MASTERS PROJECT

IMPLICATIONS OF DISCONTINUATION OF LARC METHODS WITH REMAINING NEED AMONG WOMEN IN SINDH PROVINCE, PAKISTAN

Submitted by

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BACKGROUND

Global Trends

In 2016, at the midpoint of Family Planning 2020 (FP2020), 300 million women and girls were using a modern method of contraception in the world's 69 poorest countries, with 30 million new users added in these countries since 2012 when the initiative was launched.[1] Though this represents an overall reduction in unmet need for contraception of almost 12% since 2012, progress is still shy of the trajectory needed to reach their goal of 120 million additional new users of contraception by 2020.[1] Regardless of whether FP2020 is able to achieve a 50% reduction in unmet need by 2020, the progress made so far is considered a positive indication of gathering momentum in ensuring universal access to sexual and reproductive health and rights. However, contraceptive users switch, discontinue and restart methods frequently, so once a client receives services they can subsequently move between met and unmet need multiple times over the course of their reproductive life. As one review demonstrates, over one-third of women in 34 countries with current unmet need for contraception had discontinued use of a modern method at some point in their lives, and in many countries this rate was 50% or higher.[2] Contraceptive discontinuation accounts for around 33% of unintended births in low-income countries, and globally there is evidence that addressing the underlying causes of discontinuation has the potential to produce dramatic reductions in a country's total fertility.[3,4]

Increase in access to and availability of long-acting and reversible contraceptive (LARC) methods has been an integral part of reductions to unmet need and fertility, but low LARC method use and high discontinuation of certain methods remain persistent barriers to further progress. Globally, 12-month discontinuation rates for LARC methods are disparate, ranging from 9% among implant users and 15% among IUD users to 32% among injectable users (a rate

higher than the annual discontinuation rate for traditional methods of contraception).[5,6] The fact that IUD and implant discontinuation rates are lowest compared to other modern and traditional methods of contraception is understandable, given that they are provider-discontinued methods, whereas injectables and some other modern methods can be discontinued passively and require continuous renewal.[5]

Strong family planning (FP) programs – including availability of a wide range of methods, adequate counseling, informed choice of method and good follow-up services – are frequently associated with continued and satisfied use of contraception.[4,6,7] Improvement in continuation of method use is often achieved by providing LARC and permanent methods, however, dependence on a single or few methods is unlikely to help a country achieve their desired reductions in fertility.[7]

LARC Use in Pakistan

Though classified as a middle income country, Pakistan falls among the least developed countries globally in terms of its social indicators.[8,9] Pakistan was one of the earliest countries in Asia to adopt policies to reduce population growth, however, the country experienced a slow onset of fertility decline and today remains one of the only countries in South and Southeast Asia with a total fertility rate (TFR) above 3 children per woman.[8,10] Few other countries have exhibited such a lengthy discrepancy between fertility desires and fertility behavior, with a stable difference of 1.5 to 2 children between ideal family size and TFR over the last three decades.[2] Recent projections estimate an increase in Pakistan's population by over 100 million, from 197 to 307 million, in the next 30 years as a result of continuing population momentum.[11]

The progress that Pakistan made in improving contraceptive prevalence in the 1990s, increasing its national contraceptive prevalence rate (CPR) from 12% to 28%, slowed to a crawl

in recent decades. [10,12] Most countries in South and Southeast Asia who succeeded in rapidly increasing their CPR to 30% have seen continued increases up to 50-60%, but Pakistan's CPR was still only around 35% in 2012-13.[8,10] This does not reflect a lack of need for family planning services as unmet need remains high at 20% and an estimated 2.2 million induced abortions were performed in Pakistan in 2012.[10,12,13] This estimate is nearly double the estimated number of induced abortions in 2007.[14] Considering the relationship between factors such as unintended pregnancy and unsafe abortion and poor maternal and infant health outcomes, it is clear that family planning should be a key strategy in reductions of maternal and infant mortality in Pakistan.

