills suggests that trainees adequately retained their LARCs knowledge and skills six months after the two week training period. Therefore, while these results might imply that the demand generation and supervisory support activities also contributed; we believe that all elements in our programmatic approach contributed to the 'add value'; and not solely the *full access, full choice* offered at the YFS unit.

The demographic profile of LARCs acceptors show that many young women, regardless of their marital status, not only desire to delay their first birth but also opt for a highly effective contraceptive method when offered in a 'safe' environment. Overall, while close to 80% of all LARCs adopters in both study arms were nulliparous; in the intervention study arm, the percentage rose from 71% (pre-intervention phase) to 83% (post-intervention phase). Our post-

Table 3: Service Providers Training Assessment (n=24): Average Scores for Modules I, II and III.

Modules	Immediate Assessment			Retention Assessment		
	Pre-Training	Post-Training	p-value	Post-Training	Six Months	p-value
Module I: RH/FP Knowledge	5.7	7.5	0.001	7.5	6.5	0.01
Module II: FP Counseling	4.8	6.3	0.001	6.3	5.8	0.1
Module III: LARCs ¹	16.0	20.0	0.001	19.5	19.1	0.1 ²

1. Module III: LARCs Knowledge and Skills

2. Service Providers (n=21); excluded three service providers for statistical analysis (paired t-test)

Table 4: Percentage Distribution of Removal Clients' Characteristics; Disaggregated by Intervention and Non-Intervention Study Arms; June, 2014 - April 2015

Characteristics	Intervention Arm %	Non-Intervention Arm %	TOTAL %
Method Removed	n = 214	n = 56	n = 270
Implants	93.9	98.2	94.8
IUDs	6.1	1.8	5.2
Reason for Removal	n = 214	n = 56	n = 270
Opted for pregnancy	35.5	14.3	31.1
Three/five year duration completed ¹	36.0	53.6	39.6
Severe/continuous vaginal bleeding	8.4	12.5	9.3
Pain/weakness (arm)	0.5	1.8	0.7
Switched to IUD	0.9	0.0	0.7
Severe vaginal discharge	0.5	0.0	0.4
Others ²	18.2	17.9	18.2
Age (years)	n = 213	n = 56	n = 269
15 – 19	30.5	48.2	34.2
20 – 24	69.5	51.8	65.8
Marital Status	n = 209	n = 55	n = 264
Married	91.4	65.5	86.0
Living together	1.4	12.7	3.8
Single	7.2	21.8	10.2
Parity	n = 203	n = 56	n = 259
Nulliparous	66.5	58.9	64.9
One	23.2	30.4	24.7
Two or more	10.3	10.7	10.4

1. Three/five year duration completed: implants removal (Implanon® 3 years; Jadelle® 5 years)

2. Others: Husband (complained, disapproved), spotting, misconception, headache, back pain, change to other method, discomfort, not living together and reason not reported/explained

intervention findings show that, in the intervention arm, 71% were married and 54% were under twenty. Our findings therefore might imply reduction in provider bias towards serving adolescent, nulliparous women with a LARC. The study would have benefited by documenting the role that provider bias played in serving this cohort of young women irrespective of marital status, age or nulliparity. While there are several anecdotal reports on provider bias, there is scarce literature from developing countries that document the nature and breadth of provider bias for offering LARCs to adolescents and nulliparous young women.

Our results show that more young people visited the YFS units to accept a contraceptive method overall; and, with respect to the intervention sites, to use more effective methods. The overall increase in the total number of new contraceptive acceptors in the post-intervention phase compared to the pre-intervention phase in either study arm might be attributed to the difference in the longer duration (8 months) for the post-intervention phase as compared to the pre-intervention phase (3 months). However, per month averages across intervention (pre-intervention=289; post-intervention=344) and non-intervention (pre-intervention = 165; post-

Intervention = 176) arms belie the longer duration probable explanation. Consequently, while the longer duration might be proposed as a contributing factor, our growth rate results, and a growth rate percentage difference of 11% indicates not only an overall increase in FP acceptors in either study arm; but a greater proportion of new acceptors in the intervention arm as compared to the non-intervention arm. Secular trends, HEWs outreach activities, IFHP+ supported peer education activities in addition to youth seeking employment opportunities abroad or higher education are the more likely plausible explanations for the overall increase in FP acceptors in either study arms than the longer duration of the post-intervention period. We therefore believe that the growth rate percentage difference of 11% between the intervention and non-intervention arms indicates the positive influence of our intervention approach in encouraging more young people to visit the YFS unit and accept a FP method. Furthermore, the shift in the proportion of new acceptors to LARCs implies that the LARCs trained YFS providers enabled youth to accept more effective methods.