Although use of modern methods of contraception has nearly tripled in Pakistan since 1990, use of LARC methods such as IUDs and implants among married women of reproductive age remains low at 2.3% and 0.2% respectively.[10] Permanent methods, such as tubal ligation, account for over one-third of modern contraceptive use.[10] Across Pakistan there is also a concerning trend of high rates of LARC discontinuation. 12-month IUD discontinuation rates are around 16-25%, and over half of women discontinuing IUD use do not switch to another method of contraception after discontinuation.[10,15–17] Although implant use in Pakistan is relatively low, and therefore less frequently studied, recent research has demonstrated discontinuation rates for implants which are similar to those for IUD use.[18,19] Discontinuation rates for injectables are much higher in Pakistan than the global average, with the most recent DHS estimating a 12-month discontinuation rate of 60.7% for injectables.[10] Available evidence suggests that the main reason for discontinuation of modern methods in Pakistan is side effects, particularly excessive or irregular bleeding.[12,15,16] High discontinuation rates due to side effects may additionally be linked to infrequent FP counseling and follow-up, given that only slightly more than one-third of

modern contraceptive users were informed by a health worker about potential side effects of their chosen method and only 28% received education on what to do if they experienced side effects.[10]

Just as globally there is convincing evidence that a focus on addressing high discontinuation rates is vital to achieving necessary reductions in unwanted pregnancy, current research from Pakistan demonstrates similar findings. For example, some evidence from a regional study in the Punjab province in Pakistan suggests that addressing discontinuation among women with met need might be more effective than trying to meet unmet need, though the difference is minimal (only 1 percentage point additional reduction in unwanted fertility).[2] It is at the very least apparent that the only fully effective strategy at reducing unwanted fertility in Pakistan combines the promotion of method use among women with unmet need and support to women to continue method use after their need for contraception has been met.

STUDY AIMS

In 2011, Save the Children began supporting eight health facilities in the Sindh province in Pakistan to provide FP and post-abortion care (PAC) services. The program aims to support clients with a variety of contraceptive choices, including short-acting, long-acting, and permanent methods. Save the Children regularly monitors aggregate numbers of new users of contraception as well as numbers of implant and IUD removals performed at these supported health facilities. While removals are expected for a variety of reasons, a high number of removals can serve to alert the program to quality or counseling issues for targeted program improvement. Although Save the Children regularly reviews service statistics generated by these supported facilities to inform program decisions, these indicators are limited to aggregate data, which do not permit analysis of variables at a client level or comparison of demographic characteristics of clients who receive services. This study aims to understand the profile of FP

clients removing an IUD or implant at Save the Children supported facilities in Pakistan through analysis of data from a systematic register review, and to consider the potential impact of women in this sample who transitioned from met to unmet need upon removing an IUD or implant.

METHODS

Data

In May 2017, Save the Children staff systematically collected select variables about women who removed an IUD or contraceptive implant at eight Save the Children facilities during the period of July 1, 2015 to March 31, 2017. These data were collected by means of a retroactive client register review.

Measures

Variables were collected from both facility FP registers and LARC removal registers. FP registers are standard forms provided by the Pakistan Ministry of Health for use in tracking essential information of FP clients. In this review, FP registers provided demographic details, such as client age (in years), client parity and place of residence. However, these registers do not track LARC removals, and as a result Save the Children added a supplemental LARC removal register to the standard facility forms at the onset of its program in Pakistan in 2011. Variables collected from LARC removal registers include month and year of insertion and removal of implant or IUD as well as reason for method removal as stated by the client. Both a general and specific reason for method removal were recorded, with specific reasons for removal being categorized under one of seven general reasons for removal (Return to Fertility, Socio-cultural Reasons, Reasons Related to Side-Effects, Medical Reasons, Duration Complete, Other Reasons, and Missing Information). Both general and specific reasons are provided as explicit options in the LARC removal registers and answers were not open-ended. These general reasons for

removal were developed through an extensive review process conducted by Save the Children technical advisors and clinical staff. If the client accepted a new method of contraception, this was also recorded from the LARC removal register.

Analysis

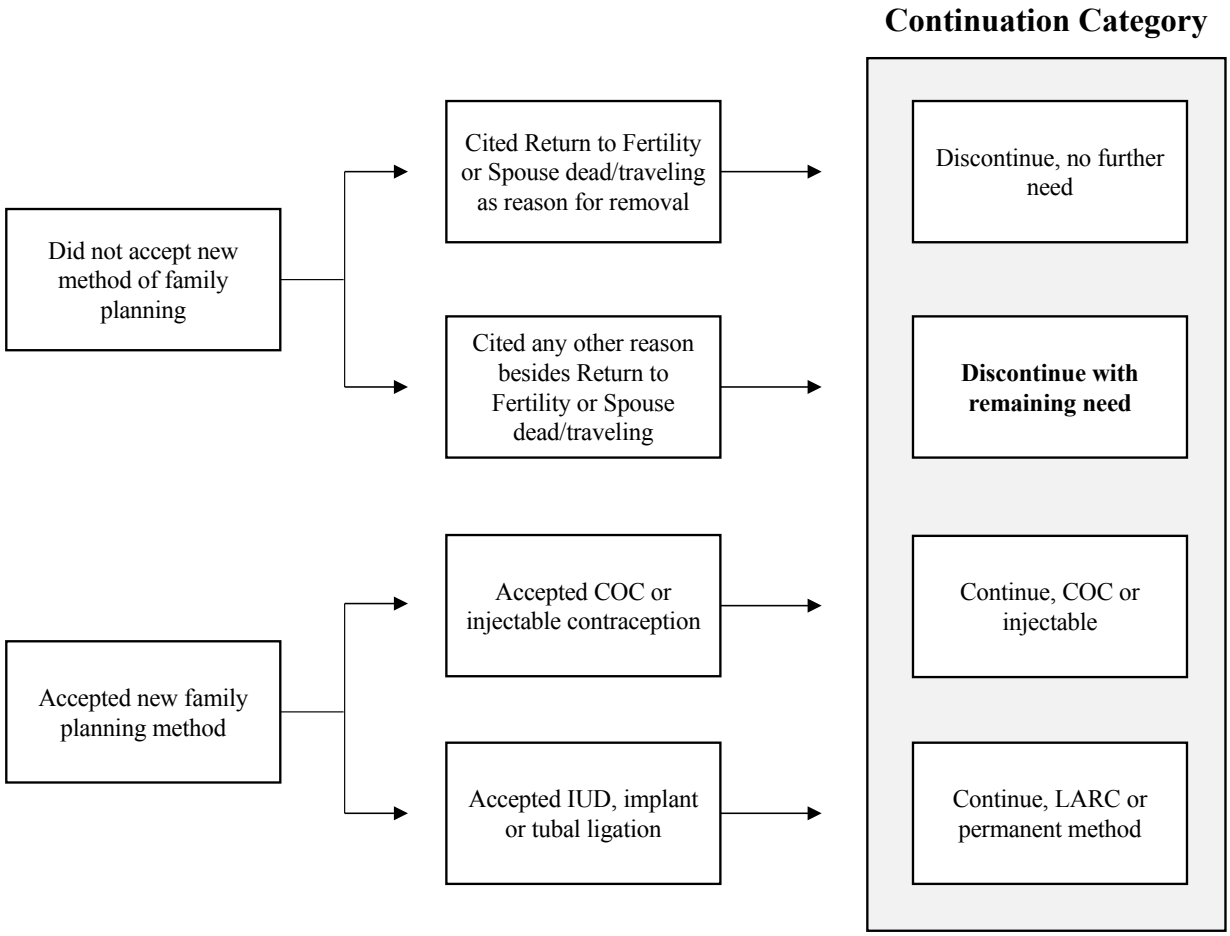
General descriptive analysis of these data was in Excel with significance testing conducted using STATA 14. We first calculate descriptive statistics of the overall sample. We then disaggregate the sample by method used (IUD and implant) to identify any significant differences in age, parity and other descriptive characteristics between the two methods. Any significance testing is two-sided with an alpha of $p<0.05$.

The bulk of our analysis concerns the categorization of women into continuation categories, including (1) discontinue: no further need; (2) discontinue: remaining need; (3) continue: LARC and permanent contraception; and (4) continue: injectable and combined oral contraceptive (COC). The procedure for categorizing women into these continuation categories is represented in Figure 1. Women are initially separated based on whether they accepted a new method of family planning after removal of an IUD or implant. Among those women who accepted a new method, continuation categories are based on the method of family planning which they accepted. Among women who did not accept a new method, categorization is on the basis of the reason given for method removal. The choice to group injectable contraception with COC instead of other LARC methods was due to the high rates of discontinuation in Pakistan among injectable users (60.7% after one year of use) and COC (56.4% after one year of use) in comparison to IUD and implant discontinuation rates.[6,10]

After an analysis of the differences between these continuation categories in terms of demographic and method-related characteristics, we estimate the impact of discontinuation with

remaining need in this sample on unintended pregnancy, abortion and unintended births over a 15-month period using a simple model that is described further below.

Figure 1: Process for categorization of Pakistani women removing an IUD or implant into continuation categories, 2015-2017



RESULTS

Descriptive Statistics

The mean age of this sample was 32 years, mean parity was 5 children and over 90% of women in this sample removed an implant (Table 1).