Unintended pregnancy, especially among young women using a short-acting method, frequently occur due to typical use failure rates reflecting incorrect or infrequent use rather than method failure *per se*. On the other hand, even though the medical literature is limited, 12-month continuation and satisfaction rates for LARCs remains high - 68 - 82%³⁵⁻³⁶. While the objective of our study did not directly address continuation and satisfaction rates, we noted that none of the new LARCs acceptors discontinued during the eleven-month study period. LARCs removals were reported only among repeat users; most common reasons were to get pregnant or scheduled removals (duration completed); whereas implants (54.5%) and injectables (31.1%) were the favored method among the 470 switchers. We therefore suggest that, albeit indirectly, our study findings provide insight for continuation rates even among nulliparous adolescents.

The strengths of our study include a prospective quasi-experimental counterfactual study design, conducted under routine field conditions, data extracted from the FP service

registers - operated within a larger ongoing YFS program. While these strengths are noteworthy in the context of testing a model that segues into effective and efficient programming and scaling up, there are inherent study limitations. These include a convenience purposive sampling, clinic randomization criteria based on quarterly FP service statistics, and an implementation science approach closely aligned with regional field operational requirements. The convenience purposive regional selection sampling and clinic randomization may limit the generalizability of our study. The clinic selection criteria, based on the last quarterly FP service statistics, selected two clinics; both randomly allocated to the non-intervention study arm that we consider contributed to the skewed age and marital status between the intervention and non-intervention study arms. Informal discussions with our research assistants indicated that younger (< 20 years) unmarried women adopting LARCs match the employment behavior (employed in the Gulf countries as maids) of the respective clinic catchment population and is indicative of their reproductive aspirations for a user independent long-acting reversible contraceptive method while employed. As noted earlier, our results demonstrated statistically significant increase in LARCs uptake in the intervention arm as compared to the non-intervention arm. However, if the random allocation had resulted in one unit allocated to the intervention arm and the second unit to the non-intervention arm, the skewed age and marital demographic characteristics might have been mitigated whereas the increase in LARCs uptake strengthened. We also noted that there were differences in total number of new FP clients that attended any YFS unit each month as well as between individual units that we anticipated might be mitigated by our clinic randomization strategy. Our decision to opt for 10 YFS units per region was based on logistical convenience, feasibility and costs.

While our study findings have provided valuable insights to strengthening FP service delivery for youth to include offering LARCs at YFS units, we believe that our findings would have benefited from broadening the study scope to include client satisfaction exit interviews,

continuation rates, and provider bias. Furthermore, our findings need to be validated in other developing countries as well as adequately funded robust cluster randomized trials. We suggest a 2X2 factorial design conforming with CONSORT guidelines including sample size calculations accounting for intra-cluster correlation coefficient, design effect and unequal cluster sizes (number of new family planning clients per month in each unit or between units)³⁷⁻³⁹.

In conclusion, training YFS providers to offer quality counseling and provide all contraceptive methods including LARCs in a 'one-stop shop' unit resulted in higher LARCs uptake for all sexually active young women; including those planning on delaying their first pregnancy in Ethiopia's Amhara and Tigray regions. In the short-term, we urge the Government of Ethiopia to adopt *full access, full choice* for youth irrespective of marital status or nulliparity by training all YFS providers to offer LARCs; and in the long-term include LARCs training in the national nursing and midwifery pre-service curricula in addition to YFS training. LARCs, the most effective reversible contraceptive method, must be available as a first-line option for all sexually active young women seeking to avoid an unintended pregnancy or delaying their first birth.

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Contribution of Authors

FFF conceived the idea and led the write-up of the manuscript. WKA, MMM, KLH and MA contributed to the study concept, data collection tools, data collection, the write-up, review and edit of the manuscript. All authors read and approved the final manuscript. The opinions expressed herein are those of the authors and do not necessarily reflect the views of Pathfinder International or the U.S. Agency for International Development.