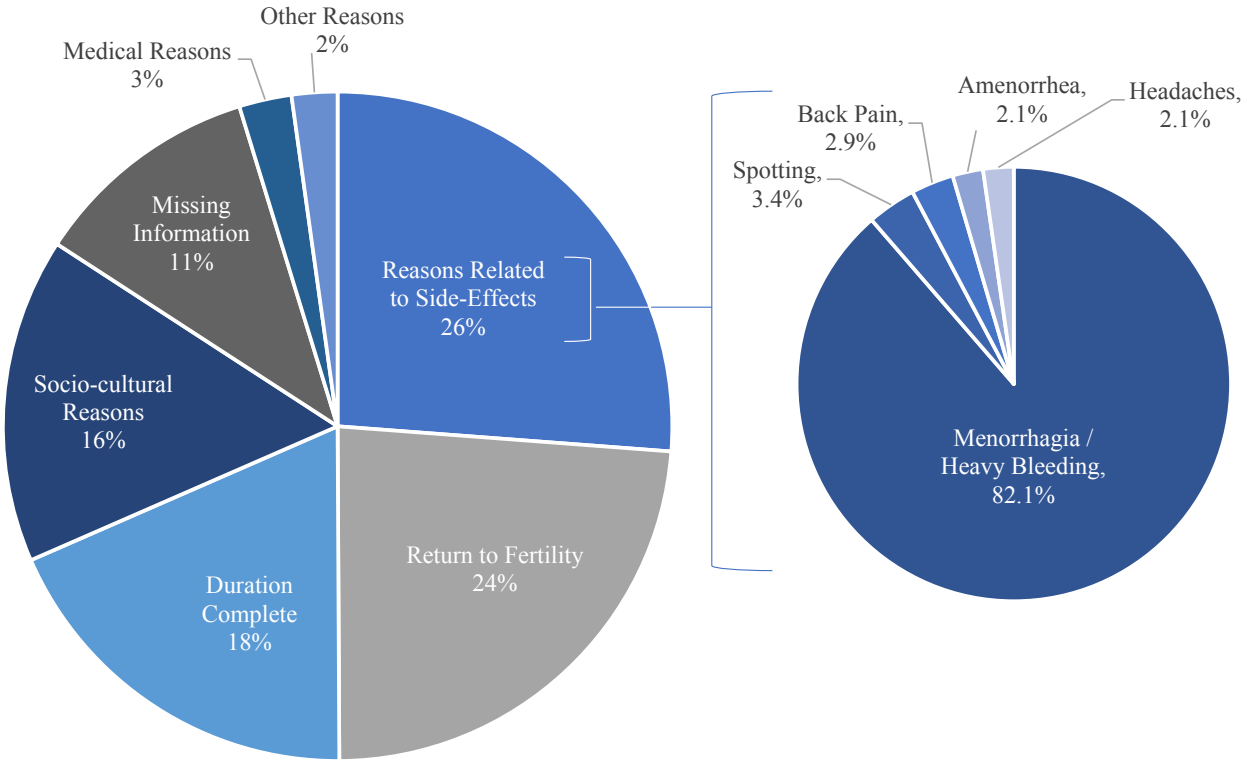
Table 1: Demographic characteristics of Pakistani women receiving LARC removal, 2015-2017

Characteristic	Mean or % of column total
Demographics	
Age, (range 19 - 49) (n=1805)	32.2
Parity, (range 0 - 15) (n=1787)	4.9
Method (n=1813)	
IUD	9.8%
Implant	90.2%
Facility of insertion (n=1769)	
Ganga Bai	23.3%
Madeji	18.8%
Jacobabad	14.1%
Khanpur	11.8%
Sultankot	11.1%
Thull	10.5%
Lakhi	8.1%
Non-Save the Children facility	2.3%

The most common general reasons cited for method removal include “Reasons Related to Side Effects” and “Return to Fertility”, followed by “Duration Complete” and “Socio-cultural Reasons” (Figure 2). Women who state that side-effects are the primary reasons for removing

their IUD or implant overwhelmingly cite "Menorrhagia/Heavy Bleeding" as the specific reason for removal.

Figure 2: General reasons for removal and specific reasons for removal related to side-effects for Pakistani women removing an IUD or implant, 2015-2017 (n=1813)



Age and parity are lowest among women citing "Return to Fertility" as the general reason for method removal and time between insertion and removal is shortest among women citing "Socio-cultural Reasons" (Table 2).

Table 2: Mean age, parity and time between insertion and removal by general reason cited for method removal among Pakistani women removing an IUD or implant, 2015-2017

Reason	Age *(years)*	Parity (*children)*	Time between insertion and removal *(months)*
Reasons Related to Side-Effects	32.6	5.3	28.2
Return to Fertility	29.9	3.5	28.0
Duration Complete	34.5	5.7	44.7
Socio-cultural Reasons	31.5	5.0	23.9
Medical Reasons	33.8	5.6	27.8
Other Reasons	32.6	5.3	26.5
Missing Information	32.6	4.9	29.1

Method Disaggregation

As indicated in Table 1, the sample size for IUD removals was relatively small (n=177) in comparison to implant removals (n=1636). Although comparable data on method insertion during the same time is not available to calculate overall rates of discontinuation, an analysis of all new acceptors of FP during the period of October 2016 to March 2017 within the same facilities shows a preference for IUDs (1035 new IUD acceptors vs. 528 new implant acceptors) which is inconsistent with the proportions discontinuing demonstrated in these data. Brief analysis of the dates of insertion for the LARC methods in this sample (dates range between January 2012 to March 2017) indicates no major trends in the use of each method over the past five years. These findings suggest that discontinuation rates are likely higher for implants than for IUDs in these facilities. Some of this variance may be the result of different lengths of effectiveness for the commonly used types of IUDs and implants. The Copper IUD, which is the primary type of IUD inserted in these facilities, has an effective period of ten years in comparison to most implants which last up to four years.

There were significant differences demonstrated in age, time between insertion and removal and general reasons for removal among the two method groups. IUD discontinuers are younger and remove methods earlier than implant users in this sample. Implant users are more likely to cite "Reasons Related to Side-Effects" or "Duration Complete" as the general reason for method removal in comparison to IUD users who are more likely to cite "Return to Fertility" and "Medical Reasons" (Table 3). In this sample, menorrhagia/heavy bleeding is also more commonly cited among implant users (22.1%) in comparison to IUD users (16.3%) (data not shown).

Table 3: Age, parity, time between insertion and removal of LARC method and general reasons for removal of LARC method (by method) among Pakistani women, 2015-2017

Characteristic / Reason	IUD (%) (n=177)	Implant (%) (n=1636)
	mean or % of column total	
Age*	31.2	32.3
Parity	4.6	4.9
Time between insertion and removal*	27.1	30.8
General Reasons for Removal		
Reasons Related to Side-Effects	23%	27%
Return to Fertility	29%	23%
Duration Complete	11%	19%
Socio-cultural Reasons	16%	16%
Medical Reasons	7%	2%
Other Reasons	2%	2%
Missing Information	11%	11%

*$p<0.05$

Continuation Categories

Table 4 presents a summary of the total number of women classified into each continuation category by their general reason stated for method removal. Within the sample, two-fifths of women accepted a new family planning method. Only 6% accepted another IUD or implant or received a tubal ligation and 34% accepted either an injectable contraceptive or COC. Three-fifths of women who removed an IUD or implant chose to discontinue method use. 28% of women disctontinuing in this sample are determined to be at no further need of contraception based on their cited general reason for removal. The remaining 32% of the sample is classified in the discontinue with remaining need category.

Among the reasons for removal of IUD or implant, women who cited "Side Effects / Medical Reasons" were the most likely to continue method use, with 66% of women in this category accepting a new method of contraception. Besides women who elected to return to fertility, women who cited "Socio-cultural Reasons" were least likely to continue method use, with only 23% of women in this category accepting a new method (Table 4).

In examining differences between continuation categories in terms of demographic and method-related factors, statistically significant differences exist between categories in terms of age, parity, time to method removal and the proportion of women within each category removing an IUD or implant early. Women who continue method use in this sample are generally older and higher parity than women who discontinue method use. They also have a longer mean time between insertion and removal and are less likely to remove a method early (prior to 24 months of use) (Table 4).

TABLE 4: Cross-tabulation of general reason for removal and continuation category among women removing a LARC method and descriptive characteristics of women in categories of contraceptive continuation, Pakistan 2015-2017