References

1. Williamson LM, Parkes A, Wight D, Petticrew M and Hart GJ. Limits to modern contraceptive use among young women in developing countries: a systematic review of qualitative research. *Reprod Health*. 2009; 6:3.
2. Blum RW. Youth in sub-Saharan Africa. *J Adolesc Health*. 2007; 41(3):230-238.
3. Kothari MT, Wang S, Head SK and Abderrahim N. Trends in adolescent reproductive and sexual behaviors. DHS Comparative Reports No. 29. Calverton, MD: ICF International; 2012.
4. Hubacher D, Mavranetzouli I and McGinn E. Unintended pregnancy in sub-Saharan Africa: magnitude of the problem and potential role of contraceptive implants to alleviate it. *Contraception*. 2008; 78(1):73-78.
5. Bearinger LH, Sieving RE, Ferguson J and Sharma V. Global perspectives on the sexual and reproductive health of adolescents: patterns, prevention and potential. *Lancet*. 2007; 369(9568):1220-1231.
6. Cleland J, Ali MM and Shah I. Trends in protective behavior among single vs. married young women in sub-Saharan Africa: the big picture. *Reprod Health Matters*. 2006; 14:17-22.
7. Blanc AK, Tsui AO, Croft TN and Trevitt JL. Patterns and trends in adolescents' contraceptive use and discontinuation in developing countries and comparisons with adult women. *Int Perspec Sex Reprod Health*. 2009;35(2):63-71.
8. Singh S, Darroch JE and Ashford LS. Adding it up: The costs and benefits of investing in sexual and reproductive health 2014, New York: Guttmacher Institute, 2014. Available at: https://www.guttmacher.org/sites/default/files/report_pdf/addingitup2014.pdf. Accessed on: December 14, 2016.
9. Darroch JE, Woog V, Bankole A and Ashford LS. Adding it up: costs and benefits of meeting the contraceptive needs of adolescents. New York.

- Guttmacher Institute. 2016. Available at: <http://www.guttmacher.org/report/adding-it-meeting-contraceptive-needs-of-adolescents>. Accessed on: December 14, 2016.
10. Chandra-Mouli V, Chatterjee S and Bose K. Do efforts to standardize, assess and improve the quality of health service provision to adolescents by government-run health services in low and middle income countries, lead to improvements in service-quality and service-utilization by adolescents? *Reprod Health*. 2016;13:10-17.
 11. Prata N, Weidert K and Sreenivas A. Meeting the need: youth and family planning in sub-Saharan Africa. *Contraception*. 2013; 88(1):83-90.
 12. Centers for Disease Control; U.S. selected practice recommendations for contraceptive use, 2013: Adapted from the World Health Organization selected practice recommendations for contraceptive use, 2nd Edition. Available at: <http://www.cdc.gov/mmwr/pdf/rr/rr6205.pdf>. Updated June 21, 2013. Accessed on: November 14, 2016.
 13. Winner B, Peipert JF, Zhao Q, Buckel C, Madden T, Allsworth JE and Secura GM.. Effectiveness of long-acting reversible contraception. *N Engl J Med*. 2012; 366(21):1998-2007.
 14. World Health Organization. Medical Eligibility Criteria Wheel for Contraceptive Use. Available at: http://apps.who.int/iris/bitstream/10665/173585/1/9789241549257_eng.pdf?ua=1. Updated, 2015. Accessed on: August 22, 2016.
 15. Forrest JD. U.S. women's perceptions of and attitudes about IUD. *Obstet Gynecol Surv*. 1996; 51(12 Suppl): S30-34.
 16. Glasier A, Scorer J and Bigrigg A. Attitudes of women in Scotland to contraception: a qualitative study to explore the acceptability of long-acting methods. *J Fam Plann Reprod Health Care*. 2008; 34(4):213-217.
 17. Tyler CP, Whiteman MK, Zapata LB, Curtis KM, Hillis SD and Marchbanks PA. Health care provider attitudes and practices related to intrauterine devices for nulliparous women. *Obstet Gynecol*. 2012; 119(4):762-771.
 18. Madden T, Allsworth JE, Hladky KJ, Secura GM, and Peipert JF. Intrauterine contraception in Saint Louis: a survey of obstetrician and gynecologists' knowledge and attitudes. *Contraception*. 2010; 81(2):112-116.
 19. Anguzu R, Tweheyo R, Sekandi JN, Zalwango V, Muhumuza C, Tusiime S and Serwadda D. Knowledge and attitudes towards use of long acting reversible contraceptives among women of reproductive age in Lubaga division, Kampala district, Uganda. *BMC Res Notes*. 2014; 7:153-161.
 20. Alemayehu M, Belachew T and Tilahun T. Factors associated with utilization of long acting and permanent contraceptive methods among married women of reproductive age in Mekelle town, Tigray region, north Ethiopia. *BMC Pregnancy and Childbirth*. 2012; 12:6-14.
 21. Trussell J, Lalla AM, Doan QV, Reyes E, Pinto L and Gricar J. Cost effectiveness of contraception in the United States. *Contraception*. 2009; 79(1):5-14.
 22. Neukom J, Chilambwe J, Mkandawire J, Mbewe RK and Hubacher D. Dedicated providers of long-acting reversible contraception: new approach in Zambia. *Contraception*. 2011; 83(5):447-452.
 23. Hubacher D, Olawo A, Manduku C and Kiarie J. Factors associated with uptake of subdermal contraceptive implants in a young Kenyan population. *Contraception*. 2011; 84(4):413-417.
 24. Federal Democratic Republic of Ethiopia; Ministry of Health. National Reproductive Health Strategy 2006 - 2015. Available at: http://phe-ethiopia.org/admin/uploads/attachment-161-National_RH_strat%5B1%5D.pdf. Updated March, 2006. Accessed on: November 10, 2016.
 25. Central Statistical Authority [Ethiopia], ORC Macro. Ethiopia Demographic and Health Survey 2005. Available at: <http://www.dhsprogram.com/pubs/pdf/FR179/FR179%5B23June2011%5D.pdf>. Updated September 2006. Accessed on: November 10, 2016.
 26. Central Statistical Agency [Ethiopia]. Ethiopia Mini Demographic and Health Survey 2014. Addis Ababa, Ethiopia. Central Statistical Agency; 2014.
 27. Central Statistical Agency [Ethiopia] and ICF International. Ethiopia Demographic and Health Survey 2011. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ICF International; 2012. Available at: <http://www.dhsprogram.com/pubs/pdf/FR255/FR255.pdf>. Accessed on: November 10, 2016.
 28. Asnake M, Henry EG, Tilahun Y and Oliveras E. Addressing unmet need for long-acting family planning in Ethiopia: uptake of single-rod progestogen contraceptive implants (Implanon) and characteristics of users. *Obstet Gynecol Int J*. 2013; 123 (Suppl 1):e29-e32.
 29. World Health Organization. The health of youth. Document A42/Technical Discussions/2. 1989; Geneva, Switzerland. World Health Organization; 1989.
 30. World Health Organization, Department of Maternal, Newborn, Child and Adolescent Health. Making Health Services Adolescent Friendly. Developing national quality standards for adolescent friendly health services. Geneva, Switzerland. World Health Organization; 2012.
 31. World Health Organization. Global standards for quality health-care services for adolescents: a guide to implement a standards-driven approach to improve the quality of health care services for adolescents. Volume 1: Standards and criteria. Available at: http://apps.who.int/iris/bitstream/10665/183935/1/9789241549332_vol1_eng.pdf?ua=1. Issued 2015. Accessed on: November 14, 2016.