	Continuation Categories (n=1813)			
	Discontinue: *no further need*	***Discontinue:*** *remaining need*	***Continue:*** *IUD, implant, tubal lig.*	***Continue:*** *Injectable or COC*
Reason for Removal (% of row total)				
Return to Fertility (n=430)	100%	-	-	-
Side Effects / Medical Reasons (n=521)	-	34%	4%	62%
Socio-cultural Reasons (n=285)	29%	48%	1%	22%
Duration Complete (n=336)	-	42%	15%	43%
Other / Missing Information (n=241)	-	51%	11%	38%
Descriptive Characteristic (mean or % of column total)				
Age**	30.1	32.8	34.0	33.0
Parity**	3.7	5.2	5.6	5.4
Method Use				
IUD	12.3%	8.8%	10.8%	8.4%
Time to method removal**	27.5	30.2	36.5	32.3
Early removal of method*	28.9%	28.8%	16.7%	21.3%
Total (each continuation category) *n (% of sample)*	**512 (28%)**	**579 (32%)**	**102 (6%)**	**620 (34%)**

*p<0.05, **p<0.001

Classification of women into contraceptive continuation categories additionally allows us to consider the potential impact of the movement of women from met to unmet need on unintended pregnancy, abortion and unintended birth within this sample. Using a simple model, we estimate the number of unintended pregnancies which might be experienced by this group, and subsequent estimates of abortions, pregnancy loss and live births, in the 15 months following

their removal of an IUD or implant. This model is not meant to be exhaustive, but rather to provide an estimation of the impact of discontinuation with remaining need in this sample. Table 5 presents the probability assumptions utilized for our projections.

Table 5: Variable / probability assumptions for projecting the impact of discontinuation with remaining need among Pakistani women, 2015-2017

	Probability	Source	Pakistan specific
Status of women 3-months after discontinuation[a]			
Pregnant	0.26	Staveteig, 2015	Yes
Not using, high risk of pregnancy	0.31	Staveteig, 2015	Yes
Not using, low risk of pregnancy	0.13	Staveteig, 2015	Yes
Using sterilization	0.01	Staveteig, 2015	Yes
Using LARC method	0.11	Staveteig, 2015	Yes
Using other modern method	0.10	Staveteig, 2015	Yes
Using traditional method	0.08	Staveteig, 2015	Yes
Pregnancy, abortion and births			
Pregnancy within 12 months given no contraceptive use	0.92	Gnoth et al., 2003	No
Induced abortion, given pregnancy	0.25	Sathar, 2014	Yes
Spontaneous pregnancy loss, given pregnancy	0.15	Sathar, 2014	Yes
Live birth, given pregnancy	0.61	Sathar, 2014	Yes
Method Failure Rates[b]			
LARC method failure	0.02	Pakistan DHS 2012-13	Yes
Other modern method failure (COC, condom, LAM)	0.07	Pakistan DHS 2012-13	Yes
Traditional method failure	0.12	Pakistan DHS 2012-13	Yes

[a] *probabilities regarding the status of women three months after discontinuation are specifically for women who discontinue IUDs in the source study*

[b] *failure rates are for a period of 12 months and are calculated using a weighted average of individual method failure rates and proportion of use of that method*

We utilize a 15 month time period due to the availability of data on the contraceptive use status of women who discontinued an IUD three months after discontinuation in Pakistan.[5] We begin with the number of women who discontinue with remaining need in this sample (n=579) and predict their status in terms of contraceptive use or pregnancy three months after they have discontinued method use. Secondly, at this three month mark, we use the probability of pregnancy within a 12-month period to estimate the number of women who may become pregnant due to no method use or contraceptive failure within the next twelve months. Women who we estimate to already be pregnant at this three month mark or who are at low risk of pregnancy are excluded from this second step. Lastly, among women who we estimate will become pregnant (both within the initial 3-month period and subsequent 12-month period), we apply probabilities to estimate whether they experience an induced abortion, pregnancy loss or live birth. All the probability assumptions used in this projection are context specific to Pakistan except for the time to fertility estimate over a 12-month period.

We make several assumptions to simplify the projection, which include the assumption that after the 3-month period post-discontinuation each woman remains in the same category for the following twelve months. As indicated previously, this assumption does not reflect real-world fertility dynamics, given the frequency with which women move between categories of contraceptive use and between contraceptive methods. However, maintaining a static state for this 12-month period can still provide a glimpse into the impact of discontinuation among this sample. Secondly, although the probabilities regarding the status of women three months after discontinuation come specifically from an analysis of women who discontinued IUD use in Pakistan, we assume that these probabilities are similar for women discontinuing implant use as there is no comparable data regarding implant discontinuation in Pakistan. Lastly, the probability

utilized for women who are at low or no risk of pregnancy three months after discontinuation also include women who stopped method use due to a spouse traveling or dying, however in our sample those women are included in the group which discontinued at no further need. Therefore, our model might overestimate the number of women who are non-users with low risk of discontinuation and subsequently underestimate unintended pregnancies. Results of the simple model are presented in Table 5.

Table 5: Projections of pregnancy, abortion, and live births 15 months after discontinuing with remaining need among Pakistani women removing an IUD or implant, 2015-2017

Status of women discontinuing method 3-months post discontinuation	N	Outcomes within following 12-month period: Became Pregnant	Induced Abortion	Loss of Pregnancy	Live Birth
Pregnant	149	149	37	22	90
No use, low risk*	74	0	0	0	0
No use, high risk	182	167	42	24	101
Using sterilization	6	0	0	0	0
Using LARC method	62	1	0	0	1
Using other modern method	60	4	1	1	2
Using traditional method	47	6	1	1	3
	579	327	81	48	198

**Assumption that there is no risk of pregnancy among women who are at low risk (husband death, divorce, etc.)*

Based on our projection, at the 3-month mark following discontinuation, 149 women in the discontinuation with remaining need category are already be pregnant and an additional 178 women become pregnant in the following 12-month period. 81 of these women are projected to have an induced abortion, with a total of 198 live births resulting from unintended pregnancies.

We estimate that 18% of the overall sample of 1,813 women experience an unintended pregnancy, 4.5% an abortion and 11% an unwanted birth.

Although not included in this model, it is important to note that more women from this sample may move into unmet need from met need in the 15-month period included in this projection. This is a result of the high levels of method switching from IUDs and implants to injectables and COC (622 women in this sample), which have much higher discontinuation rates, particularly in Pakistan compared to other low-income countries. Based on the most recent 12-month discontinuation rates for these methods from the 2012-13 Pakistan DHS (60.7% for injectables and 56.4% for COC), we project that over the 12-month period following removal of an IUD or implant and switch, of the 622 women who switched to an injectable or COC, 21 may have an unintended pregnancy due to method failure and 176 may discontinue with remaining need. The effect of this discontinuation with remaining need in the subsequent year could be as high as 162 unintended pregnancies, 40 abortions and 98 unintended live births (data not shown).

DISCUSSION

In this study, we examine the factors related to removal of implants and IUDs by women in the Sindh province in Pakistan between October 2015 and March 2017 and provide estimates of the impact of discontinuation with remaining need in this sample over the 15-month period after discontinuation. While not intended as a formal comparison of program approaches, our results reinforce the claim that prioritizing increasing access to contraceptives among women with unmet need may not be enough to fully achieve a country's fertility reduction goals without additional support provided to women to continue method use. Although most unwanted fertility is still the result of unmet need for contraception, discontinuation is also a significant contributor. Even among women in this sample, who are presumed to have already overcome the barrier of being able to access a trained provider, discontinuation with remaining need was projected to contribute to an unintended birth for 11% of the total sample.

We should also consider the high percentage of women in this sample who, even with the presence of a trained provider, chose to switch to a short-acting method. Over one-third of our sample, after discontinuing IUD or implant use, chose to switch methods to COC or injectables. Injectable contraceptive methods have many benefits which explain their widespread and growing popularity. For instance, they are more convenient, can be used discretely by women not wanting their partners to be aware of their contraceptive use and don't require special skills for insertion or removal.[20] However, discontinuation rates for these methods are more than double that of IUDs and implants, making their contribution to unwanted fertility significantly higher than other modern methods.[10] Evidence regarding reasons for high discontinuation of injectable contraception is limited, though results from one qualitative study conducted in Kenya point to side-effects, method stock-outs, lack of cash to purchase methods, and provider/clinic

restrictions as common reasons for discontinuation of injectables.[21] Although we might assume that through the course of their reproductive life cycle, women would typically move from shorter to longer acting methods and then to a permanent method when they are sure they no longer want children, a review of 13 countries highlights that costly short-acting methods, especially injectable contraception, have become more widely used regardless of age and fertility intention.[20] Addressing high levels of discontinuation with remaining need may therefore necessitate an increased emphasis on other LARC methods with lower discontinuation rates, such as IUDs and implants. However, this emphasis should not come at the expense of women's method choice and ability to meet their individual fertility goals. Programs and providers have a responsibility to address the underlying factors preventing contraceptive continuation while remaining committed to a rights-based approach to family planning service provision.[22]