32. Pathfinder International. Bringing youth-friendly services to scale in Ethiopia. <http://www.pathfinder.org/publications-tools/pdfs/Bringing-Youth-Friendly-Services-to-Scale-in-Ethiopia.pdf?x=65&y=21>. Updated April, 2012. Accessed on: November 10, 2016.
33. Global Consensus Statement for expanding contraceptive choice for adolescents and youth to include long-acting reversible contraception. Available at: <http://www.familyplanning2020.org/youth-larc-statement>. Updated October 20, 2015. Accessed on: November 10, 2016.
34. Secura GM, Allsworth JE, Madden T, Mullersman JL and Peipert JF. The contraceptive CHOICE project: reducing barriers to long-acting reversible contraception. *Am J Obstet Gynecol*. 2010; 203(2):115-126.
35. Peipert JF, Zhao Q, Allsworth JE, Petrosky E, Madden T, Eisenberg D and Secura G. Continuation and satisfaction of reversible contraception. *Obstet Gynecol*. 2011; 117(5):1105-1113.
36. Funk S, Miller MM, Mishell DR, Archer DF, Poindexter A, Schmidt J, Zampaglione E and The Implanon™ US Study Group. Safety and efficacy of Implanon, a single-rod implantable contraceptive containing etonogestrel. *Contraception*. 2005; 71(5):319-326.
37. Campbell MK, Piaggio G, Elbourne DR and Altman DG. Consort 2010 statement: extension to cluster randomised trials. *BMJ*. 2012; 345:e5661
38. Schulz KF, Altman DG and Moher D. CONSORT 2010 statement: updated guidelines for reporting parallel group randomised trials. *BMJ*. 2010; 340:c332. Hayes RJ and Moulton LH. Cluster randomised trials. 2009, CRC Press.