This leads us to ask what is feasible to address programmatically, both for Save the Children and other organizations looking to support women in continuing contraceptive use. For instance, when considering factors contributing to early method removal, nearly one-third of women in this sample who removed their IUD or implant prior to 24 months of method use indicated that the reason for removal was socio-cultural reasons, more specifically that their husband or a family member requested that the contraceptive method be removed. Examination of household dynamics in Pakistan points to the influence of both the husband and mother-in-law in decision making around contraceptive use. Perceived support from a woman's in laws has a high association with intentions to use methods of contraception.[23] Women are also ten times more likely to use FP if their husband approves.[24] There is therefore a recognition, based on these data, that community participation is an important strategy in addressing premature method removal, especially considering that potential clients may live in communities where socio-

cultural barriers to FP use or autonomous decision-making prevent them from exercising their right to access contraceptive information and services.[22] However, although early discontinuation of method use in this sample may be linked to socio-cultural factors, this is not always a feasible issue for programs to address with limited resources and a predefined scope.

Removing a method due to side-effects, on the other hand, seems to be linked in this sample with a higher likelihood of accepting a new contraceptive method and can be a viable target area for programs looking to address discontinuation with remaining need. Research regarding the cultural view of menstruation and bleeding in Pakistan over the previous 30 years reveals negative perceptions concerning amenorrhea as a side-effect of contraception.[25–28] However, simultaneously nearly three-quarters of Pakistani women in one survey indicated that they were unwilling to accept more bleeding as a side effect of contraception. This is likely in large part due to the restrictions placed upon Muslim women during the time of menstruation, when women are prohibited from bathing, visiting religious places, cooking, and praying.[25,29] Although women citing side-effects in this sample accepted a new contraceptive method at a higher rate than women citing other reasons, the majority (62%) of these women chose to switch to an injectable contraceptive or COC rather than continue with another LARC or permanent method. This implies heavy bleeding may be a significant barrier for Pakistani women in continuing the IUD and implant methods which are available to them. Additional approaches to addressing contraceptive discontinuation due to heavy bleeding, such as diversification of the method-mix, might be useful in this context.

Strengths and Limitations

One of the strengths of this study was the possession of a large and representative sample due to the collection of information from all eligible woman in every study site. This large

sample provided significant power to the calculation of associations between factors included in our analysis. However, a few limitations warrant discussion in this study. The small sample size of IUDs in comparison to implants resulted in limited capacity to compare across method and small group sizes when disaggregating for certain characteristics by contraceptive method. For the measurement of new FP method accepted, although data collectors copied information directly from the registers, a "blank" in the register may have indicated missing information for some clients. For purposes of this study we have assumed that all blanks represent women who did not accept a new FP method, but further examination of this could be necessary to ensure the validity of study findings.

There are also significant limitations to the accuracy and generalizability of our model, which provides only a general idea of the potential consequences of discontinuation with remaining need in this sample in terms of unintended pregnancies and births. Our assumption that women remain in a static state of contraceptive use or non-use for 12 months does not mirror our understanding of the frequency with which women start, stop and switch method use in the real world. Furthermore, the probabilities utilized for the status of women three months after discontinuing method use are specifically for IUD discontinuation due to the limited availability of data on implant use in Pakistan. These probabilities also overlap in some areas with groups of women that we have already separated out during our classification of women into continuation categories (such as women who are at low risk of pregnancy due to a spouse dying or traveling). Lastly, because data was only collected about women who removed an IUD or implant and not all women who started an IUD or implant, we cannot calculate overall discontinuation rates for these methods from this study.

Conclusion

We found that among women discontinuing an IUD or implant within the eight facilities in Pakistan examined in this study, self-reported side effects related to method use were a significant barrier to continuation of an IUD or implant. A substantial proportion of women in this sample also removed a method of contraception specifically at the request of their husband or another family member, indicating a need for additional community outreach to address discontinuation for cultural reasons. We also project the impact of discontinuation with remaining need in this sample in terms of unintended pregnancy, abortion and unintended birth, concluding that supporting women to continue method use is an essential component in reducing unwanted fertility. Lastly, even among women continuing method use, high rates of method switching to injectables and COC in this sample, a phenomenon mirrored in other developing countries worldwide, reinforce the need to better understand and address underlying reasons for switching from long-acting to short-acting methods of contraception.

Findings from this study establish the need for development of programmatic strategies to address how cultural considerations and constraints around menstrual bleeding may limit use of LARC methods. Our findings also point to a need for increased community and household involvement in family planning outreach and counseling to counteract premature method removal. Based on the outputs of our model, we provide support regarding the importance of effective and accessible family planning counseling and follow up and propose further examination of factors influencing high levels of discontinuation with remaining need and switching to self-discontinued methods in Pakistan.

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